(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 1 068 886 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
17.01.2001 Bulletin 2001/03

(51) Int Cl.[7]: **A63H 33/08**, A63H 33/12

(21) Application number: **00500124.3**

(22) Date of filing: **13.06.2000**

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **18.06.1999 ES 9901363**

(71) Applicant: **Interlander Patermann, S.L.**
08029 Barcelona (ES)

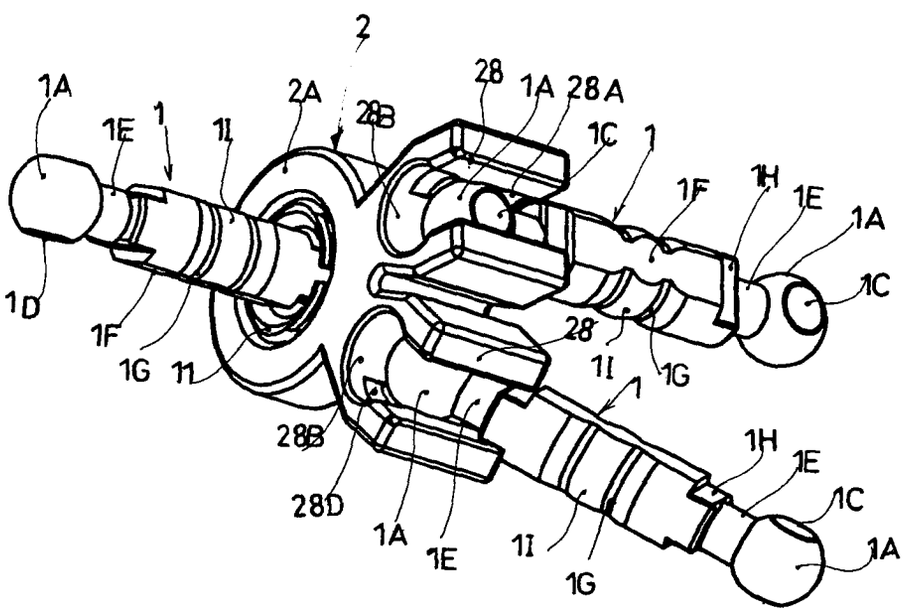
(72) Inventor: **Guitart Camps, Francisco**
08029 Barcelona (ES)

(74) Representative: **Manzano Cantos, Gregorio (ES)**
Cabinet Manzano
Embajadores, 55-6.I
28012 Madrid (ES)

(54) Modular toy construction

(57) MODULAR TOY CONSTRUCTION, composed of a set of structural members, consisting of rod-plugs with end and intermediate anchoring plugs; mixed square prismatic bars and emptied inside with intermediate anchoring gudgeons and external anchoring gudgeons or external anchoring plugs; a ring or radial gudgeons pinched in "U", with multiple integral or partial development, recessed internal fittings and a equicentral housing device with means of jibbing means related to each other together with different supplements completing the formation of structures and exact regular dihedric and polyhedric volumes.

Fig-1



EP 1 068 886 A2

Description

[0001] The invention refers to a modular toy construction, consisting of a series of basic parts shaped to assemble or fit them to construct complex toy structures, as well as, by means of developments based on the parts themselves, to likewise construct complementary parts or others giving a determined finish, functionality or movement to the combination or structured body.

[0002] A modular construction, according to the invention, which is essentially based on the development of a minimum of parts that may be assembled or recessed which, being provided with beneficial linking means permitting the establishment of unions, knots, connections or joints of, practically any shape or regular geometric frame, both straight and curved, being possible that they be flat, spherical, discoidal, dihedric or polyhedric.

[0003] According to the invention, said parts may be sized with the measurements required, although this capability is attributed to the main members of the structure, whose over sizing does not demand special changes in its manufacture, that is, that by maintaining its specific design joints the only variable will be its length, which would be repeated as many times as may be fitted in said size of the assembly, linking or recessing means, corresponding to this part.

[0004] Therefore, according to the invention, the core gudgeon component, integrated by a ring of anchoring members, a ring which is known, but in its constructive solution, will be manufactured by means of a complete or partial annular development, being possible to count with partial toothing of a member, two or more until the total permitted by the ring diameter or radius.

[0005] A specific solution of the invention is that the plugs are manufactured with a mixed or ambivalent part, such that its assembly plug ends consist of a body with gudgeon devices according to that admitted by its length, with an anchoring solution which is the same the assembly gudgeon ring has.

BACKGROUND OF THE INVENTION

[0006] The system of the invention is based on the toy construction development patented in the USA by Glikman, having its most representative version in US patent number 5350331 which is the culminating point, US patent number 5061219 and US patent number 5137486 which mainly comprise a connection component provided with one or several radial swinging arms and a set of structural components between them to carry out a structure system identified with the geometrical principle of complementary triangles, comprising a lattice or framework, where the hypotenuse of the base triangle is the leg of the associated complementary triangle. The US Patent No. 08/725.095 is a construction set based on a set of parts, joined by assembling their members, among which, there is a gudgeon catch ring with anchorage that may be complete at 360° or proportionally, passing through the entire scale, it may be a part of the latter at 45° and a rod or plug which at its ends has assembly or fastening gudgeons.

[0007] Other fittings are subdivided from this set of parts. The catching is carried out by means of a side fastening which, by slightly forcing the small elastic stress of the part, the teeth interlock in a throat, gudgeon anchoring of the rod or set plug.

[0008] This assembly allows the rod to rotate. Also the gudgeon part has a central or equal central housing for a rod, especially a free housing of the rod.

[0009] In the other reference, patent EP No. 97500115.3 "TOY CONSTRUCTION SYSTEM", also containing a set of parts that may be assembled, where the union is articulated, being possible to pivot over the same point of union, on counting with a spheric plug member and a trough consisting of two spherical caps and where the spherical plug head has a cylindrical crest forming the pivoting point itself.

[0010] Another solution of this system is that the plug parts integrate a ring of radial plug members, with a circular core provided with a circular mouth endowed with slots for jibbing of other parts which belong to the ring and which compose assembly plug volumes, according to the different coordinated axis of a regular geometric body.

INVENTIVE STEP

[0011] The invention contributes a new anchoring system between the parts to be assembled, having the capability of sufficient fastening and non-detachability among the assembled parts; enabled to articulate with the shape of a joint or to rotate in any of its interlocking points, between the receiving gudgeon component ring and the plug end of the rods.

[0012] It is also intended to enable said rods with the body provided with its own intermediate or equidistant means, according to a fixed elevation as a value of the distance satisfied in the entire system, to be fastened with the possibility of locking said ring with its own means.

[0013] It is also intended that said ring provides means, specifically its equicentral housing, with a special shape to freely receive said rods and other complementary members with the possibility to rotate or not.

[0014] Another capability of the invention is to contribute mixed bars having ends with assembly plugs. It consists of a body having gudgeon housings to receive rods of the previous plug type or other parts under the same conditions as the equicentral ring means.

[0015] Another idea of the invention is that the equicentral gudgeon means of the rings have two different versions, regarding the receiving means of other parts of the assembly and, in another version, the mentioned gudgeon means consist of non-detachable assembly plug means, to be assembled on the mentioned equi-

central gudgeon means or on other intermediate gudgeon means of the mentioned mixed bars.

[0016] Another capability of the invention is to develop mixed curvilinear bars with or without anchoring plug means and with a different number intermediate gudgeon housings of this type.

[0017] Another functionality of the project is to incorporate equivalent parts, both with peripheric plug means of the mentioned type and circular gudgeon means of the mentioned type.

[0018] It considers the contribution of parts to form the housing or body of the objects that may be obtained with the mentioned construction members which we will call superficial parts.

[0019] Therefore, the essential idea of the invention is to develop constructions with a greater structural and functional complexity where the shapes and their functional behaviors approach more reality or the tridimensional toy specifically constituted as such, and not by means of a construction system by parts.

[0020] Another basic purpose of the invention is therefore that of constructing regular geometric volumes, such as a regular straight hexahedral, a regular spherical body, a regular cylinder, or a mixed body with possible combination of the latter.

DESCRIPTION OF THE INVENTION

[0021] According to the invention, the set of parts integrating the system are the mentioned plug part, a rod having spherical members at its ends, basically oblate on two opposite planes, provided for their assembly on the anchoring or assembly gudgeon members, such that the oblate parts, limit the head diameter to reconduct its entry in the gudgeon anchoring members, rotating the rod a quarter of a turn. Said head remains housed in the gudgeon member with the possibility of rotating and articulating being doubled with a suitable inclination, towards one side or another of the gudgeon anchoring member by the two open parts of the mentioned gudgeon anchoring member.

[0022] A mentioned anchoring gudgeon member, which specifically is a "U" fork basically having a substantially spherical trough and an entrance with less diameter than said trough. An entrance through which the oblate planes of the spherical head of the rod or plug member pass, as well as a head that remains housed and pinched in the mentioned spherical trough and which, rotating a quarter of a turn, remains interlocked, preventing that it detaches unless that the opposite maneuver is made or it is pulled forcing the pinching.

[0023] A spherical trough, according to the invention, having small salients on one side or other of the trough, respectively situated in an area next to their respective entrances and a diagonally opposite or inversely antagonic position, such that whatever the selected entrance of the fork, the spherical head remains restricted or retained by two small interlocking stops, preventing the head from detaching alone, but not preventing its rotation or articulation.

[0024] Essentially, the diagonally opposite and inversely antagonic arrangement of the salients within the spherical pinching trough, assures an easy shake out of the part, without forcing it, being possible to open the azial mold, antagonically and regularly.

[0025] The mentioned plug member in the form of a rod, which is cylindrical rod likewise oblate in two opposite coplanar planes with the head oblates and that the cylindrical part consists of equidistant sections, as many permitting the extension of the rod, comprising as many other specific sections that may likewise freely assembled or fixed on the gudgeon anchoring or housing of the remaining gudgeon parts, in a crossed position, whether centered or uncentered, under the same conditions as the mentioned plug head, that is, it being possible to rotate or articulate in the two possible directions across the two entrances of the fork.

[0026] The initially mentioned plug rods, beneath the neck of the spherical assembly heads, have some straight side undercuttings so that, the articulation of the plug rods in the anchoring or pinching housings of the rings and mixed bars, articulate in the same direction as the openings of said forks, preventing articulation in opposite directions.

[0027] A gudgeon part which is a circular ring with as many gudgeon anchoring or pinching forks as may fitted in the complete diameter of the latter or that may be partial rings equipped with one, two, three or more forks or as many that may form the complete ring, constituting multiple angles of 45° until completing the 360° of the ring or in as many combinations as may fit in the geometric sections of this scale.

[0028] Said rings, according to the invention, consists of a circular core provided with likewise equicentral circular housing. A housing that has a regular square version and another, which is made in an angular core which, internally is octagonal and which has less height than the ring core, but which is coplanar with one of the faces of this ring.

[0029] In said housings, it is possible to install the mentioned free or fixed plug rods by means of a linch pin.

[0030] For this purpose, the invention contributes two sockets having an external adjustable configuration to the respective housing and an internal configuration provided with a spline to optionally immobilize rod installation.

[0031] In this case, the spline is a rectangular slot for jibbing of a specific plug member, related to the mentioned pinching gudgeon means, a specific component which among others, may be a cylindrical pin or bushing integrated by three lugs arranged at 120° and with different lengths; two of them shorter and equal to each other with ends having chamfered edges and a prismatic triangular section and the other, longer, of the same section and finished by an external lateral salient. The

difference of length between one and the other is equivalent to the height of the base from which the former project. This base forms a relative elevation with the support face over the gudgeon fork.

[0032] On the one hand, this configuration permits that the lateral salient of the long lug catches against the opposite edge of the circular housing, fitting in the spline and the other, that the other equal plug member, may be housed through the opposite side of the housing, being respectively imbricated, being possible to fit two plug parts of this type, on one and other side of the housing.

[0033] A gudgeon member, according to the invention, associated with a pin or cylindrical bushing of the lugs at 120°, where the support plane consists of a gudgeon housing, which is a proportional part of the circular housing of the ring and of the bars, and which especially in its interior, in the straight horizontal support plane, has a partial and eccentric semi-cylindrical salient for recessing of a respective groove foreseen in a prismatic lug, associated to a complementary gudgeon fork member having a dihedric base to form a spherical body of gudgeon fork members.

[0034] Another essential feature of the invention is that the mentioned plug member is a mixed bar which, in one case is: a rod having plug components at its ends formed by said spherical heads and a rectangular hollow prismatic gudgeon body which, internally, has as many circular housings with linch pins as admitted by the length of the rod. Some housings whose centers are equidistant from the edges of the spherical plug heads and also equidistant from the centers of other housings located in the axis of the bar, centers which in all cases, have the same distance.

[0035] Another detail is that the invention in another case, has other bars which having the same characteristics as those mentioned and a single intermediate gudgeon housing at their ends, has gudgeon pinching means with equal interlocking salients for the oblate heads of the plug rods.

[0036] This mixed bar in association with a plug rod will permit articulation at 90° and up to 180° of both members.

[0037] Another aspect is that the circular housings with spline integrated in the mixed bars are included in the bars with an equidistant separation in relation to their respective external edges.

[0038] These separations permit the attached overlapping of said prismatic bars to form platforms. For this reason, the invention incorporates a cylindrical bushing divided by an annular arista over which, the two adjacent overlapped bars make a stop, while the two parts of the bushing which fit in the respective rod housings, consist of two ruling grooves to provide the bushing with certain elasticity to adjust with relative pressure in said housings.

[0039] These are also two bushings integrated by a rib or octagonal or circular arista separating two equal tubular parts with grooves, according to a ruling cut and, in the mouths, tangential salients extended over the edge of the latter forming anchoring ratchets hooking on the opposite external face of the housings where they are fitted.

[0040] Additionally, the invention contributes a gudgeon pinching part, also in fork, whose base is an anchoring claw which is mounted over the closed surfaces of the mixed bars in which, the separations between the edges of said faces and housings, serve as an anchoring for some lateral ratchets of said claw, whose ratchets in "C" are closed over the edges of the mentioned mixed bar.

[0041] A complementary pinching gudgeon part, according to the invention, having the mentioned fork shape, consists of a cylindrical plug pin consisting of two equal shoulder lugs, like pins, with the externally chamfered tips and with horizontal salients beneath these tips to be fitted in the central circular housing of the gudgeon member, where the chamfers aid assembly and the salients are ratchets for anchoring against the opposite edge of the mentioned housing.

[0042] According to the invention, the different auxiliary parts of the assembly to complete the formation of the different objects that may be constructed with this construction system, include the following:

[0043] A spherical oblate cap with the shape of a hat fitted as a finish of the oblate spherical head of a plug rod and consisting of a tubular neck cut in two symmetrical halves with respective means for internal interlocking.

[0044] A meshing which is a discoidal part with a toothed perimeter of cylindrical sections and an equicentral housing with spline of the mentioned type which may be fitted in a plug rod, like an axis, which may be immobilized with a special linch pin for this purpose.

[0045] A linch pin which is a flat shank with the same section as the spline, joined to a semicircular part equivalent to the half of the mentioned housing, provided with a crest over the external face to facilitate its assembly-disassembly.

[0046] A meshing, according to that mentioned, that has as a central body a complete ring of anchoring or pinching gudgeon forks with the mentioned central housing and spline.

[0047] A wheel for a tyre integrated by a central member which is a complete ring of mentioned pinching gudgeon forks, over which two symmetrical rings with a semi-conical profile are fixed and each one of which is provided with spherical head plug members which interlock in respective pinching forks, for example, in four pinching forks at 90°. Two rings, overlapped in the gudgeon ring form the channel for tyre installation.

[0048] A shock absorber consisting of a cylindrical-tubular sheath with a spherical plug head where a spring and a piston are housed consisting of a plug rod member completed by a gudgeon bushing where an internal tongue is housed and interlocked having two lateral

ratchets guided and anchored in two longitudinal parallel grooves opposite the sheath, where the spring is housed.

[0049] A linking and articulation part between mixed bars, gudgeon-gudgeon having external spherical plug members and pinching gudgeon members in end fork. A part therefore having, a plug part of this type and a gudgeon part of this type and consisting of a supplement to complete the measurements, always proportional, of the system. A supplement which is installed between the gudgeon end of the fork and the plug member of the link part, being embedded in the neck of this plug part like a staple.

[0050] Another complementary part of the structure in which the mixed rectangular prismatic bars with circular integrated housings and plug ends are curved, with similar dimensions to the straight ones, may be supplemented by the link, connection or union parts referred to.

[0051] Another link part consisting of two plug members with a spherical head joined by a thin plate of the same format and size as the mixed prismatic parts.

[0052] A set of superficial, flat or curvo-parabolic parts having regular polygonal formats proportional to the measure given by the different parts of the structure and provided with anchoring plug means, such that said spherical or simple or ratchet heads with catching to fasten on the separations of the shoulders of the mixed parts.

[0053] The plug means of the spherical head are arranged in the flat superficial parts which, moreover, equicentrally, consist of the mentioned circular housing with spline. The ratchets are arranged over the edges of the superficial curvo-parabolic parts.

[0054] The flat parts are fitted on the structure to close the panels, walls or surfaces of the object which is desired to form or to form the housing, bottom, cockpit or body of the object in question.

[0055] The flat parts are mainly, quadrangular, octagonal or semi-octagonal parts cut by a diagonal or straight plane; others with a polygonal-octagonal shape and others, semi-octagonal; others quadrangular and, by multiplying or demultiplying the polygons to obtain shapes of different dimensions and other polygonal shapes, such as semicircular, circular or others.

[0056] The basic superficial arco-parabolic parts have shapes with a triangular, quadrangular, octagonal, rectangular or other developments in shape of a spherical sector at 90° and another complementary, increasing or decreasing the measurements of the latter.

[0057] The combination of the mentioned structural parts, permits respective polyhedric volumes to be constructed such that a regular straight hexahedron and a sphere, as well as other volumes equivalent to those given as examples in the illustrations of the patent, may be formed. As well as different passive or active structures with different articulated or mobile organs. Vehicles of two and four or more wheels. Aerodynamic vehicles, as well as articulated bodies, constructed with a combination of the mentioned parts. Likewise, with the latter, mechanized housings are constructed, by means of motorized complements, supplying energy or components of this type, to make the operation of these sets automatic.

[0058] A more extensive idea of the essential features of the invention will be made as follows, by referring to the drawings attached to this specification, in which schematically and only as an example, the preferred details of the invention are shown.

[0059] In the drawings:

[0060] Figure 1 is a perspective view of an assembled set of plug rod members and gudgeon ring.

[0061] Figure 1A is a sectioned view along the line I-I of the view 1B.

[0062] Figure 1 B is a plan view of figure 1A.

[0063] Figure 1C is a view of detail A of figure 1A.

[0064] Figure 1.0 is a perspective view of the mixed bar with gudgeon pinching ends.

[0065] Figure 1.0A is a perspective of the mixed bar with spherical plug ends.

[0066] Figure 1.0B is a plan view of figure 1.0.

[0067] Figure 1.0C is an elevated view at 90° of figure 1.0B.

[0068] Figure 1.0D is a front elevated view at 90° of figure 1.0B.

[0069] Figures 1.0E, 1.0F and 1.0G are similar views to the three previous ones of figure 1.0A.

[0070] Figure 1.1 is a plan view of the mixed bar with pinching gudgeon ends and an anchored plug rod.

[0071] Figure 1.1A is an elevated side view of figure 1.1.

[0072] Figure 1.1B is a view sectioned along the line A-A of figure 1.1A.

[0073] Figure 1.2 is a plan view of plug rod parts and mixed bars of different sizes with plug ends.

[0074] Figure 1.4 is an elevated side view of the articulated joint of the parts of figure 1.1.

[0075] Figure 1.4A is a section along the line B-B of the figure 1.4.

[0076] Figure 1.4B is an elevated side view at 90° of figure 1.4.

[0077] Figure 1.4C is a view in section along the line C-C of figure 1.4B.

[0078] Figure 1.4D is a view of detail A of the figure 1.4C.

[0079] Figure 1.5 is a view cut by the line D-D of the figure 1.5A.

[0080] Figure 1.5A is an elevated view of the union at 90° of the parts of figure 1.4.

[0081] Figure 1.5B is a view cut by the line E-E of figure 1.5A.

[0082] Figure 2 is a perspective of the pinching fork ring and plug rods in the octagonal core version.

[0083] Figure 2A is a view cut by the line F-F of figure 2C.

[0084] Figure 2B is a view cut by the line G-G of figure 2D.

[0085] Figure 2C is a plan view of figure 2A.
[0086] Figure 2D is a plan view of figure 2B.
[0087] Figure 2E is detail A of figure 2A.
[0088] Figure 2F is detail B of figure 2B.
[0089] Figure 3 is a perspective of the pinching fork ring in the octagonal ring version and mixed bars with spherical plug ends.
[0090] Figure 3B is a view cut by the line H-H of figure 3B.
[0091] Figure 3B is a plan view of figure 3A.
[0092] Figure 3C is the increased detail A of figure 3A.
[0093] Figure 4 is a view cut by the line J-J of figure 4A.
[0094] Figure 4A is a plan view of mixed bars of figure 1D linked by a plug rod.
[0095] Figure 4B is a plan view at 90° of Figure 4A.
[0096] Figure 4C is a plan view of the plug rod of figure 4B.
[0097] Figure 5 is a plan view of a mixed bar with two partial complements fitted on crossarm.
[0098] Figure 5A is an elevated view at 90° of the above once dismantled.
[0099] Figure 5B is a perspective of figure 5A.
[0100] Figure 6 is a view cut by the line L-L of figure 6A of the union of said mixed bar and the mentioned complement.
[0101] Figure 6 A is an elevated view at 90° of figure 6.
[0102] Figure 6B is detail A of figure 6.
[0103] Figure 6C is a plan view of the mentioned union of figure 6.
[0104] Figure 6D is the section along the line K-K of figure 6C.
[0105] Figure 6E is detail A of figure 6 D.
[0106] Figure 6F is a perspective view "foreshortening" of the mentioned complement.
[0107] Figure 6G is a perspective view of the union or imbricated assembly of two complements of figure 6F.
[0108] Figure 6H is detail A of figure 6G.
[0109] Figure 6I is detail B of figure 6G.
[0110] Figure 7 is the perspective of a fitted semi-ring of pinching gudgeon members with two complements incorporated of multiple parts of those shown in figure 6F.
[0111] Figure 7A is a dismantled perspective of figure 7.
[0112] Figure 7B is detail B of figure 7A.
[0113] Figure 7C is a perspective of the complement of multiple pinching elements.
[0114] Figure 7D is a plan view of figure 7C.
[0115] Figure 7E is detail A of figure 7C.
[0116] Figure 8 is a view cut along the line M-M of figure 8A of the union of two mixed bars by a symmetrical linking bushing.
[0117] Figure 8A is a plan view of figure 8.
[0118] Figure 8B is a perspective view of figure 8A, once dismantled.
[0119] Figure 9 is a view cut along the line N-N of figure 9A of the union of a partial member of the pinching gudgeon fork ring with another partial member of the latter and a radial complement, jibbed in the latter.
[0120] Figure 9A is a plan view of figure 9.
[0121] Figure 9B is detail A of figure 9.
[0122] Figure 9C is an exploded perspective of the combination of figure 9.
[0123] Figure 9D is a mounted perspective of the combination of figure 9C.
[0124] Figure 9E is a mounted perspective of a spherical set with the repeated combination of figure 9.
[0125] Figure 9F is an exploded perspective of the set of figure 9E.
[0126] Figures 10 to 10G are perspectives of the gudgeon ring with pinching forks and free octagonal core with simple or multiple projections at 45° from the pinching element.
[0127] Figure 11 is a view cut along the line N-N of figure 11A of the link by octagonal bushing of two parts of figure 10.
[0128] Figure 11A is a plan view of figure 11.
[0129] Figure 11B is detail A of figure 11.
[0130] Figure 11C is an exploded perspective view of the set of figure 11.
[0131] Figure 11D is a plan view of the linking part of the set of figure 11.
[0132] Figure 11E is a plan view of a solution similar to figure 11 with a cylindrical link.
[0133] Figure 11F is an exploded perspective of the set of figure 11E, once dismantled.
[0134] Figure 11G is a plan view of the linking element.
[0135] Figures 12 to 12G are perspective views of the basic pinching gudgeon members, until the complete circular ring in an octagonal version with angles or multiples of the latter at 45°.
[0136] Figures 12H and 12M are other simple pinching or multiple representations at 45° in different versions to those of the previous figures.
[0137] Figures 12N-12Ñ are perspectives of the gudgeon ring part of figures 12E-12F with pinching or multiple elements at 60ª.
[0138] Perspectives 12O-12P belong to the same part as above with a triple lug plug member.
[0139] Figures 12Q-12T are perspectives of other versions of figures 12D-12P.
[0140] Figures 12U-12X are respective perspectives "foreshortening" referring to the previous figures.
[0141] Figure 13 is a perspective of a mixed bar member with a side set and surface knotting to the marginal edges of said mixed bar.
[0142] Figure 13A is a plan view of figure 13.
[0143] Figures 13B-13D are perspectives of said anchoring part seen from different angles.
[0144] Figure 15 is the perspective of a gudgeon ring set acting as a mixed anchoring part with a double lug boss, incorporated in the central housing of the latter.
[0145] Figure 15A is an elevation view of figure 15.
[0146] Figure 15B is a view cut along the line O-O, of

figure 15A.

[0147] Figures 15C-15E are different perspectives of the anchoring member with cylindrical double lug boss.

[0148] Figure 16 is a view cut along the line P-P of figure 16A of the union of a cap to the spherical head of plug rod.

[0149] Figure 16A is an elevation view at 90° of figure 16.

[0150] Figure 16B is a perspective of the mentioned cap.

[0151] Figure 16C is a view of detail A of figure 16.

[0152] Figure 17 is a view cut along the line Q-Q of figure 17A of the union of a meshing and a plug rod and its immobilization linch pin.

[0153] Figure 17A is an elevation view of figure 17.

[0154] Figure 17B is a perspective of said parts, once dismantled.

[0155] Figure 17C is an elevation view of a set of meshings of the mentioned type combined with a mixed bar in form of a connecting-rod.

[0156] Figure 17D is a perspective of the previous set.

[0157] Figure 17E is an elevated view of a wheel, consisting of a rim, composed of a core which is a gudgeon ring, according to the invention and two hoops or discoidal saucers fitted on the latter.

[0158] Figure 17F is a perspective of the previous set, once dismantled.

[0159] Figure 17G is the perspective of a shock absorber.

[0160] Figure 17H is an elevated view of said shock absorber.

[0161] Figure 17I is a view cut along the line R-R of figure 17H.

[0162] Figure 18 is a plan view of a mixed bar with gudgeon ends, connected to another mixed bar, gudgeon-plug, by means of a mixed joint and immobilizing supplement like a staple.

[0163] Figure 18A is a view at 90° of figure 18.

[0164] Figure 18B is a dismantled perspective of the set of figure 18.

[0165] Figure 19 is an elevated view of mixed curvilinear gudgeon-plug bars of different measurements, fitted on a bracket of mixed bars, gudgeon-gudgeon and gudgeon-plug.

[0166] Figure 19A is a perspective of the previous set.

[0167] Figure 20 is a perspective of a superficial parabolic-triangular arch.

[0168] Figure 20A is detail A of figure 20B.

[0169] Figure 20B is a view cut along the line S-S of figure 20C.

[0170] Figure 20C is a plan view of the mentioned part of figure 20, hooked onto the edges of the curvilinear gudgeon-plug mixed bars.

[0171] Figure 20D is a plan view at 180° of the above.

[0172] Figure 20E is a lower plan view of an arched triangular plate fitted on a respective set of rectilinear and curvilinear mixed bars.

[0173] Figure 20F is a perspective of the mentioned triangular sector, seen along the lower face.

[0174] Figure 20G is an upper plan view of the installation of a straight triangular plate.

[0175] Figure 20H is a lower plan view at 180° of figure 20G.

[0176] Figure 20I is an upper plan view of figure 20E.

[0177] Figure 21 is an elevated view of a regular hexahedric block or cube.

[0178] Figure 21A is a perspective of the previous object.

[0179] Figure 21B is a plan view of a regular hexahedron or cube in another constructive solution according to the invention.

[0180] Figure 21C is a perspective of the set of figure 21B.

[0181] Figure 21D is a view along one of the sides of the regular hexahedron or cube, according to another constructive solution of the invention.

[0182] Figure 21E is a perspective of the set of the previous figure.

[0183] Figures 22 to 39, inclusive, represent different examples of objects built according to the invention.

DESCRIPTION OF THE DRAWINGS

[0184] According to the multiple representations described, the parts and their different sub-parts and set assembled by the latter are identified by the respective references or alphabetic numbering and are:

1.- Plug bar with plug assembly members.
2.- Ring with radial anchoring or pinching members.
3.- Mixed, gudgeon-gudgeon bar.
4.- Mixed, gudgeon-plug bar.
5.- Octagonal core ring (Figure 2), with radial pinching members.
6.- Mixed anchoring gudgeon-plug member (Figure 5).
7.- A complementary linking member of the gudgeon ring (Figure 7).
8.- A mixed bar connecting cap (Figure 8).
9.- A radial gudgeon supplement with half jibbing plug (Figure 9).
10.- Octagonal cap member of pinching ring connection of the polygonal core and free-fixed coupling of plug rod (1) (Figure 11).
11.- Cylindrical cap member for free or fixed housing of plug rod (1) (Figure 11-E-F).
12.- A ring with pinching gudgeon members at 60° (Figure 12H-P).
13.- A superficial collateral connecting part for mixed bars (Figure 13).
14.- A spherical finishing cap for plug rods (Figure 16).
15.- A mixed pinching linking part with plug element (Figure 15).
16.- Meshing jibbing member with plug rod (1) (Figure 17). 17.- Meshing (Figure 17).

18-18'.- These are discoidal rim saucers or hoops for a wheel (Figure 17F).
19.- Wheel (Figure 17E).
20.- Tyre (19) (Figure 17F).
21.- Shock absorber (Figure 17G).
22.- Shock absorber spring (Figure 17G).
23.- Shock absorber piston or link member (21) (Figure 17G).
24.- Connecting joint for mixed, gudgeon-gudgeon and gudgeon-plug bars (Figure 18B).
25.- Immobilization staple (Figure 18G).
26.- Mixed curvilinear gudgeon-plug bars (Figure 19).
27.- A superficial triangular parabolic arch part (Figure 20).
27D.- A superficial arched triangular part, a superficial straight triangular part.

PREFERRED EMBODIMENT OF THE INVENTION

[0185] One of the main members of the system, the plug bar (1) (Figure 1-1C) is the cylindrical bar with spherical plug members at its ends (1A-1B) having oblations (1C-1D) on opposite sides and are joined to the rod body (1) by cylindrical necks (1E). Likewise, the cylindrical body of the rod has opposing straights facets (1F and 1G) located in the same plane as the oblations (1C-1D), that is, coplanar with the oblation (1C-1D). The trunking between neck (1E) and the body (1) are symmetrical slots (1H) with respect to the facets (1F-1G).

[0186] The rod (1) has intermediate spherical sections (1I), in sufficient number to fit in the extension of the rod (1) limited by transverse notches (1G).

[0187] Another basic member of the assembly is the ring (2) (Figures 1) of the gudgeon assembly. It consists of a central annular organ (2A) with concentric housing (2B) which axially provides a cap (11) for the free or fixed assembly of the rod (1).

[0188] The ring (2) consists of radial anchoring or pinching means (28) with the shape of a "U" fork, having a straight outer section (28A) and another cylindrical inner section (28B) which is of greater radius than the straight section (28A).

[0189] Inside the cylindrical section (28B) there are interlocking means. These are ribs (28D-28E) located on the ends of this section, in diagonally opposite eccentric positions, among which the spherical head (1A-1B) of the plug rods is interlocked (1) (Figures 1A-1C) with the possibility of rotating or articulating or detaching in any position.

[0190] Regularly, if the oblations (1C-1D) are made to match with the opening (28A) of the fork (28) and are forced by a slight deformation, due to the difference between the diameter of the spherical head (1A) and the cylindrical housing (28B) of the pinching (28), it is only a 1/4, but sufficient for it not to detach by accident.

[0191] The arrangement of the ribs (28D-28E) is especially beneficial for manufacturing the part, allowing the shake out to be regular and axially antagonic without deformation of the part and without exceptional mechanical solutions in the mold.

[0192] The entrance (28A) of the external fork (28) of less radius, obliges the spherical heads (1A-1B) to be introduced by their oblate faces (1C-1D); once inside the section (28B), the heads (1A-1B) may freely articulate like a joint. The slots (1H) limit the penetration of the rod (1) in the pinching fork (28), obliging the position of the slots (1H) to be sought to be able to articulate the rod (1) through the open areas of the fork (28) (Figures 1.4-1.4D).

[0193] Through the intermediate spherical sections (1I), the rods (1) are fitted in the caps (19) contained in the housings (2B) of the rings (2) with possibility of rotating, in one option, or being immobilized by the solution of figures (17-17B).

[0194] Other main parts are the mixed bars (3) and (4) (Figures 1.0 and 1.0G). They are prismatic bars with a hollow rectangular section. The mixed bar (3) is a bar with pinching gudgeon ends (28) and the mixed bar (4) is a gudgeon bar with plug ends (1A) for anchoring.

[0195] The mixed bar (3) has at both ends, pinching gudgeon members with "U" fork (28) with all its precise characteristics. And a single intermediate gudgeon organ which is a housing (2B) with a respective jibbing slot (2C).

[0196] This is a member designed to receive a rod (1) with an articulated set until 180° at each end. And a rod (1) in the intermediate housing with free or fixed pinching.

[0197] The mixed bar (4) has at both ends spherical plug members (4A-4B), without oblations, but joined by means of the mentioned neck (1E) . Also equidistant and intermediate, there are the mentioned housings (2B) with respective slots (2C) for jibbing, sufficient of the latter at the same distance and in a straight line as fit in the length of the bar (4).

[0198] Through the respective open faces (3A-3B) and (4C-4D) of the mixed rods (3-4) there are shoulders (3C-4E) for anchoring and fastening of different supplementary parts.

[0199] Figures 1-1B show the assembly of a mixed bar (3) and a plug rod (1).

[0200] Figure 1.2 shows different plug rod (1) members and mixed bar (4) in different extensions and versions of intermediate equidistant housing members (2B).

[0201] A differential version of the gudgeon ring with radial pinching members (5) is formed by an annular element (5A). An annular element (5A) coplanar with the a body surface (2) of the ring and having a height which is 50% of the body (2).

[0202] The annular member (5) has an equicentral housing (5B) and a lower octagonal polygon socket (5C). That is, a division at 45° matching each one of the pinching members (28) of the ring (2).

[0203] Figures (2-2F) show the set of a pinching gudg-

eon ring (5) consisting of a triple set of forks (28) where plug rods (1) are fitted, assembled both through their spherical heads (1A) and their intermediate members (1I).

[0204] Figures 3-3C represent the associated ring (5) with mixed bar members (4) having plug ends.

[0205] Figures 4-4C show a set of mixed bars, with pinched gudgeon ends (3) joined by a plug rod (1) with multiple intermediate spherical sections (1I).

[0206] The supplementary linking part (6) shown in figures 5-5B and 6-6E enabled to be fitted in a circular housing (2B) with a spline (2C), whether a circular housing (2B) with spline (2C) of a gudgeon ring (2) or mixed bars (3-4), is comprised by a pinching fork body (28) with a base endowed with partial fretting (6A). A fretting which is a proportional part of a fretting (2B) internally divided in two parts and a plug member which is a cylindrical boss (6B) consisting of three unequal lugs. At 120°, a longer lug (6C) and two equal shorter lugs (6D) joined by a free base (6E), free or exempt in its space (6F) not occupied by the lugs (6C-6D).

[0207] The lugs (6D) are finished in chamfered edges (6G) and the lug (6C) is finished in a rib (6H) transverse to said lug.

[0208] The cylindrical boss (6B) is mounted in the circular fretting (2B) housing the lug (6C) in the spline (2C) and locking the rib (6H) through the opposite side of the fretting (2B) being incorporated in the separation (3C) (4E) of the mixed bar (3) (4), according to the example in figures 6-6E.

[0209] The symmetrical distribution of the lugs (6C-6D) at 120° permits two opposite cylindrical bosses (6B) to be fitted being interlinked on opposite sides, according to that shown in figures 6G, permitting a part (6) to be fitted on each side of a housing (2B) of a mixed bar (3-4) or a ring (2).

[0210] The supplementary part (7) is a compound version of the above with pinching members in "U" fork (28) at 45°, having a cylindrical boss (6B) but consisting of a partial fretting at 1/4 (7A) which internally has hooking plug members. More specifically, a cylindrical rib (7B) extended partially and longitudinally inside said housing for a jibbed member shown in figures 9-9C.

[0211] The part (8) is a connection cap between mixed bars (3-4) across their intermediate housings (2B). The connection is hidden to construct, for example, a platform or surface integrated by several mixed bars (3-4) (Figure 8A), successively attached.

[0212] The cap (8) is a tubular cylinder divided by an annular rib (8A) in two sleeves (8B-8C) with two longitudinal grooves (8D-8E) to adjust in the respective housings (2B) of the mixed bars (3-4) serving as a rib stop (8A), but remaining inside the shoulders (3C-4E) of the mentioned bars (3-4).

[0213] The part (9) of the figures (9-9E) is a supplementary part that may be incorporated in the part (7) and which is fitted in the partial housing (7A) of the latter to form a radial complement of the gudgeon rings (2) and its complements (7) to, for example, complete the rosette at 90° of a spherical set of pinching gudgeon members in "U", according to figure 9E.

[0214] A part (9) which is the referred fork in "U" (28) having a dihedric base (9A) with planes at 90° from which, laterally, a prismatic shank projects with a rectangular section (9B) endowed with a channeled transverse groove (9C) installed in the partial housing (7A) of the part (7), interlocking in the cylindrical rib (7B), adjusting against the transverse rib (7C) of the housing (7A) of the part (7).

[0215] Figure 9E is a sample of a spherical rosette integrated by a gudgeon ring (2) of pinched members at 300°, combined with another two at 180° and four complementary parts (9) in all their coordinate axis.

[0216] Figures 10-10G are different parts (5) with different combinations of gudgeon pinching members in "U" (28), from one to five pinching members (28).

[0217] The part (10) (Figure 11-1D) is a union cap for gudgeon rings (5) formed by a cylindrical tubular body divided in two symmetrical tubular sleeves (10B-10C) by an octagonal rib (10A) with two grooves (10'-10") and two longitudinal openings (10D-10E) and ribs (10F-10G) in the end edges of the caps (10B-10C).

[0218] The octagonal rib 10A is included between the octagonal sockets (5C) of the rings (5) according to figures 11 and 11C, so that the ribs (10F-10G) hook on the shoulders of the housings (5B) of said rings (5).

[0219] The longitudinal openings (10D-10E) in the housing (5B) form slots similar to the splines (2C) with the same purpose as them.

[0220] The connection part (11) is identical to the above, but separated by an annular rib (11A), the remaining elements being similar to the above (11B-11C), (11'-11"), (11D-11E) and (11F-11G).

[0221] The linking part (13) consists of a gudgeon member with fork pinching (28) having a partial housing (13A) with a hooking rib (13B) and lateral anchoring ratchets (13C-13D), in "C", directed inwards to be anchored on the shoulders (4E) of the mixed rods (3)-(4) (according to the gudgeon-plug representation (3) to laterally fasten a union member subject of being fitted on the member (28).

[0222] Part (14) of figures (16-16C) is a finishing cap for a plug bar (1) or more specifically for a spherical plug anchoring (1A), consisting of a semi-spherical oblate body (14A) open in the pole (14B) and provided with a tubular neck (14C) with an internal rib (14D) for an upper stop of the mentioned head (lA) and having longitudinal grooves (14E) to give certain elasticity to the neck (14C).

[0223] Part (15) of figures 15-15E, which is equal to part (6), likewise consisting of a gudgeon pinching member (28), is provided with a cylindrical pin (15A) with two equal lugs (15B-15C), separated by a total groove (15D) whose ends are chamfered (15E-15F) and transverse ribs (15G-15H) which are interlocking members to fasten said parts in the ring (2) housings (2B) or other parts of the set having a housing of this type.

[0224] A meshing member (17) of figures 17 to 17B having a housing of type (2B) with a spline (2C) and which is fitted in a plug rod (1) being jibbed against the parts (IF) of said rod (1), consists of a spline part (16) having a semi-annular body (16A) provided with a transverse crest (16B) like a ratchet to remove and introduce it in the spline (2C); being extended in a prismatic lug adapted to the shape and dimensions of the spline (2C) to house and be fitted statically, with the axis-rod (1), to construct an axle (1) meshing (17) set, which will rotate in a synchronized manner.

[0225] Figures 17C-17D show a set of meshings (17-17A) in a mechanical multiplication-demultiplication transmission consisting of a meshing (17A) armed with a gudgeon ring (2) of greater diameter and another (17) of less diameter, linked by a mixed bar (4) (gudgeon-plug) acting as a connecting rod and two transverse plug rod axles (1).

[0226] A wheel (19) shown in figures (17E-17F) formed by a gudgeon ring (2) core and a rim consisting of two hoops or annular saucers (18-18A), having radial anchorage plug members of the type (4A-4B) which are assembled at 90° in respective pinching members (28) of the ring (2), forming the frame for a tyre or rolling band (2D). Some saucers with "L" profile (18B-18C) which facing and fitted in the mentioned ring (2), form the channel to embed the tyre (20) or rolling band.

[0227] An absorbing member or shock absorber shown in figures 17G-17I and consisting of a cylinder (21), a spring (27) and a piston (23).

[0228] The cylinder (21) is provided with a respective plug head end of the type (4A) and sideways, on both sides, with partial longitudinal grooves (21A-21B).

[0229] The spring (22) is housed in the cylinder and contained by the piston (23).

[0230] The piston (23) consists of a tubular cylindrical body (23A) with the mentioned housing of the type (28), for a spherical member (1A) of a plug rod (21) or piston and at the opposite end, has a flat fork (23B) with lateral ratchets (23C-23D) on each lug. These external ratchets (23C-23D) are housed in the grooves (21A-21B) of the cylinder (21), compressing the spring (22), forming a shock absorbing set with respective assembly plug members (4A-1A) to be assembled with other gudgeon parts of the structure.

[0231] A linking member or joint (24) with an immobilization staple for mixed bar (3), gudgeon end gudgeon (28) and a mixed gudgeon bar (4) with plug ends (4A-4B), is shown in figures 18-18B.

[0232] The linking member (24) is a part consisting of a pinching element (28) and a plug head of type (4A) but with a neck (24A) of greater length than the mentioned neck (1E) ; a length sufficient to fit the staple (25). A "U" part having an opening (25A) of decreasing profile to adjust to the pressure in the neck (24A). Therefore, the mixed bar member (3) may pivot on the pinching housing (28) of the linking member (24) to be able to articulate forming angles of up to 180° with said set.

[0233] A structural solution with curvilinear members is shown in figures 19-19A in which, by means of mixed bars of the gudgeon-plug type (26) with the same proportions and characteristics of the mixed bars (4) of figure 1-2, it is possible to form frames of different radios or combined radii, describing curved planes which may be covered with the superficial plates (27) of figures 20-20D.

[0234] These plates with a spherical arch profile (27) or flat 27D, 27E, figures 20 to 20I and a shape equivalent to sectors derived from the geometrical compositions of the structures, that may be built according to the invention, are essentially and simply provided with a socket or shoulder (27A) provided with broken ratchets with a "four" shape (27B), fixed over the edges of the section and where the salient part of the latter (27C) are interlocked in the lower part of the side shoulders (3C-4E) of the mixed bars (3-4), is what for this example of triangular structure comprises the mentioned figures.

[0235] An example of an ideal solution of this structure consists of the representations of a straight regular hexahedron shown in figures 21-21A in one version; figures 21B-21C in a second version; Figures 21D-21E in another third version, which are an example of repetitive versatility of the structural parts, there being in all of them a mathematical proportionality based on maintaining constant a same distance between the "centers" of "gudgeon-gudgeon" means to each other and between the "centers" of the "gudgeon-plug" members to each other and another same distance between the "centers" of the "gudgeon" or "plug" members between their respective ends, the latter measurement being a proportion less than 2 ½ of the former.

[0236] The following examples may be constructed from the system described:

Trial motorbike - Figures 22-22A.
Robot - Figures 23-23A.
General purpose vehicle - Figures 24-24A-
Sphere - Figure 25.
Conical disc flying saucer - Figure 26.
Aerodynamical balloon (Zeppelin) - Figures 27-27A.
Big Wheel - Figures 28-28A.
Building with vehicle ramp - Figure 29.
Humanoid body - Figures 30-30A-30B.
Continuous electricity supply housing - Figures 31-31A-31B.
Electromotor assembly body - Figures 33-32A.
Apparatus housing support - (Figures 31-31A. 31B and 32-32A) Figures 33-33A.
Curvilinear solution - Figures 34-34B.
Spiral ramp solution - Figures 35-35A.
Triangular partition wall solution - Figures 36-36A.
Set of structural parts - Figure 37.
Set of surface parts - Figure 38.
Set of housing figures - Figure 39.

[0237] Once conveniently described the nature of the invention, it is recorded for the relevant purposes that it is not limited to the exact details of this exhibition but on the contrary, the modifications deemed pertinent may be introduced to it, provided they do not change the essential characteristics thereof, which are claimed below.

Claims

1. MODULAR TOY CONSTRUCTION, consisting of plug members in the form of rods with plug anchoring ends, and gudgeon members in the form of a ring, which have peripheric anchoring or pinching gudgeon means and linking, union or building complements; including mechanical and superficial coverage organs forming structures of different objects, with volumetric dihedric, polyhedric, regular, straight developments, such as a regular cubic hexahedron, a sphere, a conical disc or others even articulated, mechanical or motorized ones according to the invention which is CHARACTERIZED on comprising:

- built plug members (1) in the form of rods with spherical anchoring plug ends (1A) and intermediate spaced and equidistant recessable quasi spherical means (1I);
- built mixed members (3-4) in the form of prismatic bars having a hollow body with intercalated linking gudgeon means and ends with anchoring gudgeon or plug means;
- built gudgeon members (2) having an annular body or proportional part of the latter with gudgeon housing; a ring of radial pinching members (28) at 45° or 60° in the shape of "U" forks and having a pseudo-spherical housing to receive housing and pivoting of plug member ends or intermediate of the rods or mixed bars;
- complementary members or union accessories and link (6) which are fitted in gudgeon housings of the ring (2) or mixed bar (3-4);
- union members (8) fitted between two mixed bars (3-4) for overlapping of the latter;
- complementary radial member (9) of the gudgeon ring (2) which are fitted in partial housing of their body or other supplementary ring parts;
- union member (10) of two gudgeon ring parts (2) having a octo-polygonal assembly means.
- union member (11) of two gudgeon ring clamps (2) having an annular assembly means;
- collateral connection member (13) superficially fitted in the sides of a mixed bar (3-4);
- auxiliary anchoring member (15) fitted in a gudgeon housing of the ring (2) or a mixed bar (3-4);
- finishing member (14) which is a cap fitted in the plug end of a rod or mixed bar (gudgeon-plug);
- jibbed member (16) for the union of a meshing (17) with a rod (1);
- rim member (18) for a wheel (19);
- shock absorber member (21) with rod (1) plug means (1A-1B) and gudgeon means for union with the rod (1);
- linking and articulation member (24) for a mixed bar (3) and a mixed bar (4);
- mixed curvilinear (26) bar member (3-4) of a superficially (27) curvo-parabolic covered part adjustable to mixed curvilinear or flat bars (26) to bars.

2. MODULAR TOY CONSTRUCTION, according to claim 1, a plug rod (1) CHARACTERIZED in that it has a pseudo-cylindrical body (1) with two opposite flat faceted surfaces (1F-1G); stepped boxes (1H) in their respective ends and two cylindrical necks (1E) finished in the mentioned spherical anchoring members (1A); said neck (1E) with less diameter than the rod (1) and said anchorages (1A).

3. MODULAR TOY CONSTRUCTION, according to claims 1 and 2, the rod (1) has intermediate anchoring means (1I) CHARACTERIZED in that they are limited equidistant pseudo-spherical sections and spaced by transverse cuts (1G) in the cylindrical surfaces of the rod (1) and including as many intermediate anchorages (1I) as may be proportionally included in the length of the rod (1).

4. MODULAR TOY CONSTRUCTION, according to claim 2, the spherical anchorages (1A) of the rod (1) are CHARACTERIZED in that they have opposite lateral oblations (1C-1D) coplanar with the flat faces (1F-1G) of the rod (1).

5. MODULAR TOY CONSTRUCTION, according to claim 1, the mixed bars (3-4) are CHARACTERIZED in that they are internally hollow prismatic-square bodies or emptied (3A-4A) and open at two of their opposite faces, with internal circular housings (2B) equal to those of the gudgeon ring (2); one in the mixed bar (3) and as many as proportionally occupy the length of the bar (4), maintaining constant equidistant distances (3B-3C and 4D-4D) with the shoulders of the closed faces of the mixed bar (3-4).

6. MODULAR TOY CONSTRUCTION, according to claims 1 and 5, the mixed bars (3-4) are CHARACTERIZED in that in the ends of the mixed bar (3) they have gudgeon pinching means (28) as in the ring (2) in a gudgeon-gudgeon version and in the ends of the mixed bar (4) they have spherical plug means (4A-4B) in a gudgeon-plug version, where said spherical plug means (4A-4B) are not oblate.

7. MODULAR TOY CONSTRUCTION, according to claims 3 and 6, in which the distance between the "centers" of the plug or gudgeon anchoring members is CHARACTERIZED in that it is an exact and constant measurement between the centers of the plug end anchorages (1A) and intermediate (I); between the gudgeons (2B) and (28) of the bars (3) or between the gudgeons (2B) and plugs (4A-4B) of the bars (4), being less in proportion 2 ½, the distance between the gudgeon centers (28), plug (1A), plugs (4A-4B) with the respective ends of the corresponding parts.

8. MODULAR TOY CONSTRUCTION, according to claim 1, a built gudgeon member (2) contributing an annular body (2A) CHARACTERIZED in that it has an equicentral housing (2B) where it internally houses a cap (1) for the free or fixed housing of a plug rod (1).

9. MODULAR TOY CONSTRUCTION, according to claims 1 and 8, a built gudgeon member (2) having an annular body which in another different embodiment is CHARACTERIZED in that in an annular core (5) in an eccentric position of the ring (2) which internally has a regular circular housing (5B) and an octagonal socket (5C) and where the ring height (5A) is the symmetric half of the ring (2) body (2A) height.

10. MODULAR TOY CONSTRUCTION, according to claims 1 and 9, the built gudgeon member (2) is CHARACTERIZED in that it is a ring of radial anchoring or pinching members (28) which are "U" forks having straight plane entrance (28A) and a trough or pseudo-spherical housing (28B) which has a greater radius than the opening (28A).

11. MODULAR TOY CONSTRUCTION, according to claim 10, the pseudo-spherical troughs (28B) are CHARACTERIZED in that they consists of interlocking ribs (28D-28E) eccentrically and diagonally opposed, near to the respective trough ends (28B).

12. MODULAR TOY CONSTRUCTION, according to claim 8, the mentioned equicentral housing (2B) in a partial ring (7) or ring (2) fraction is CHARACTERIZED in that it is a proportional partial housing (7A) which on the base of the housing consists of a horizontal and partial rib (7B) for a complementary partial ring (2) element.

13. MODULAR TOY CONSTRUCTION, according to claims 1 and 12, a mixed linking member (6 or 7) which is CHARACTERIZED in that it consists of the mentioned pinching member in "U" (28), a partial circular housing means (7A) and a cylindrical plug organ (6B) consisting of three equidistant lugs, two equal ones and shorter (6D) and another unequal and longer (6C); the former with chamfered ends (6G) and the other provided with a transverse end shoulder (6H) like a hook; and which is projected from a pedestal (6E) slightly distanced from the base (6F) of the part (6) permitting said plug organ (6B) to couple with another equal one (Figure 6G) forming an axle which fits in the same housing (2B).

14. MODULAR TOY CONSTRUCTION, according to claim 1, the union means (8) of the mixed bars (3-4) is CHARACTERIZED in that it is a cylindrical cap having an intermediate annular rib (8A) dividing it in two equal sleeves (8B-8C) provided with respective grooves (8D-8E) to adjust the pressure between two housings (2B) of two attached mixed bars (3-4) which may build continuous platforms.

15. MODULAR TOY CONSTRUCTION, according to claims 1 and 12, the complementary radial member is CHARACTERIZED in that it is a radial sphere member which consists of the mentioned pinching organ in "U" (28) having a base like an arista (9A) at 90°, from one of whose faces is projected perpendicular to the latter a rectangular-prismatic shank (9B) with a transverse channeled groove, next to the end of the lower face of said channel (9B).

16. MODULAR TOY CONSTRUCTION, according to claims 1 and 9, the polygonal (5) core union member (10) of two gudgeon ring members (2) are CHARACTERIZED in that it is a socket defined by octa-polygonal rib (10A) dividing it in two cylindrical-tubular sleeves (10B-10C), cut longitudinally by grooves (10'-10'') and by openings (10D-10E) fragmenting them in two symmetrical parts which, at their edges, have lips (10F-10G) to hook onto the housing ends (5B) of the mentioned cores (5) and where the openings (10D-10E) forms slots or splines for the corresponding linch pin.

17. MODULAR TOY CONSTRUCTION, according to claims 1, 9 and 16, in which a union member (11) of a polygonal core (5) of two gudgeon ring members (2) is CHARACTERIZED in that it is the same as the part (10) where the rib (11A) is annular, the other elements being equal (18).

18. MODULAR TOY CONSTRUCTION, according to claims 1, 10, 11 and 12, in which a lateral connecting member (13) fitted over the closed sides of a mixed bar member (3-4) is CHARACTERIZED in that being endowed with a pinching fork in "U" (28) it has as a base a partial housing (13) or part of a housing (2B), cut transversely in the base (13E) and with a partial rib (13B) in one of the parts of the said base for anchorage of a member (9B), being fitted by

means of two lateral anchoring hooks (13C and 13D) with a "C" shape for hooking on the shoulders (3B-3C, 4D-4E) of said mixed bar member (3-4).

19. MODULAR TOY CONSTRUCTION, according to claims 1 and 8, in which an auxiliary anchoring member (15) which is fitted in the mentioned housing (2B) or a gudgeon ring member (2) is CHARACTERIZED in that it is constructed with the mentioned pinching organ (28) in "U" shaped fork and respective complements which in their base contribute a coaxial cylindrical pin (15A) cut by a longitudinal groove (15D) in two lugs or symmetrical pins (15B-15C), with prominent annular base (15I), chamfered (15E-15F) in respective ends, and adjacent to the latter, transverse teeth (15G-15H) which interlock in the mouth of a housing (2B), being partially integrated with respect to a tooth (15G-15H) in a spline (2C) of the mentioned housing (2G) where the pin (15A) is housed with a stop in the prominence (15I) of the entry mouth.

20. MODULAR TOY CONSTRUCTION, according to claims 1 and 2, a finishing member (14) of a plug rod (1) fitted in a respective spherical anchorage (1A) is CHARACTERIZED in that it is a mixed "T" piece with a semi-spherical head (14A) oblate in the pole, with a circular opening (14B) communicating with a tubular cylindrical neck (14E) vertically split in two symmetrical halves (14C) by respective grooves (14D-14E) and internally provided with respective embedding means (28D-28E).

21. MODULAR TOY CONSTRUCTION, according to claims 1 and 3, a jibbed member of a rod (1) in respective housing (2B-2C), of circular meshing (17), CHARACTERIZED in that it includes a semi-circular part (16A) with a dorsal ratchet (16B) extended in an arch and perpendicular to said part, a flat rectangular-prismatic shank (16C), like a linch pin which may be integrated and adjusted, in the respecting housing (2B) spline (2C) and against the flat facet (1F) of a plug rod (1).

22. MODULAR TOY CONSTRUCTION, according to claims 1, 8 and 9, a rim member (19) CHARACTERIZED in that it consists of two discoidal sources (18-18') of "L" section (18B-18C) which radially and internally consist of spherical plug anchorages (4A-4B) which fit at 90° in the respective pinching members (28) of a gudgeon ring (2) comprising the core of said saucers (18-18') which, facing each other, form a channeling for the respective tyre or rolling band (20).

23. MODULAR TOY CONSTRUCTION, according to claims 1 and 2, a shock absorbing member (21) having as a piston rod a plug rod (1) CHARACTERIZED in that the mentioned shock absorber consists of a cylinder (21) with opposed longitudinal grooves (21A-21B), finished in the mentioned spherical anchorage (4A), incorporating a spring (22) which is pressed by a tubular body (23A) piston (23) where the plug rod (1) or piston is housed in the suitable mentioned housing (28) and providing a flat extension (23B) in fork shape with lateral harpooned ratchets (23C-23D), which will cramped to the ends of grooves (21A-21B) so as not to leave the cylinder (21).

24. MODULAR TOY CONSTRUCTION, according to claims 1 and 5, consists of a linking and articulation member (24) for a mixed bar member; gudgeon with gudgeon ends (3) and gudgeon with plug ends (4) CHARACTERIZED in that it provides the mentioned pinching member with "U" fork (28) associated with the mentioned spherical anchoring member (4A) but joined by a neck (24A) of greater length for the integration of a staple (25) with a decreasing opening (25A) to adjust the pressure in said neck (24A) covering the distance between centers (4A) and (28) which is equal to that of the system.

25. MODULAR TOY CONSTRUCTION, according to claims 1 and 5, the mentioned mixed bars 3-4 are CHARACTERIZED in that they have equivalent curvilinear developments (26) where the circumferential arch between centers is equal to that of the mentioned mixed rectilinear bars (3) (4).

26. MODULAR TOY CONSTRUCTION, according to claims 1, 5 and 25, includes superficial parabolic arch closing members (27), flat (27D), CHARACTERIZED in that on the edges (27) of their respective sides there are sockets (27A) provided with anchorages (27B) which are ratchets broken in "four", salients proportionally in a portion to hook on the shoulders (3B-3C-4D-4E), of the mentioned bars (3-4 and 26) comprising the support frame.

Fig-1

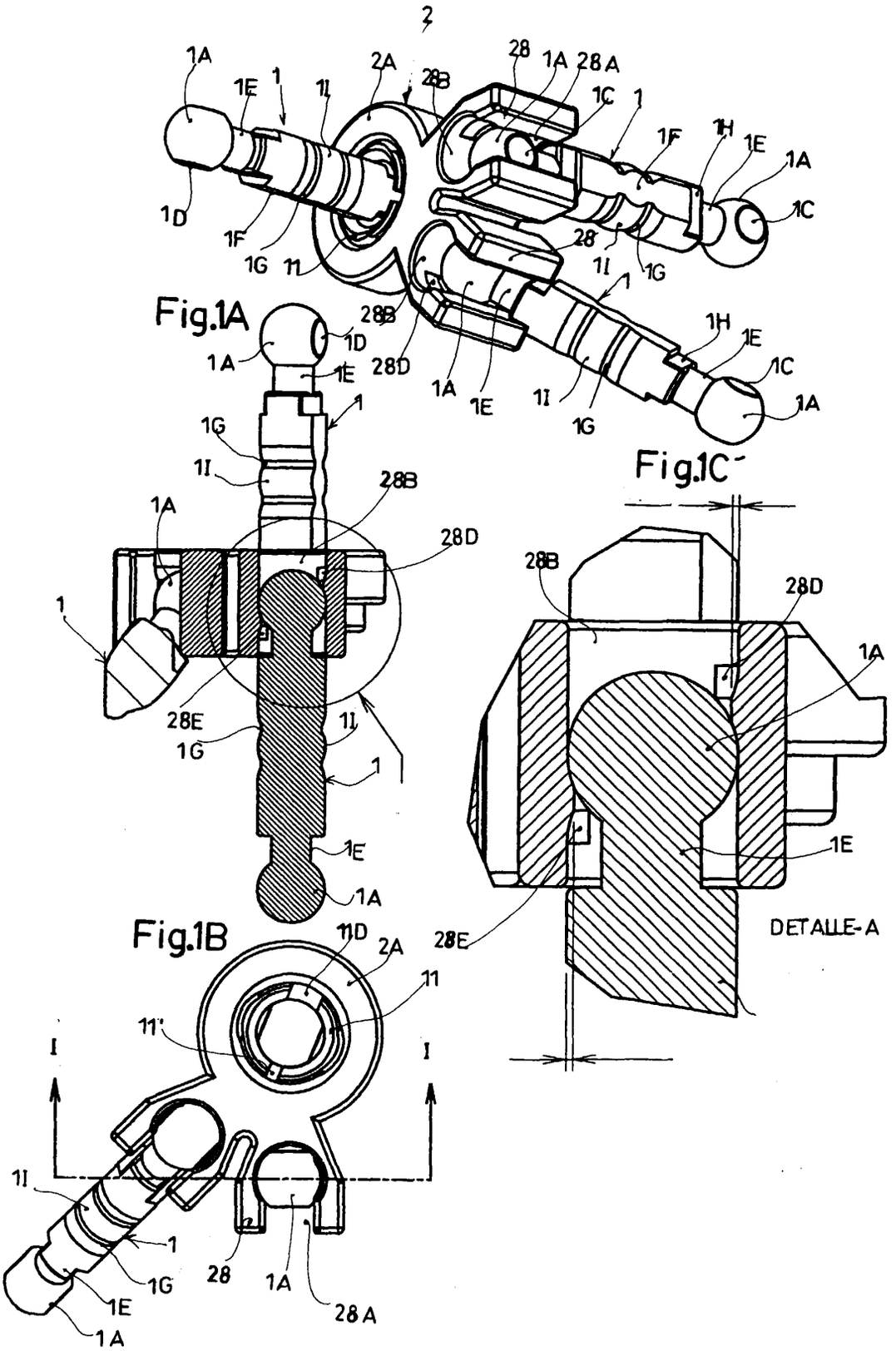

2
1A
1E
1
1I
2A
28B
28
28A
1C
1F
1H
1D
1G
Fig.1A
28D
Fig.1C
28E
Fig.1B
11D
11
11'
I
DETALLE-A

Fig-1.1

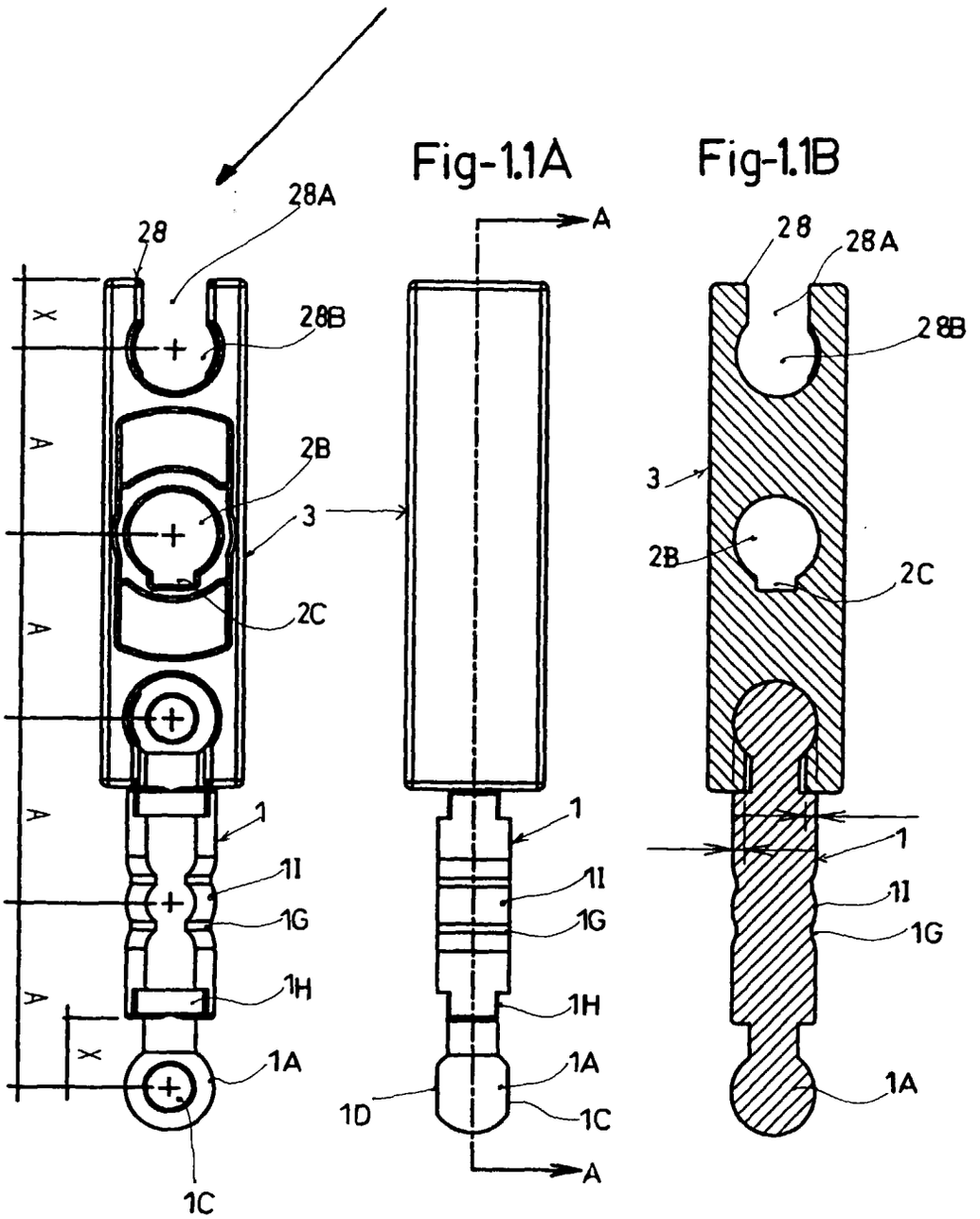

28A
28
28B
2B
3
2C
1
1I
1G
1H
1A
1C
X
A
Fig-1.1A
A
1
1I
1G
1H
1A
1D
1C
Fig-1.1B
28
28A
28B
3
2B
2C
1
1I
1G
1A

Fig-1.0

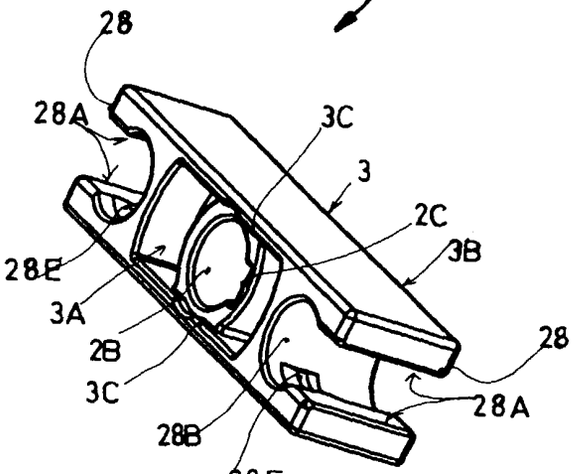


Fig-1.0A

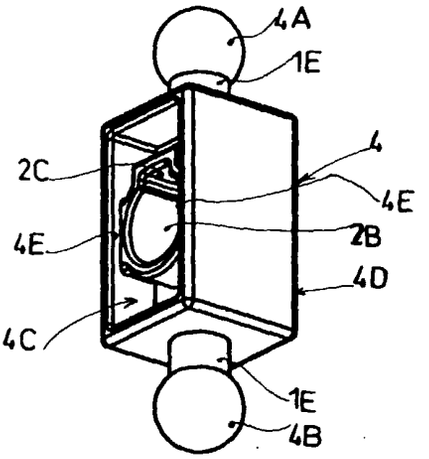


Fig.1.0B

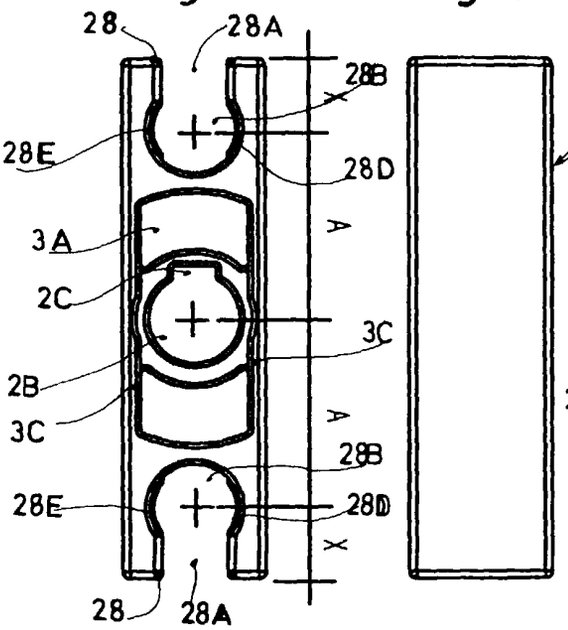


Fig-1.0C

Fig.1.0E

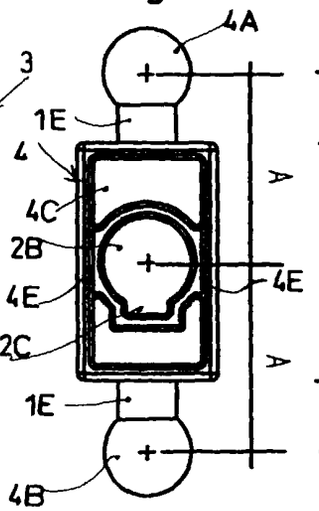


Fig-1.0F

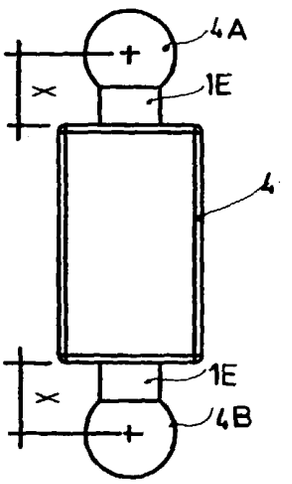


Fig-1.0D

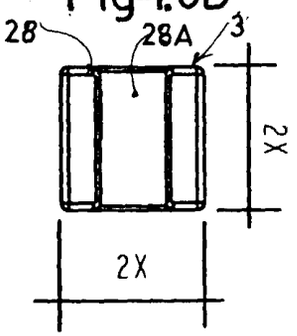


Fig-1.0G

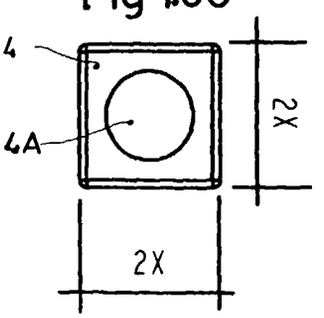


Fig-1.2

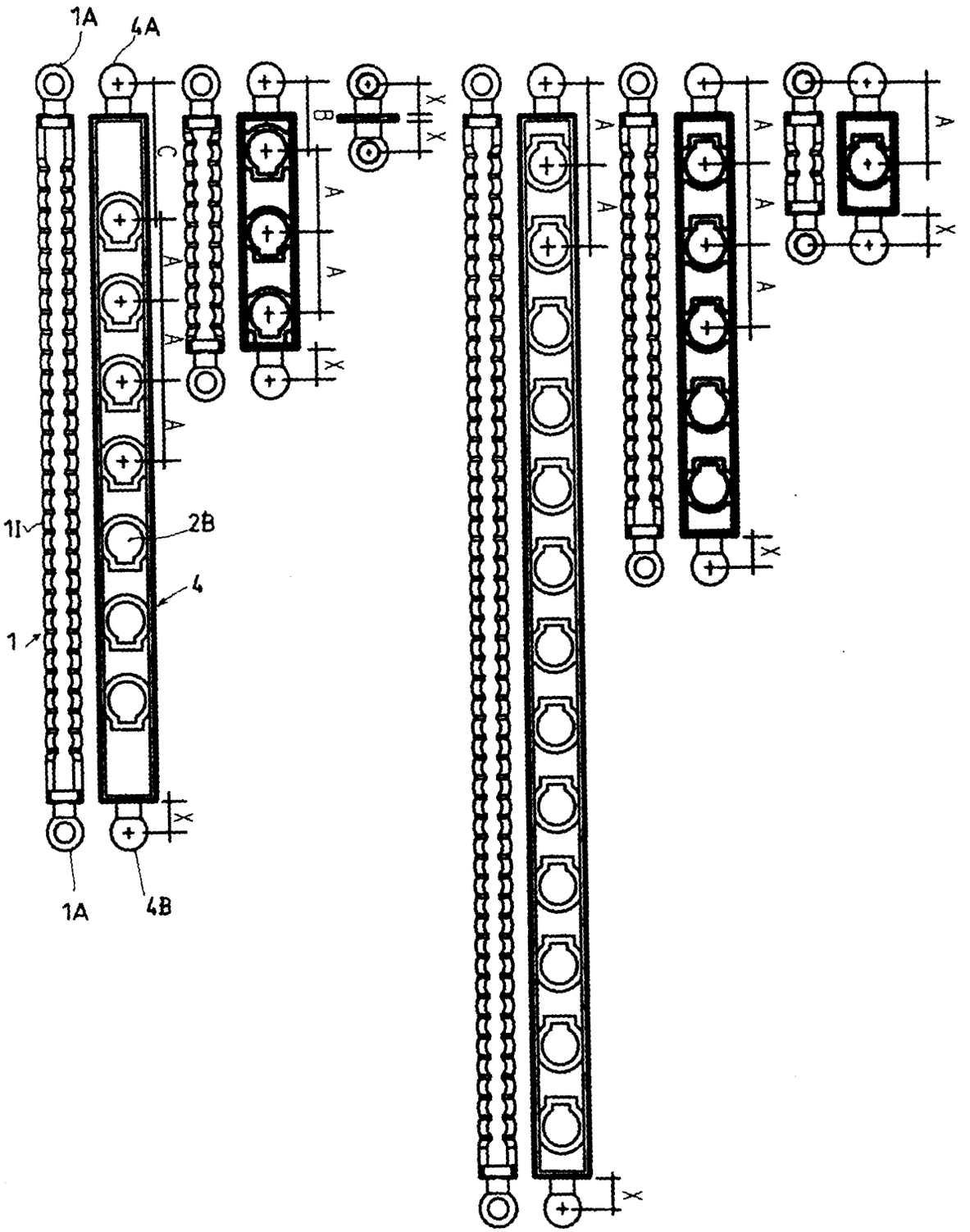


Fig-1.4

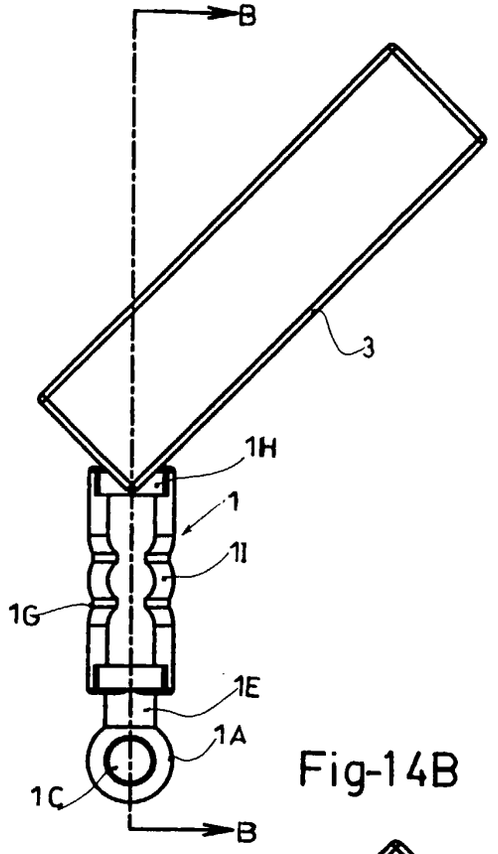


Fig-1.4A

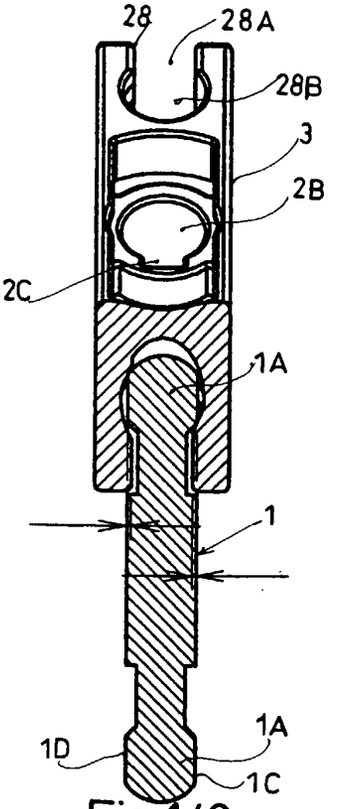


Fig-14B

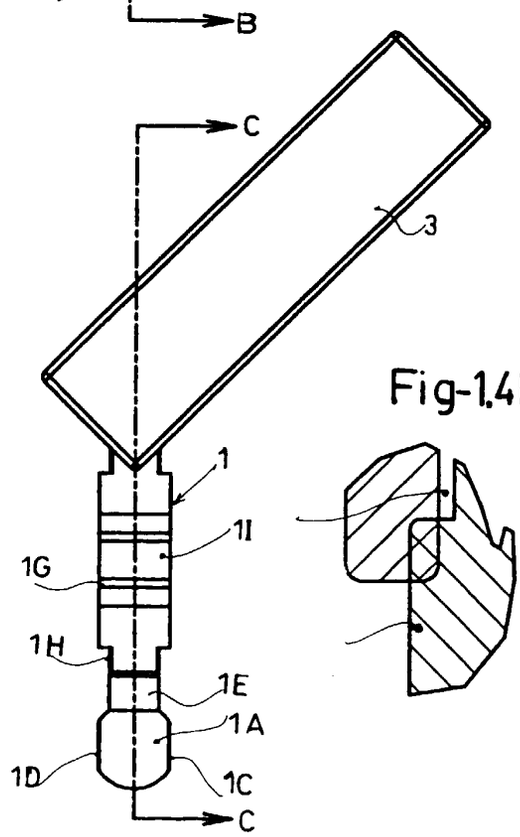


Fig-1.4C

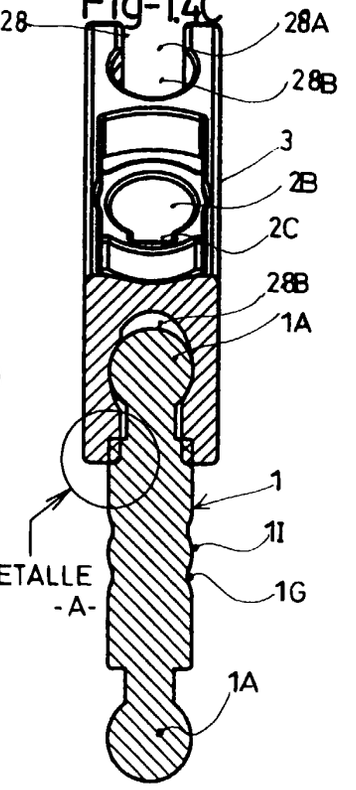


Fig-1.4D

Fig-1.5

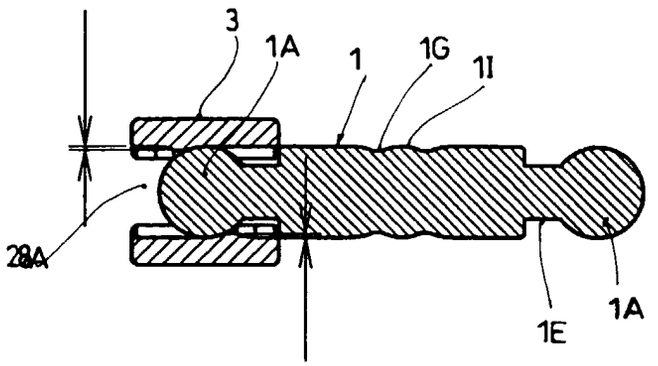


Fig-1.5A

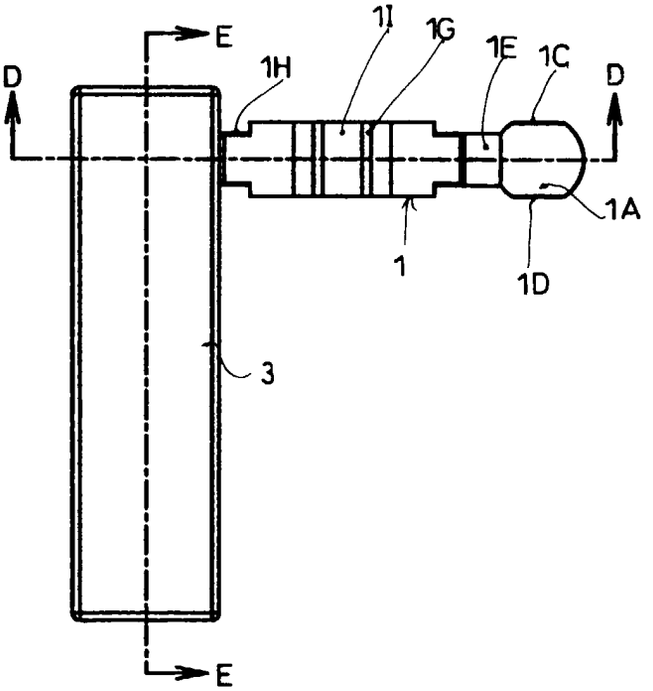


Fig-1.5B

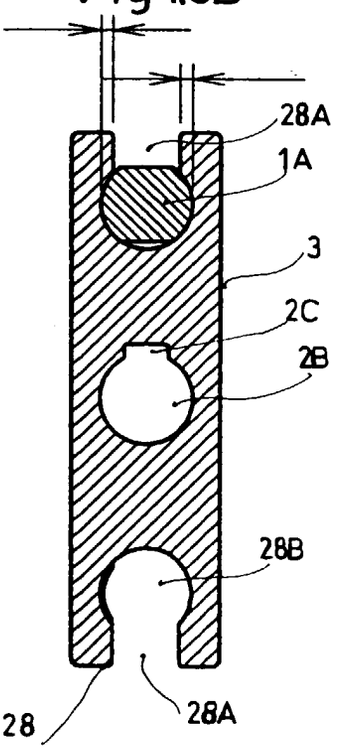


Fig-2

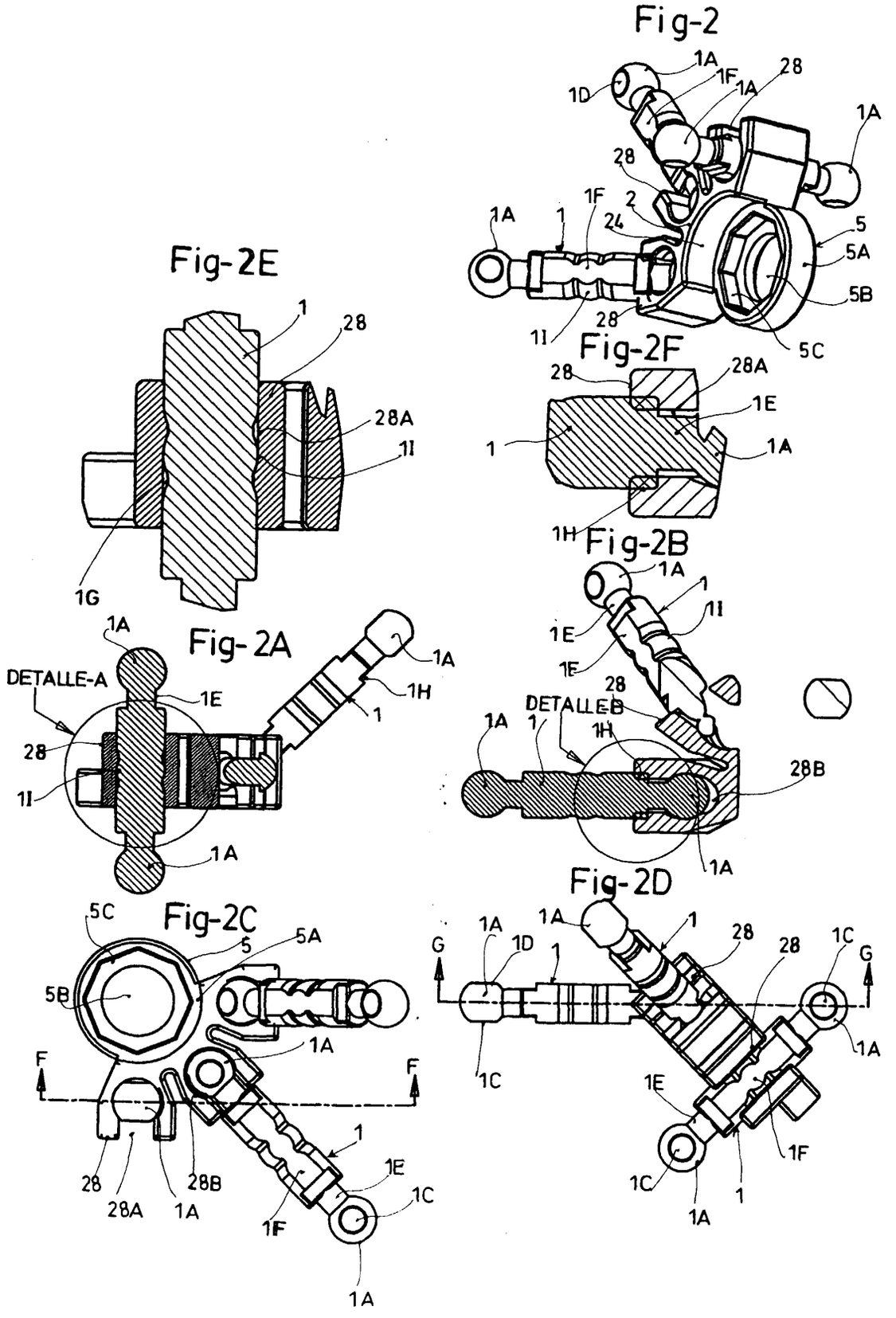


Fig-2
1A
1F
28
1D
1A
1A
28
1F
2
24
1A
1
5
5A
5B
28
11
5C
Fig-2F
28
28A
1E
1
1A
1H
Fig-2E
1
28
28A
11
1G
Fig-2B
1A
1
11
1E
1E
28
DETALLE-B
1A
1
1H
28B
1A
Fig-2A
1A
1A
DETALLE-A
1E
1H
1
28
11
1A
Fig-2D
1A
1A
1
28
28
1C
G
G
1D
1
1C
1A
1E
1F
1C
1A
1
Fig-2C
5C
5
5A
5B
1A
F
F
1
1E
1C
28
28A
28B
1A
1F
1A

Fig-3A

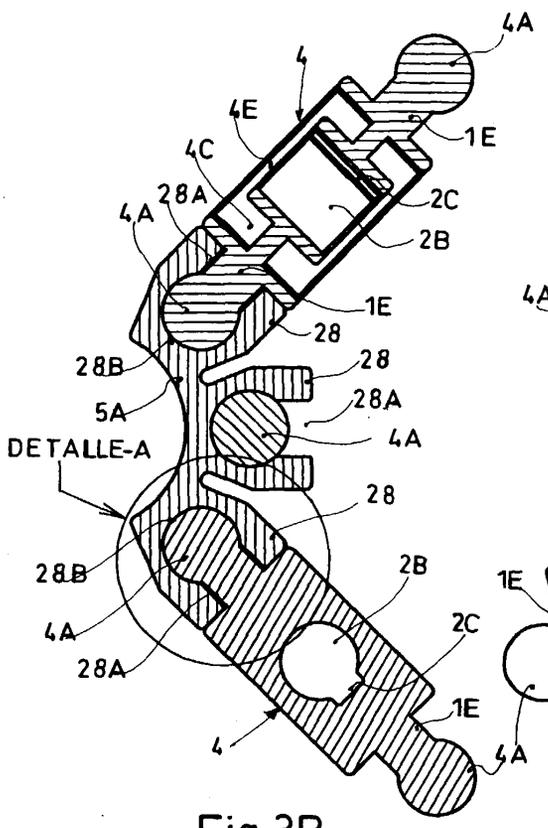


Fig-3

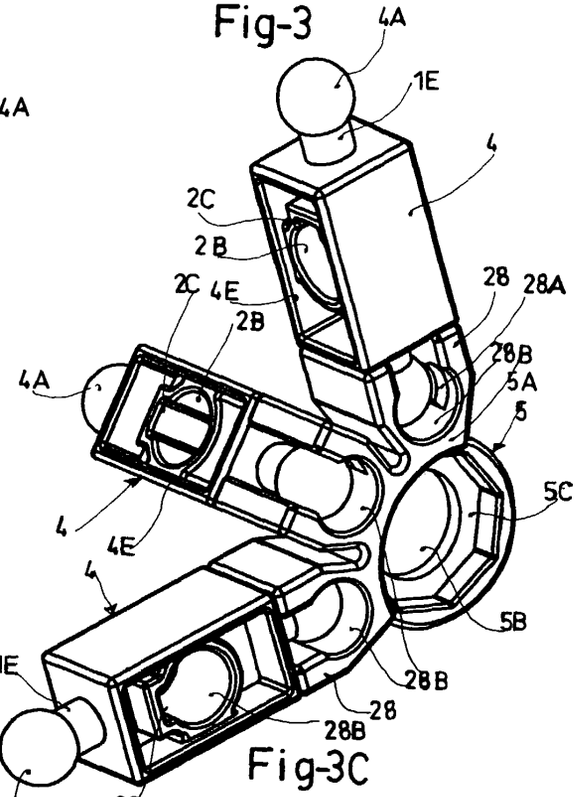


Fig-3B

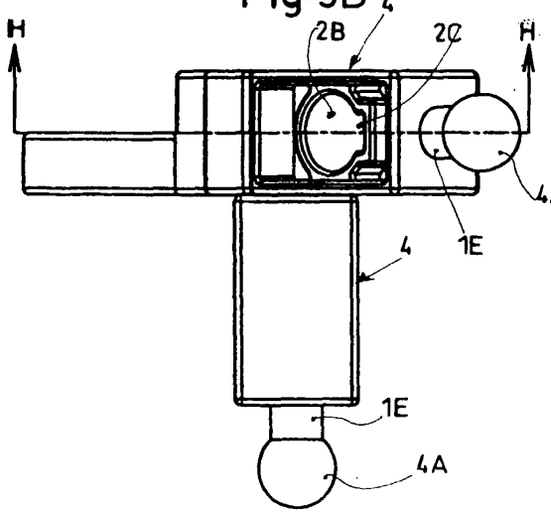


Fig-3C

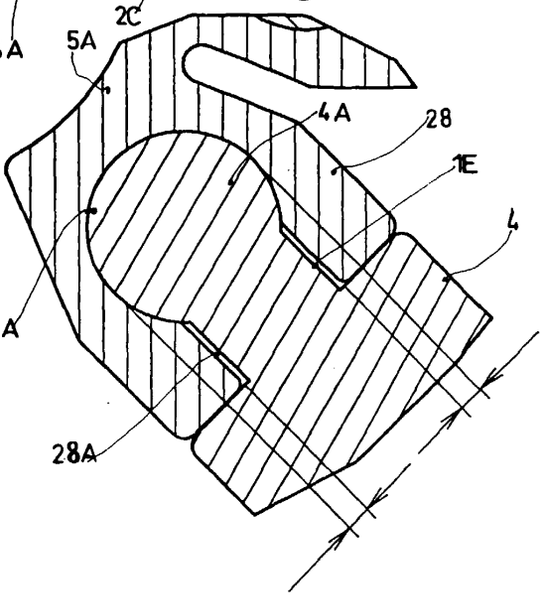


Fig-4

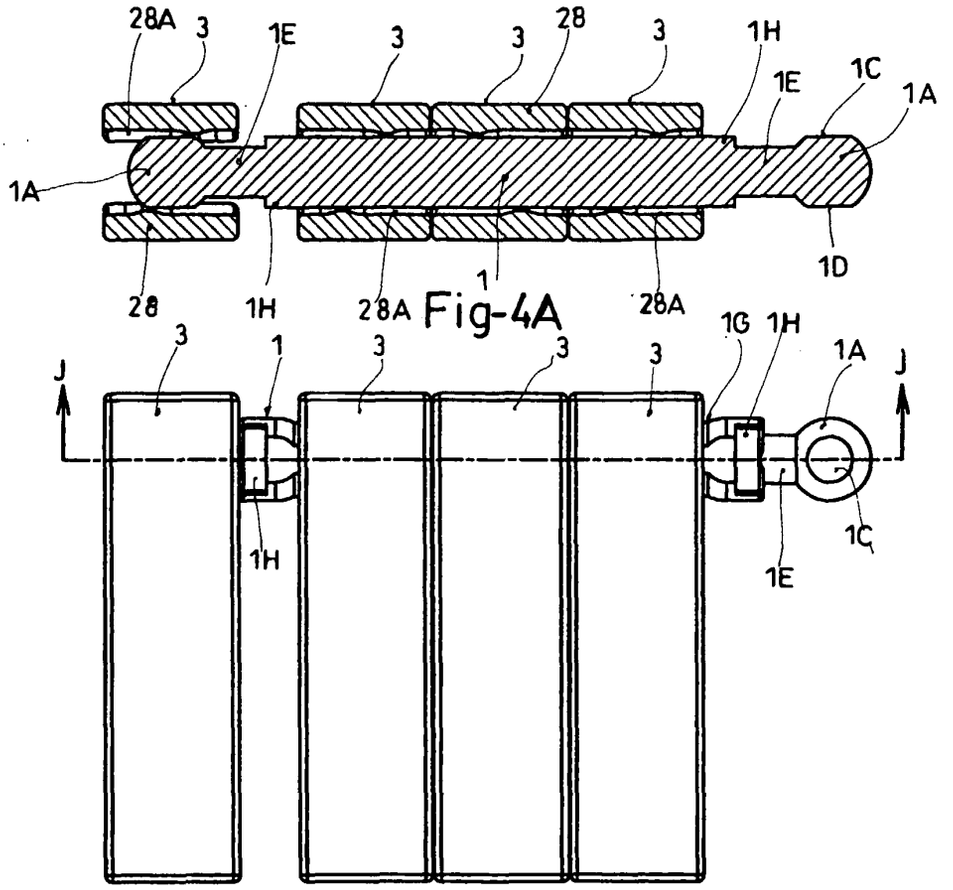


Fig-4A

Fig-4B

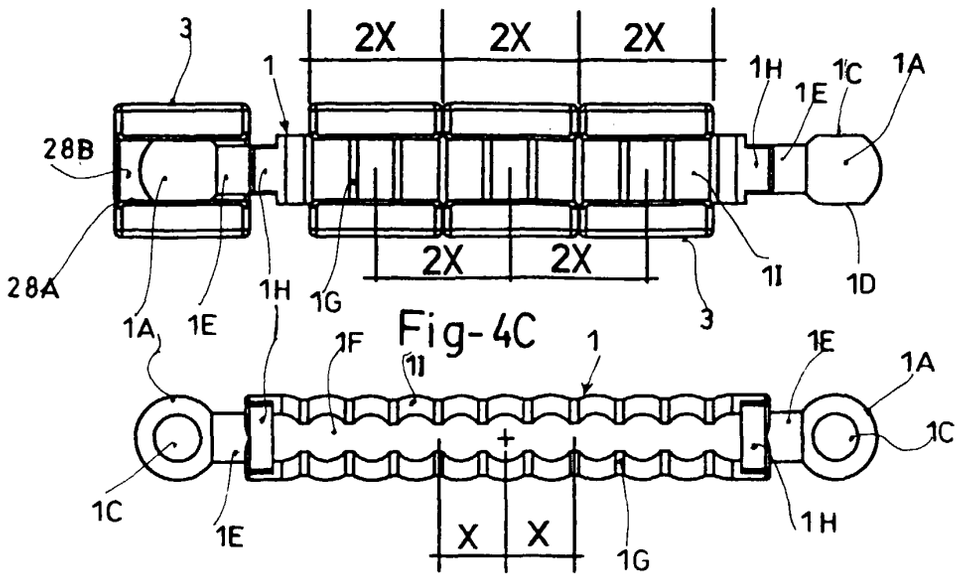


Fig-4C

Fig-5

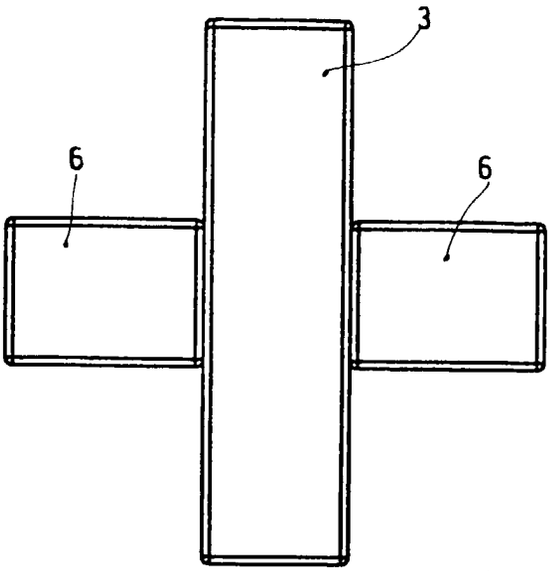


Fig-5A

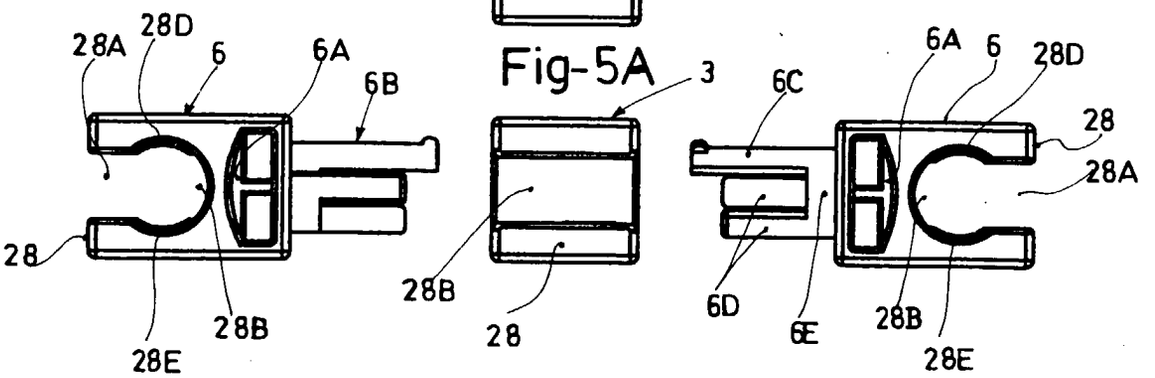


Fig-5B

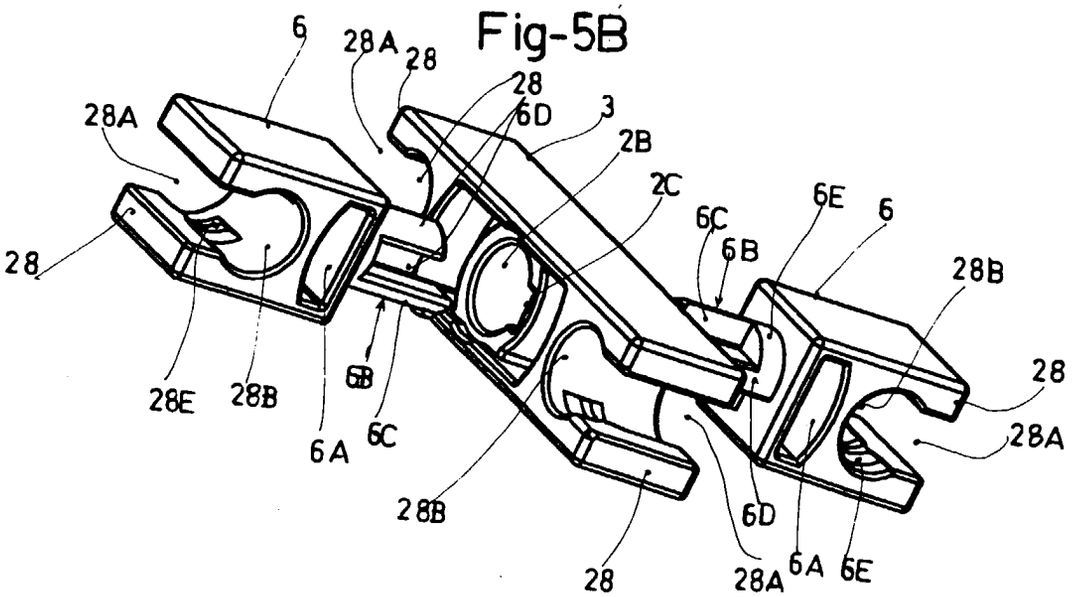


Fig-6A

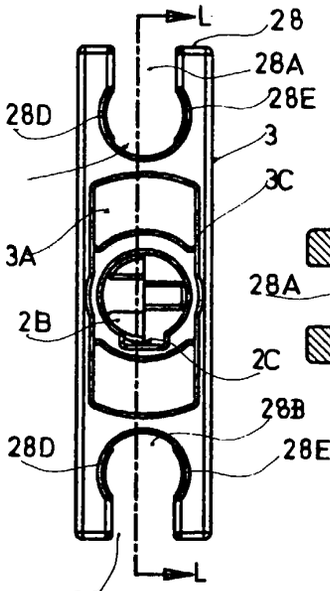


Fig-6

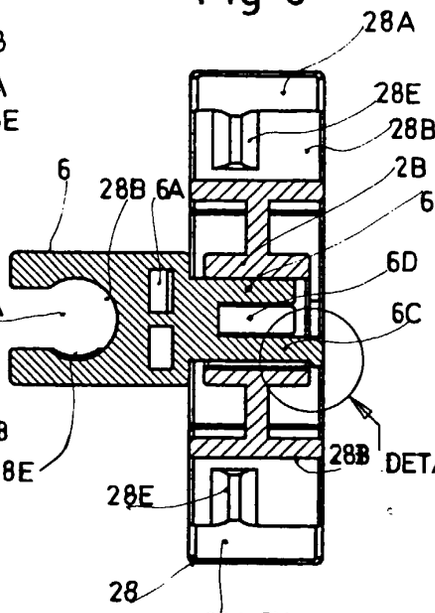


Fig-6B

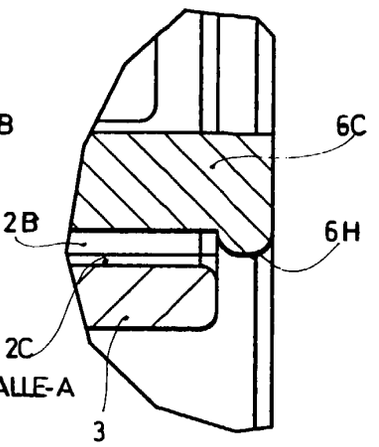


Fig-6C

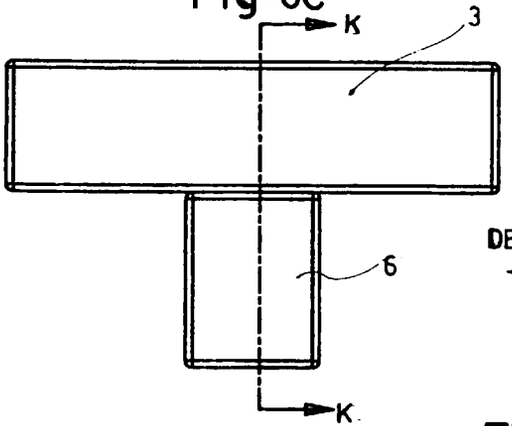


Fig-6D

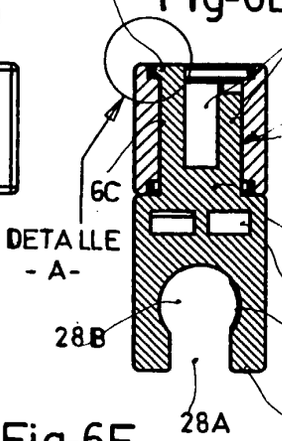


Fig-6E

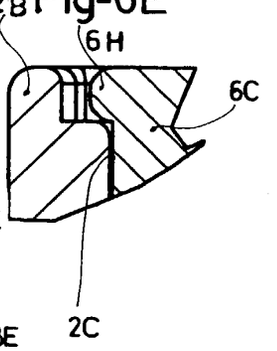


Fig-6F

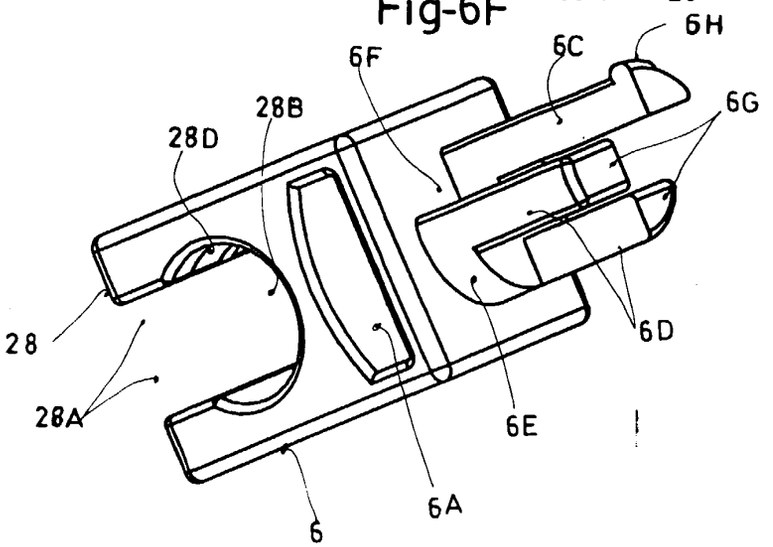


Fig-6G

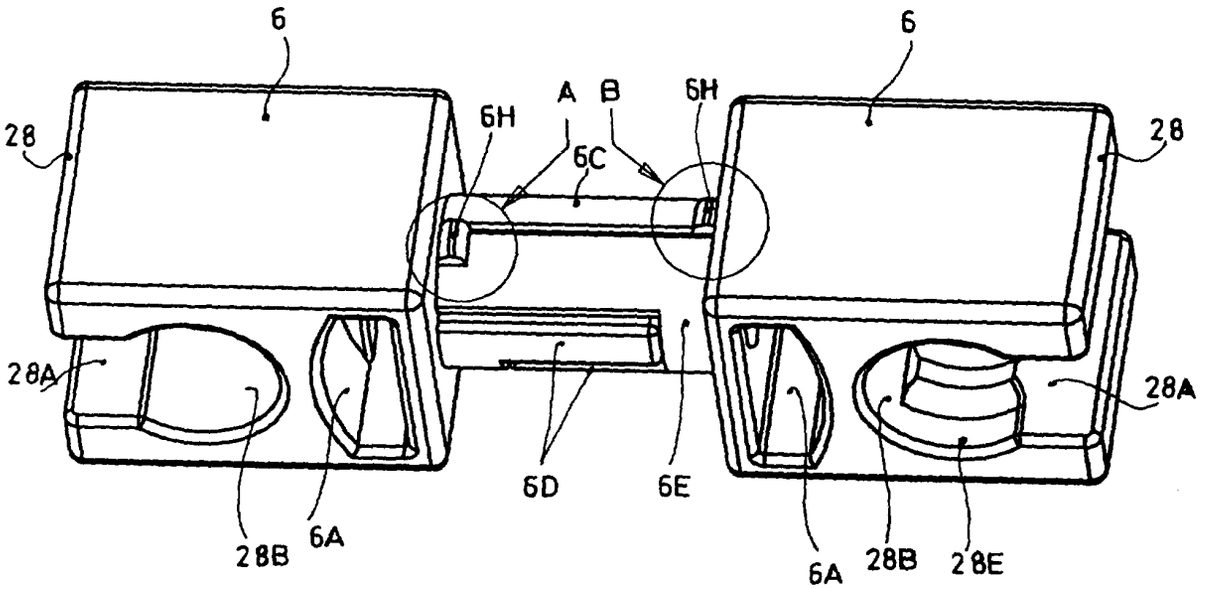


Fig-6H

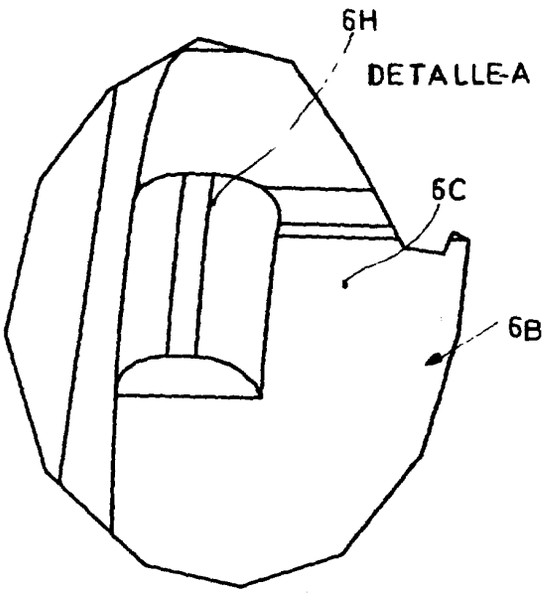


Fig-6I

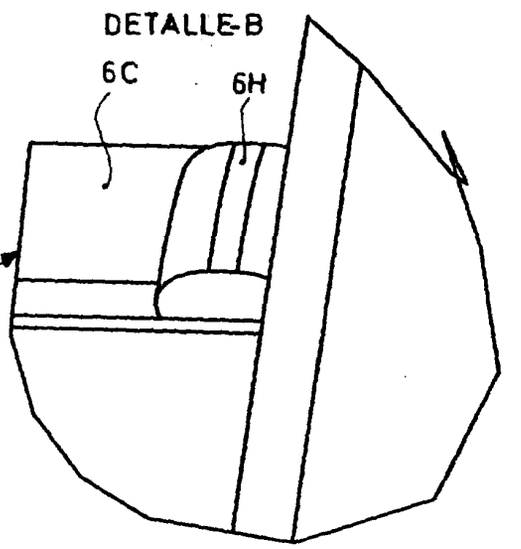


Fig-7

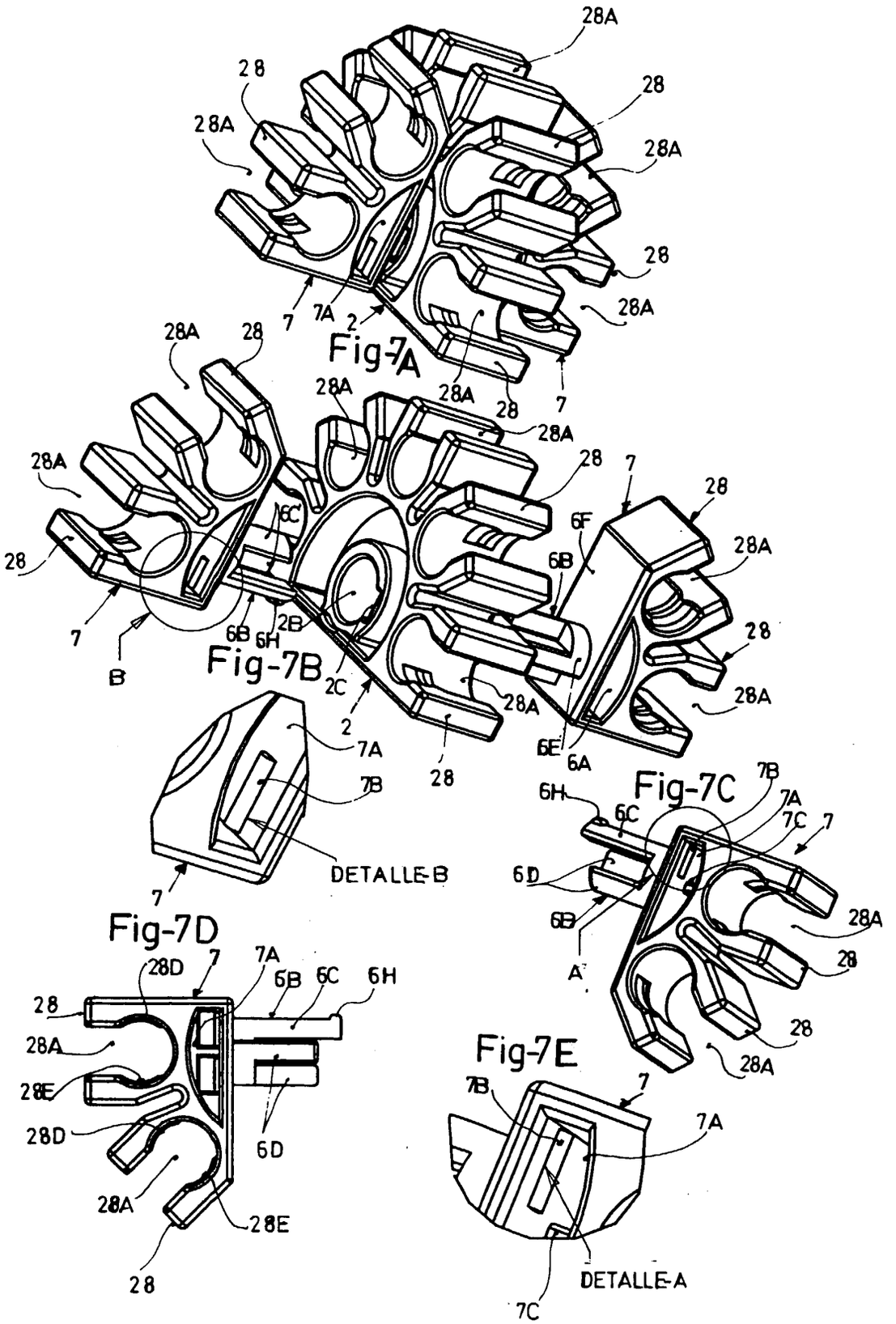

28A
28
28A
28
28A
28
28A
7
7A
2
Fig-7A
28A
28
28A
28A
28A
28
28A
28
7
28
28
6C
6F
6B
28A
7
B
6B
6H
2B
Fig-7B
2C
28A
28
2
7A
6E
6A
7B
28
DETALLE-B
7
Fig-7C
7B
6H
7A
6C
7C
7
6D
6B
A
28A
28
28
28A
Fig-7D
28D
7
7A
6B
6C
6H
28
28A
28E
28D
6D
28A
28E
28
Fig-7E
7B
7
7A
DETALLE-A
7C

Fig-8

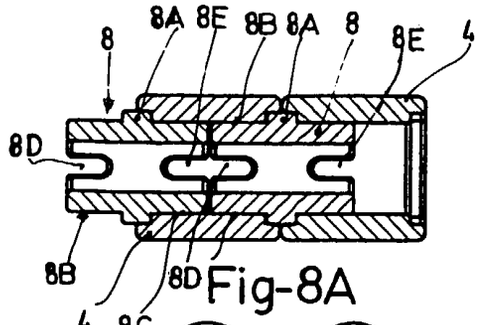


Fig-8A

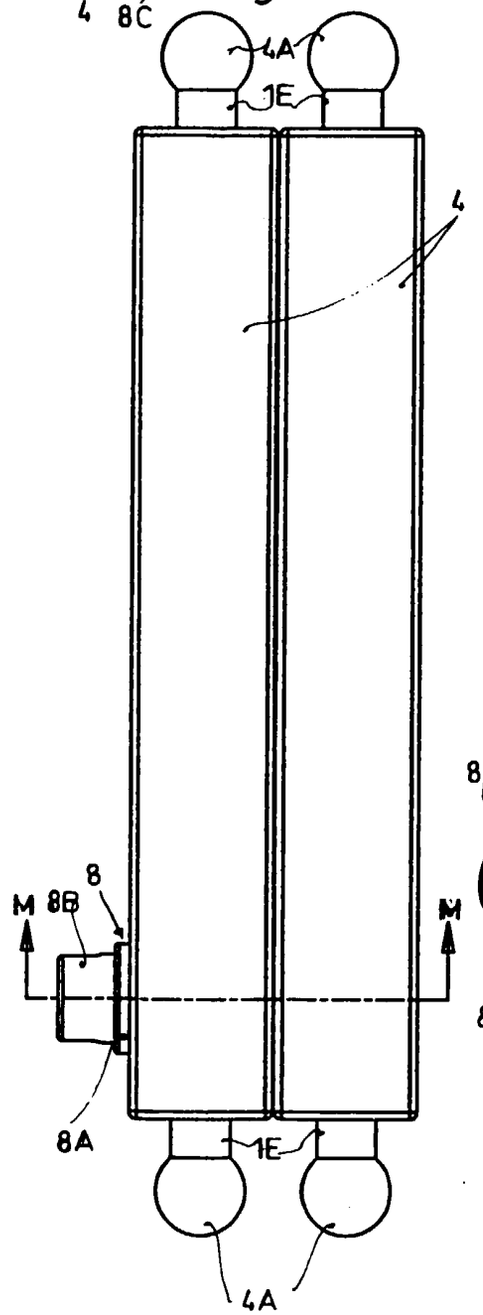


Fig-8B

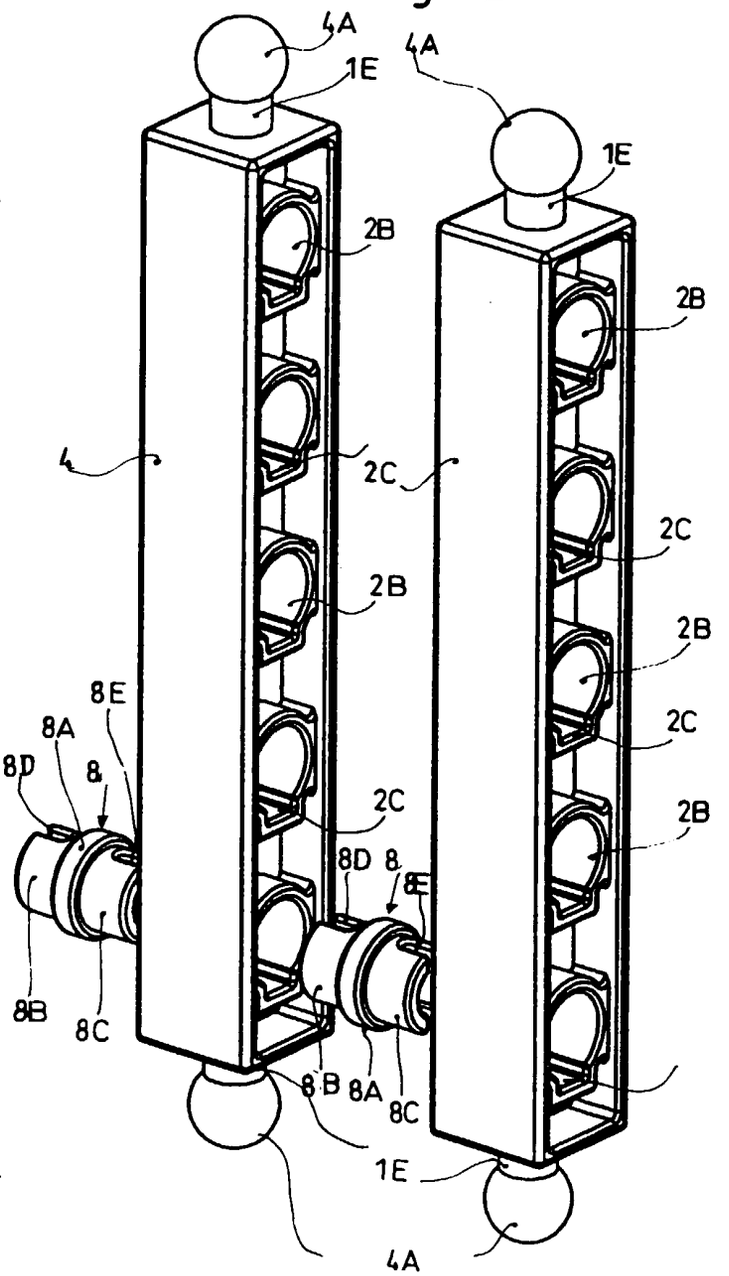


Fig.-9

Fig-9B

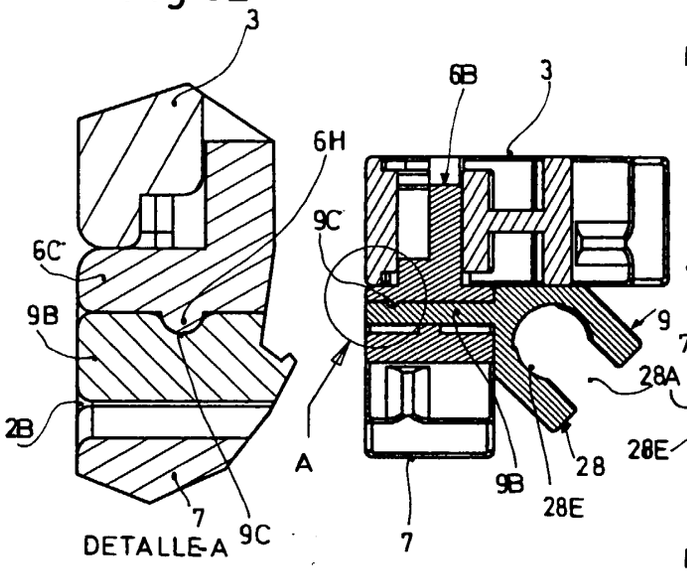


Fig-9A

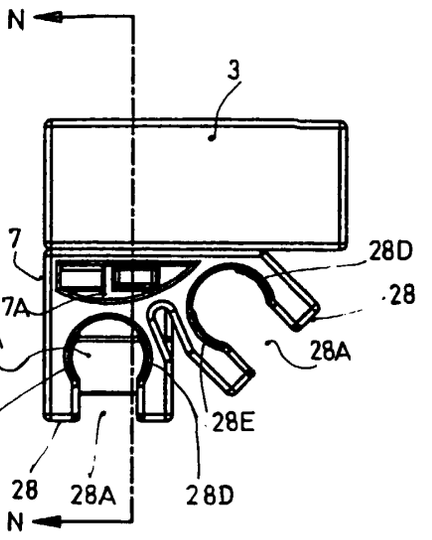


Fig-9C

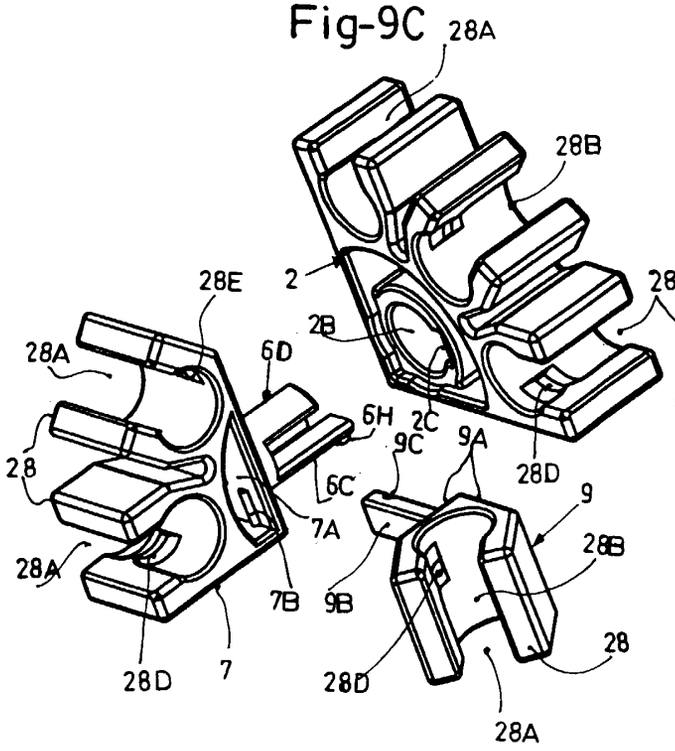


Fig-9D

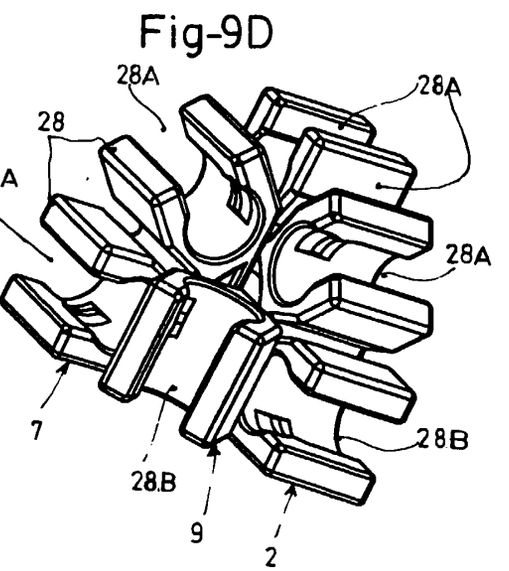


Fig-9E

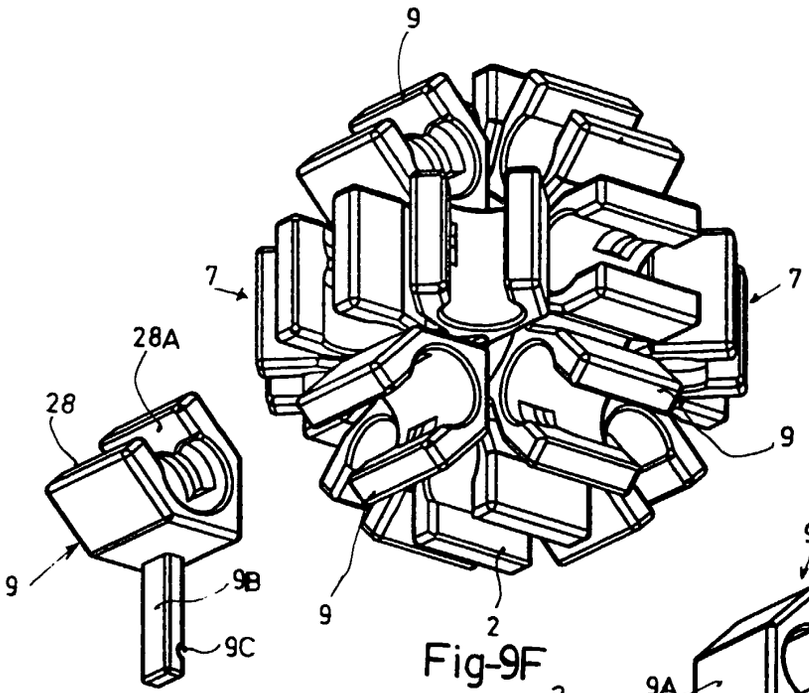

9
7
7
28A
28
9
9B
9C
9
9
2

Fig-9F

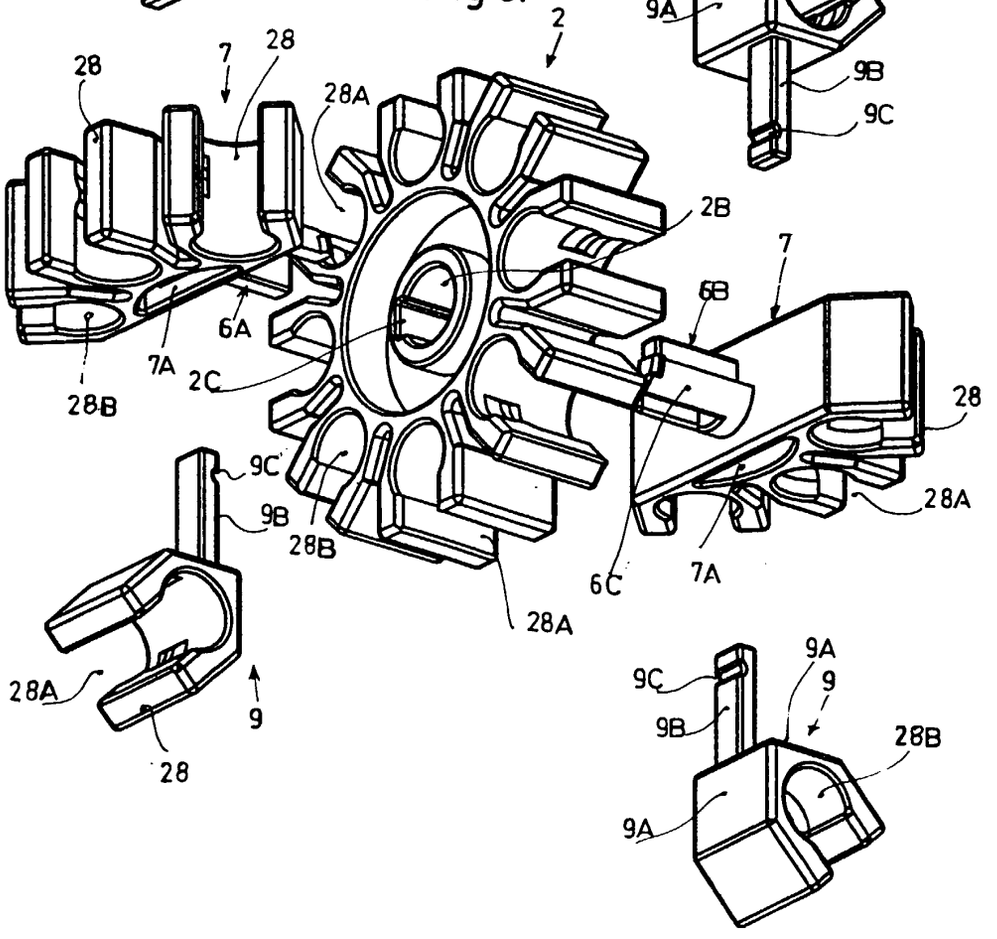

9
28A
9A
9B
9C
2
28
7
28
28A
2B
7
6B
6A
7A
2C
28B
28
9C
9B
28B
28A
6C
7A
28A
9
28
9A
9C
9
9B
28B
9A

Fig-11E

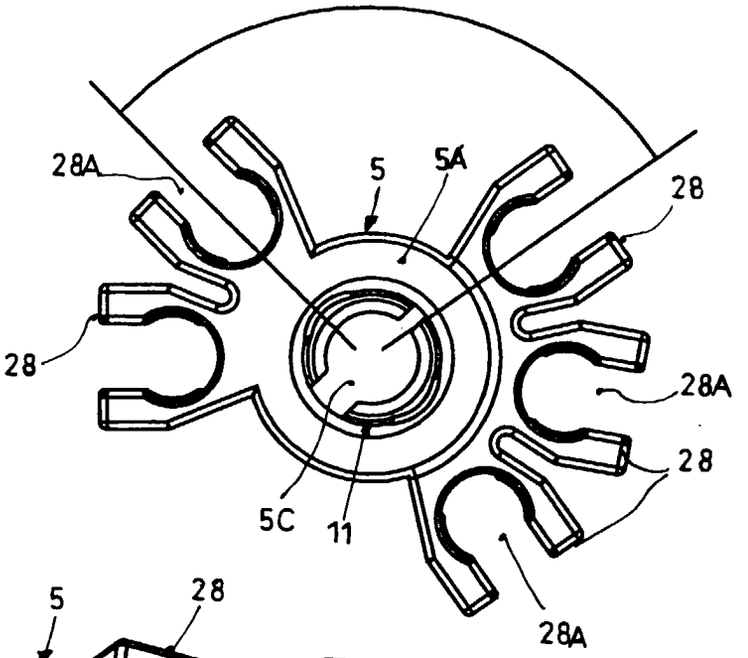


Fig-11F

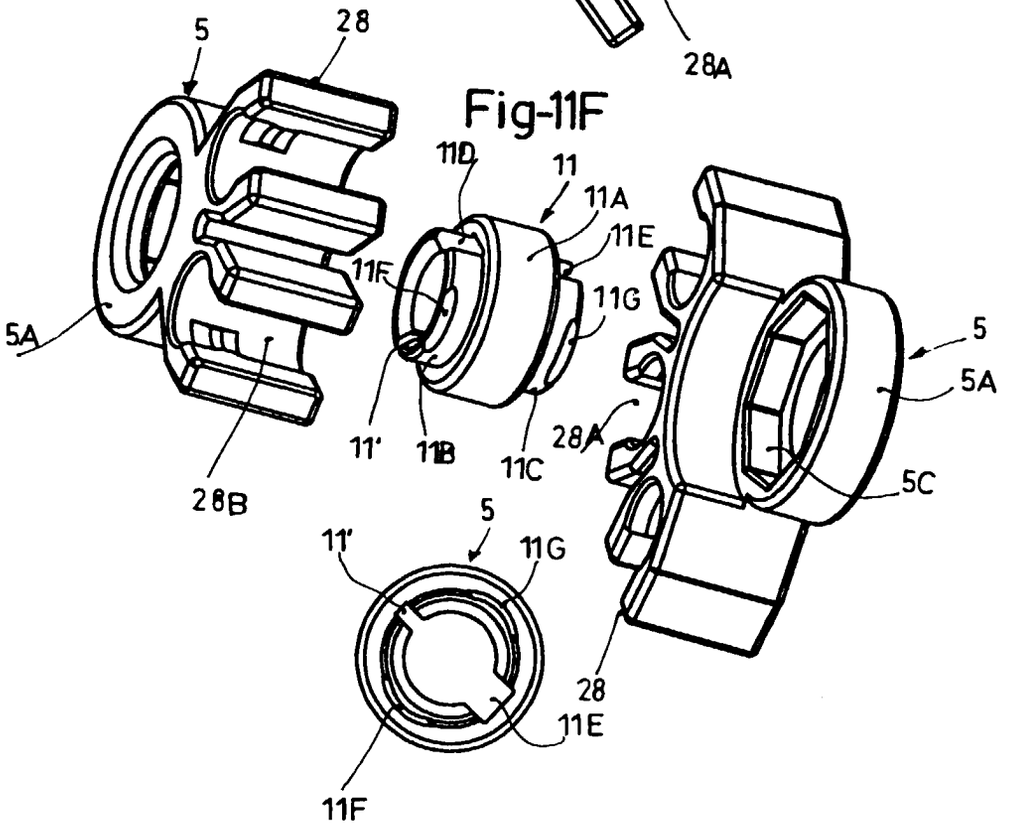


Fig-11B

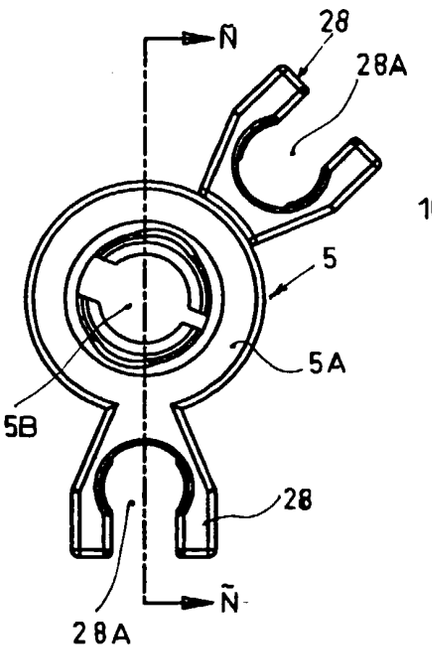


Fig-11

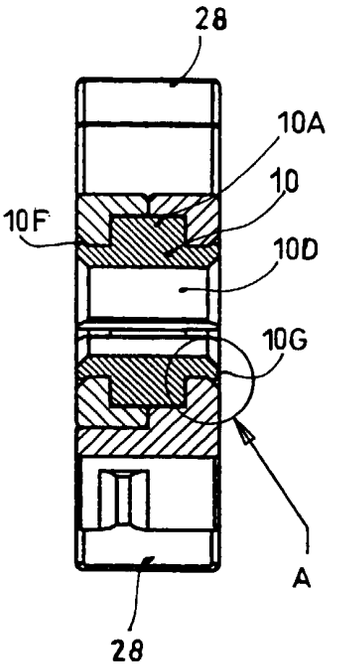
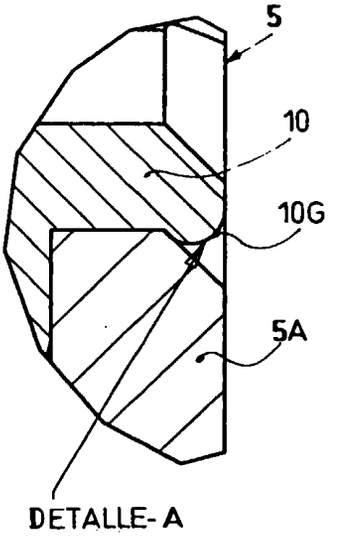


Fig-11B



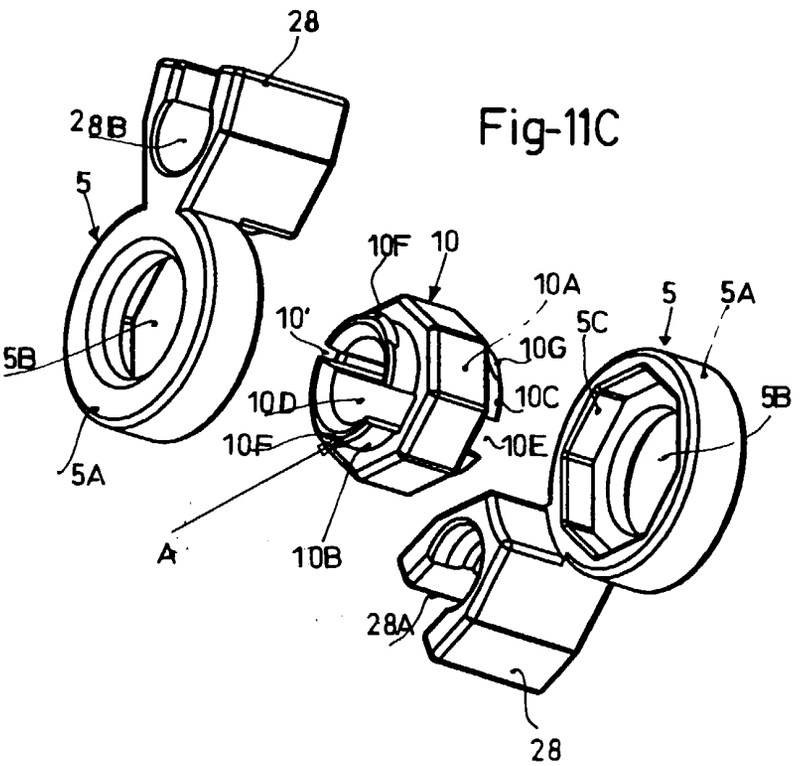


Fig-11C

Fig-11D

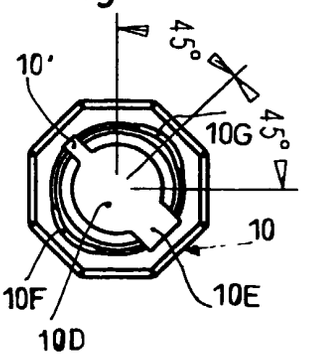


Fig-10

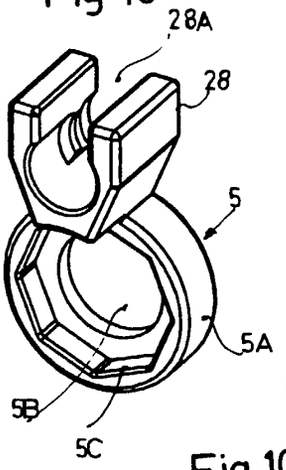


Fig-10A

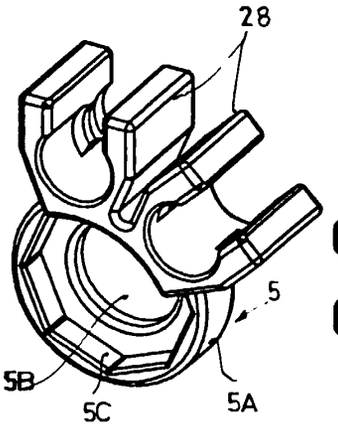


Fig-10B

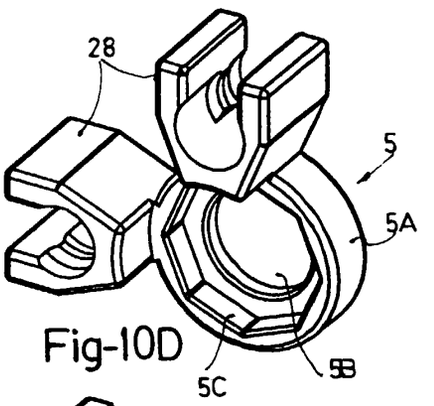


Fig-10C

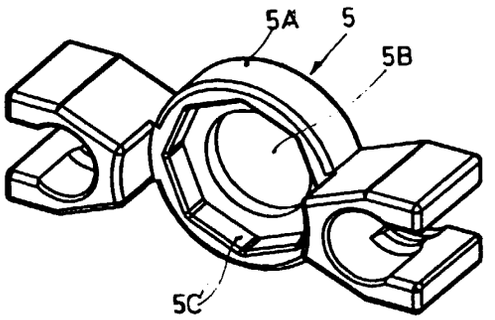


Fig-10D

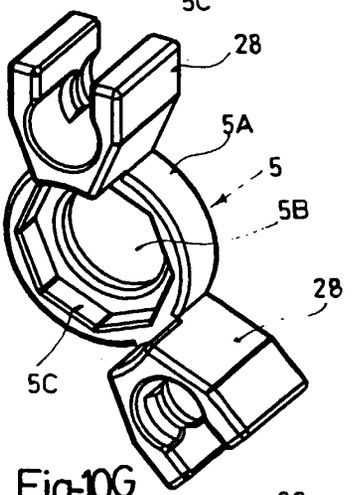


Fig-10E

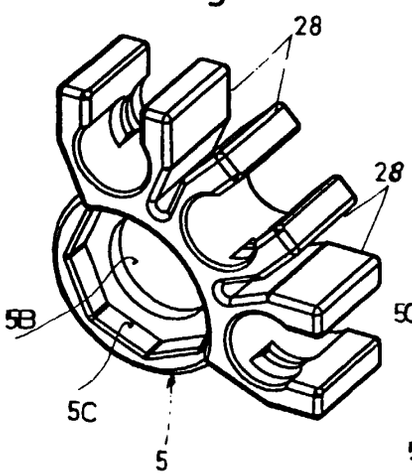


Fig-10F

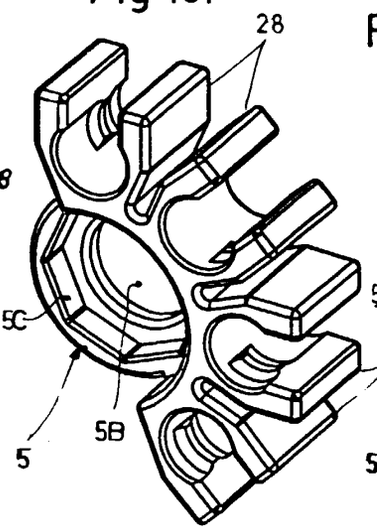


Fig-10G

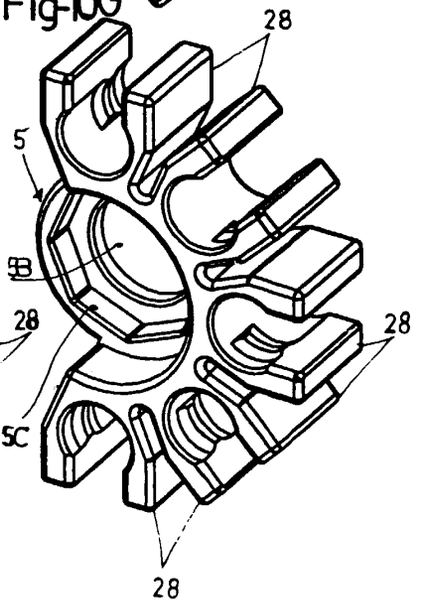


Fig-12

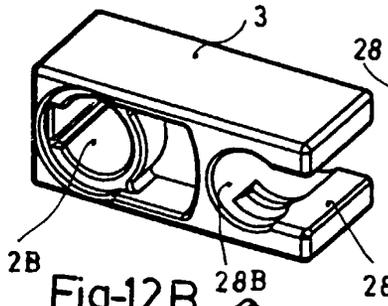


Fig-12A

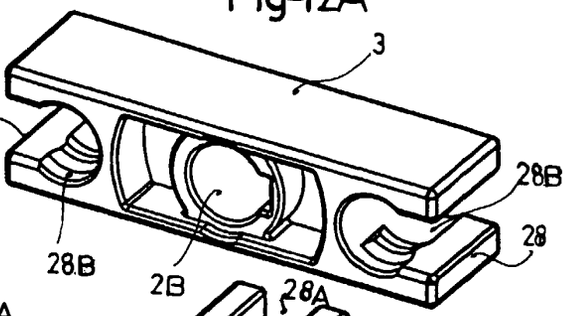


Fig-12B

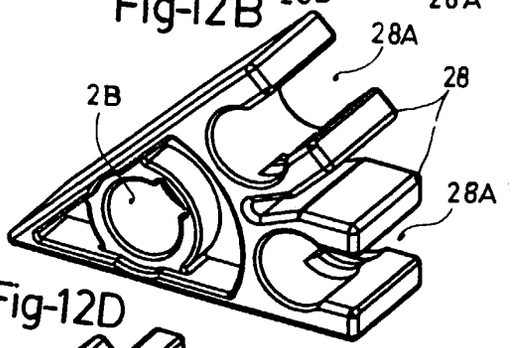


Fig-12C

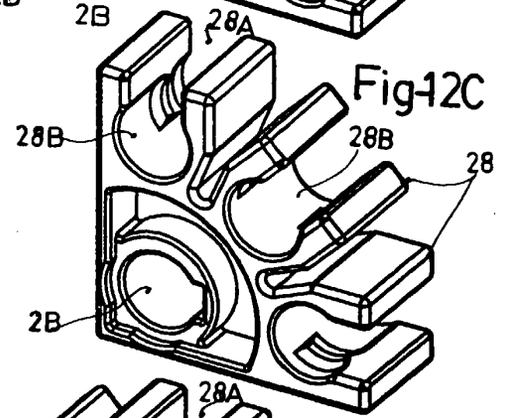


Fig-12D

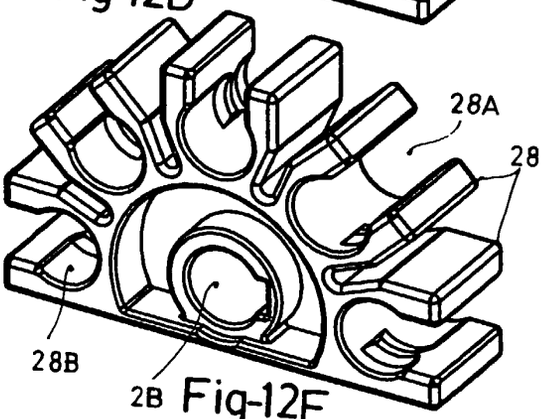


Fig-12E

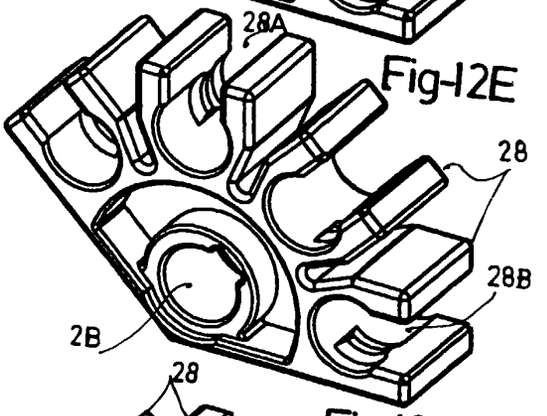


Fig-12F

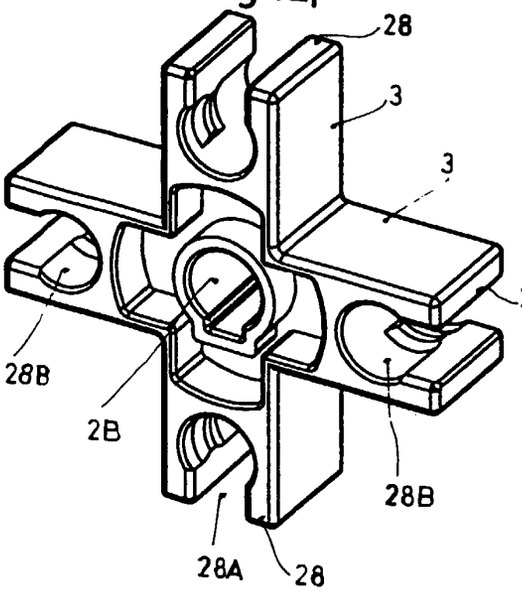


Fig-12G

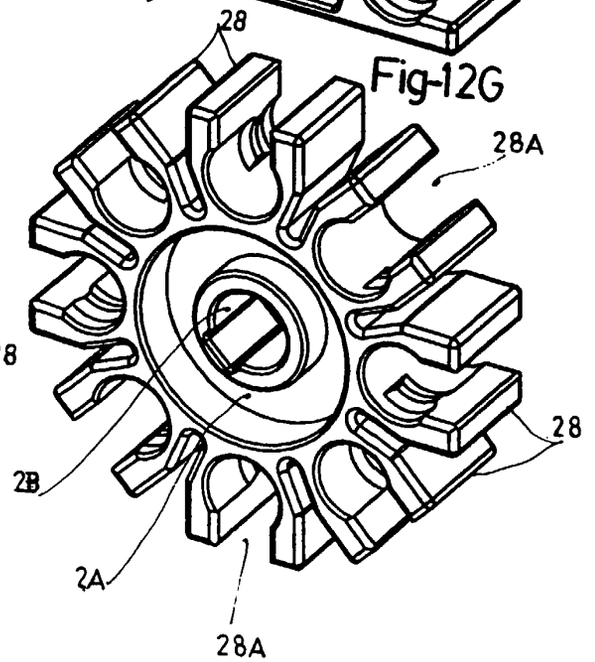


Fig-12H

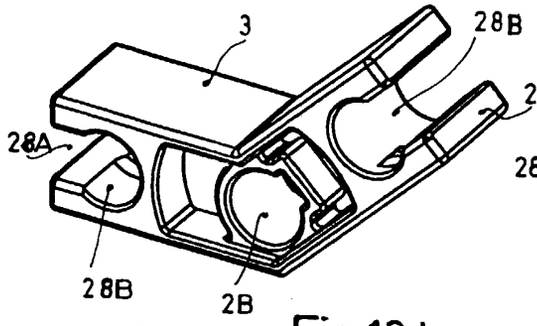


Fig-12I

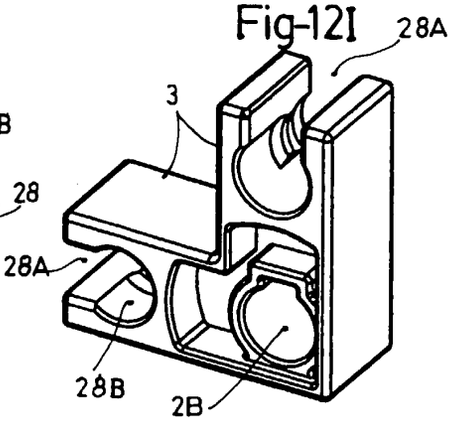


Fig-12J

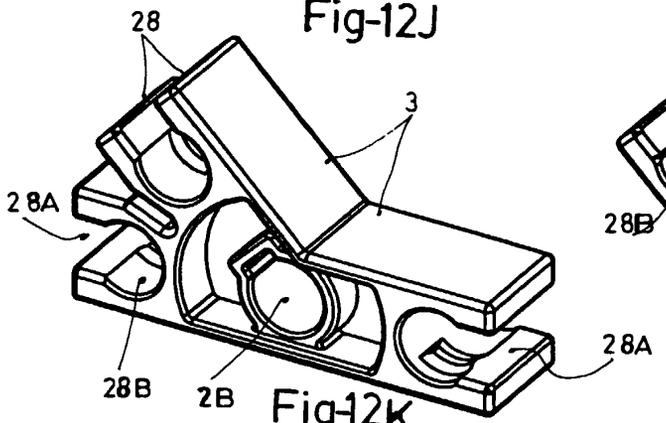


Fig-12L

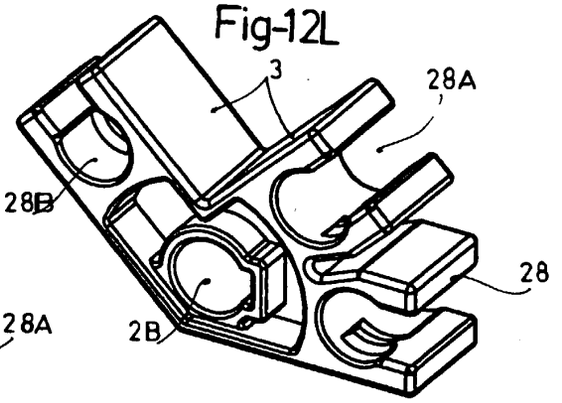


Fig-12K

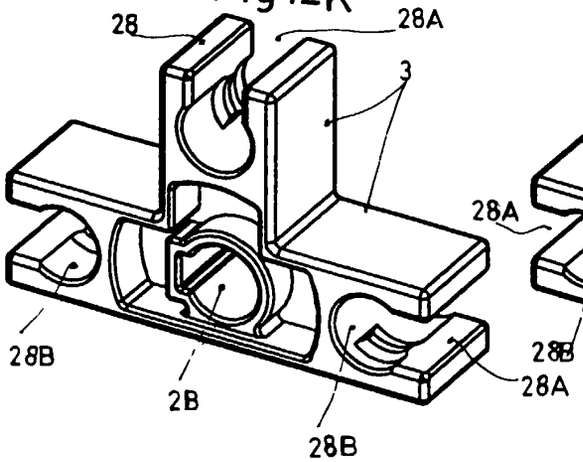


Fig-12M

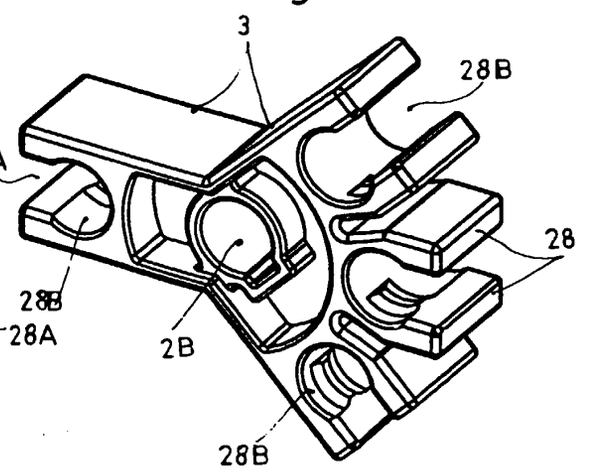


Fig-12N

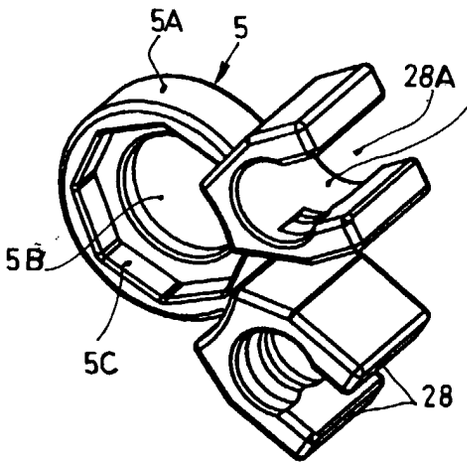


Fig-12Ñ

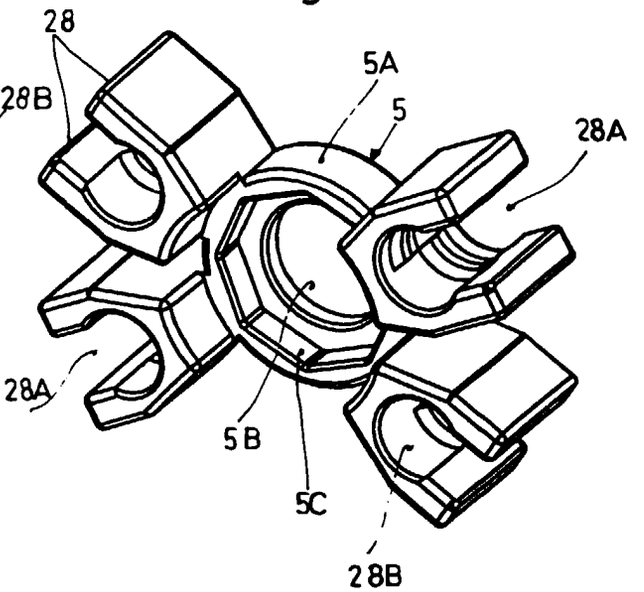


Fig-120

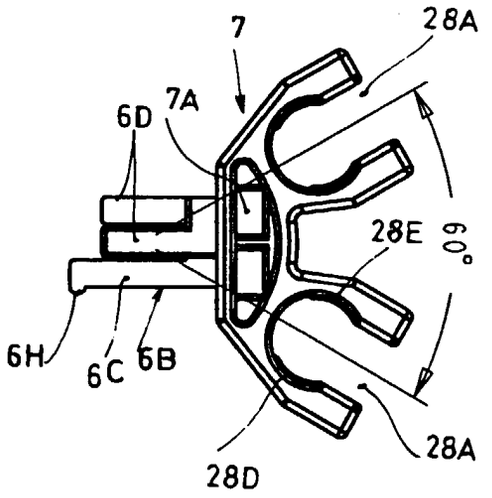


Fig-12P

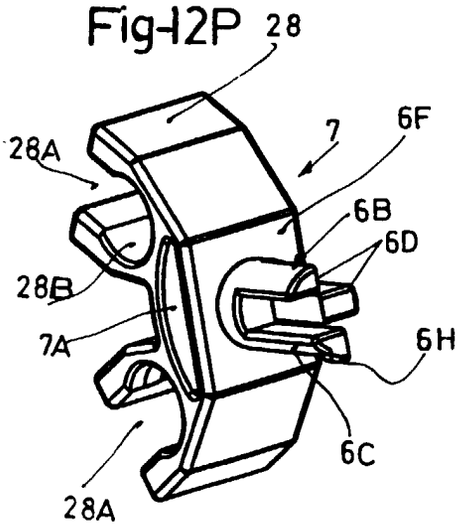


Fig-12Q

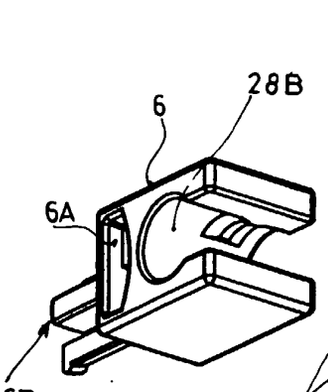


Fig-12R

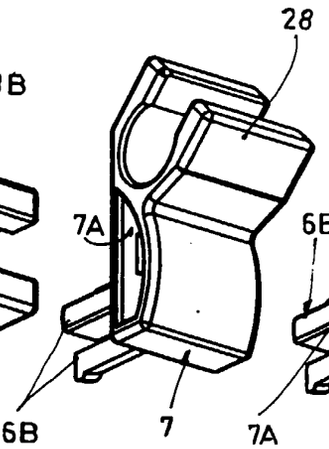


Fig-12S

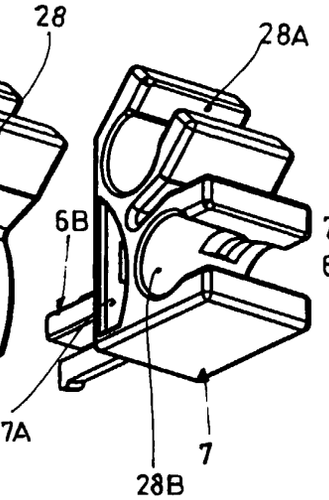


Fig-12T

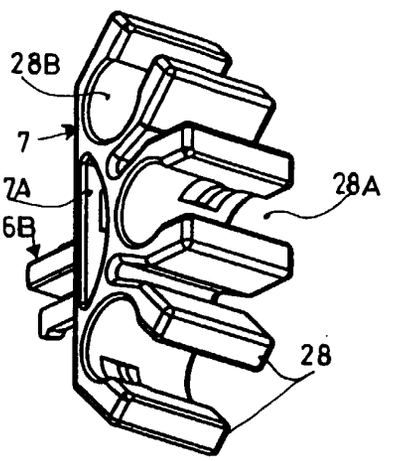


Fig-12U

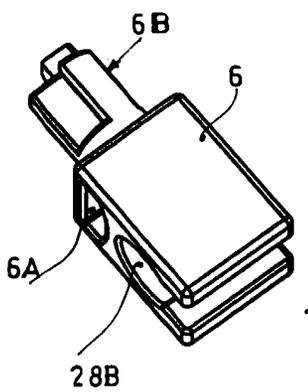


Fig-12V

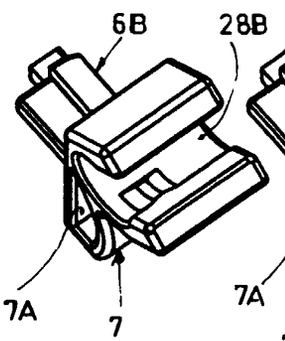


Fig-12W

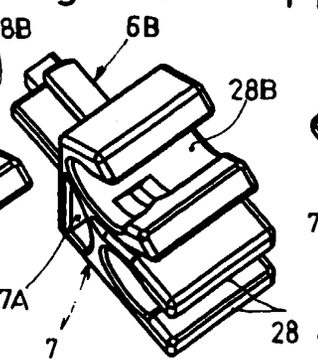


Fig-12X

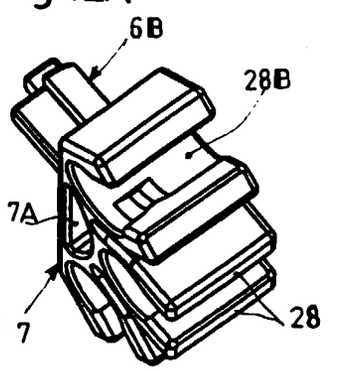


Fig-13

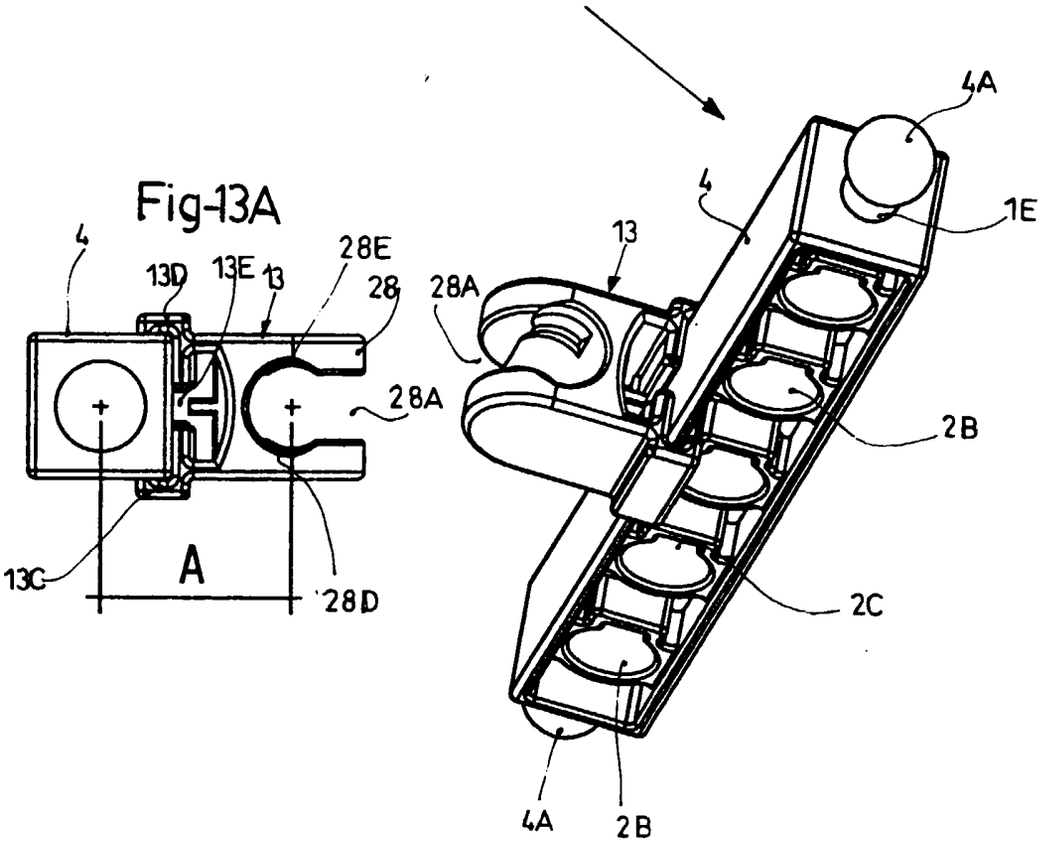


Fig-13A

Fig-14

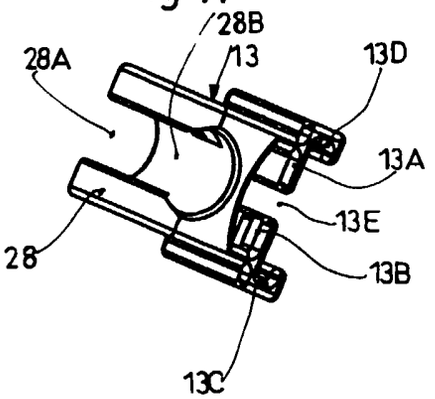


Fig-14A

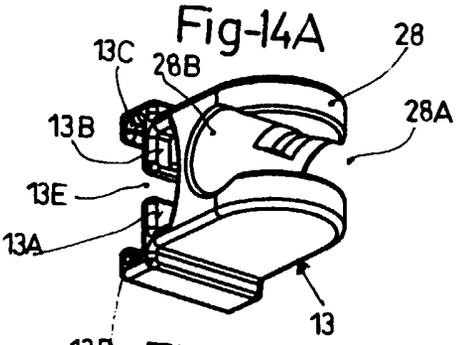


Fig-14B

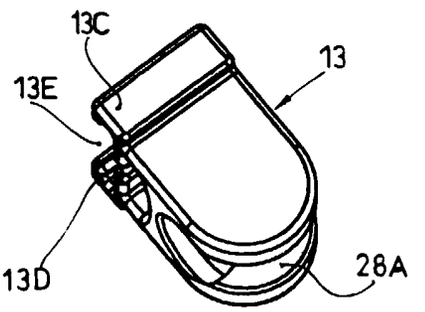


Fig-15

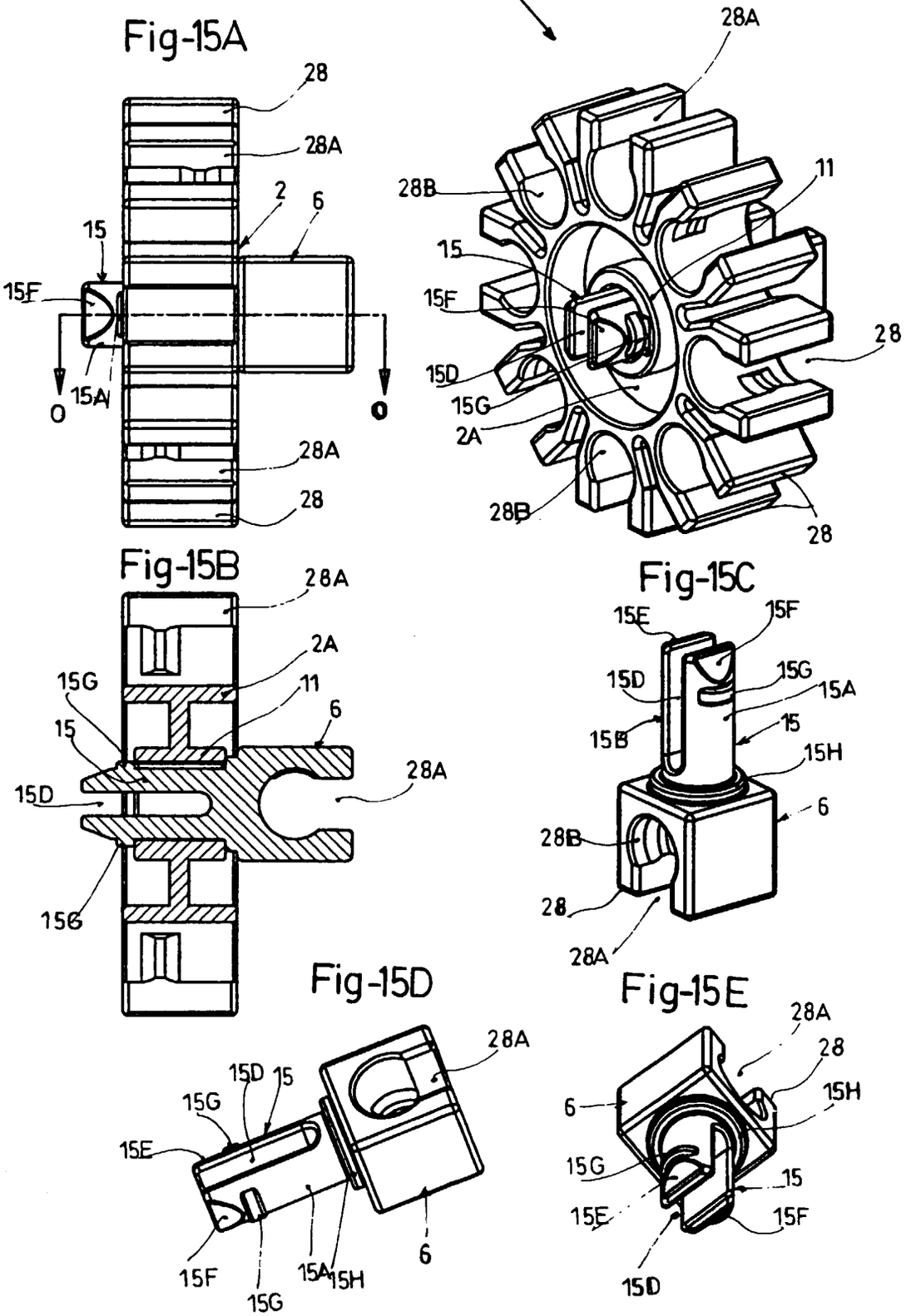


Fig-15A
28
28A
2
6
15
15F
O
15A
O
28A
28
Fig-15B
28A
2A
15G
11
15
6
28A
15D
15G
Fig-15C
15E
15F
15D
15G
15A
15B
15
15H
6
28B
28
28A
Fig-15D
28A
15D
15
15G
15E
15F
15G
15A
15H
6
Fig-15E
28A
28
6
15H
15G
15
15E
15F
15D

Fig-16A

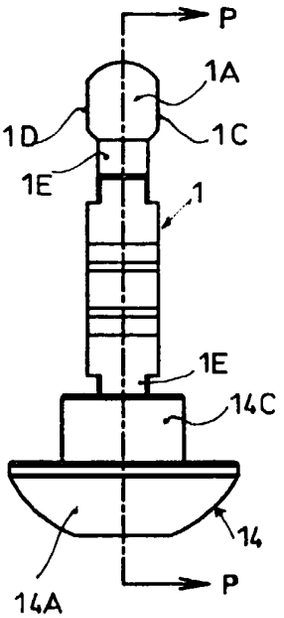


Fig-16

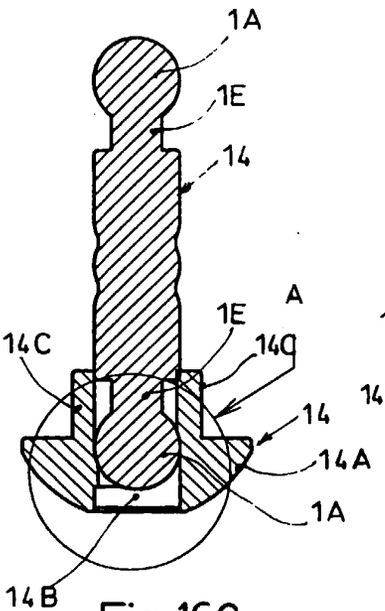


Fig-16B

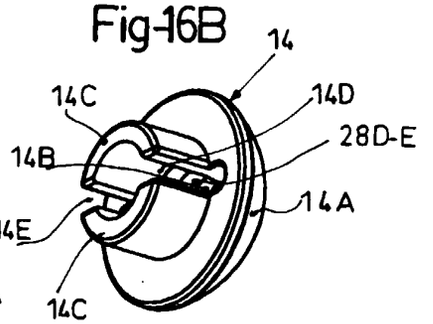


Fig-16C

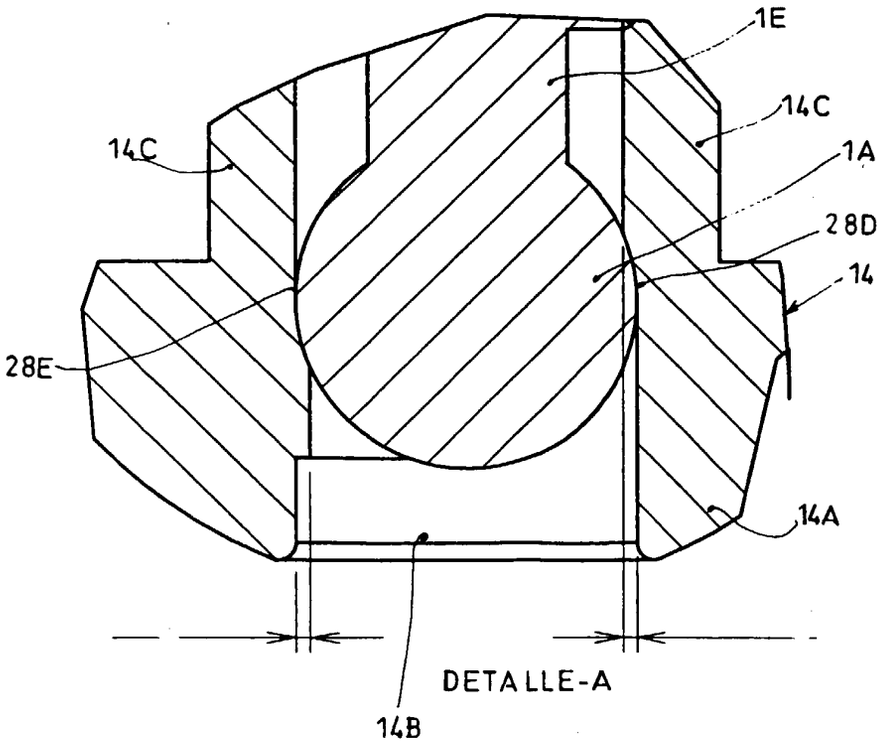


Fig-17

Fig-17A

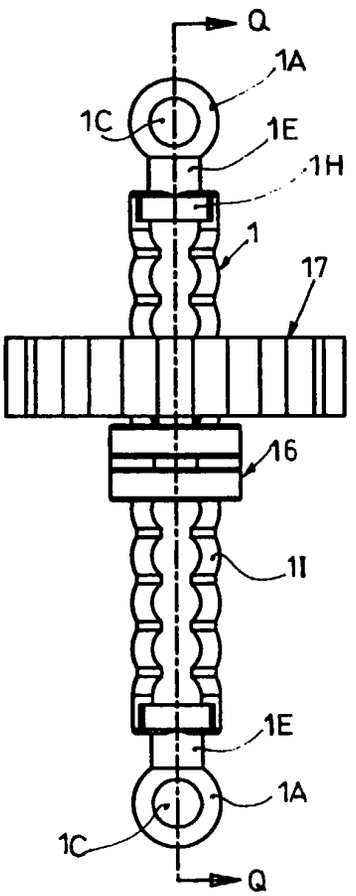


Fig-17B

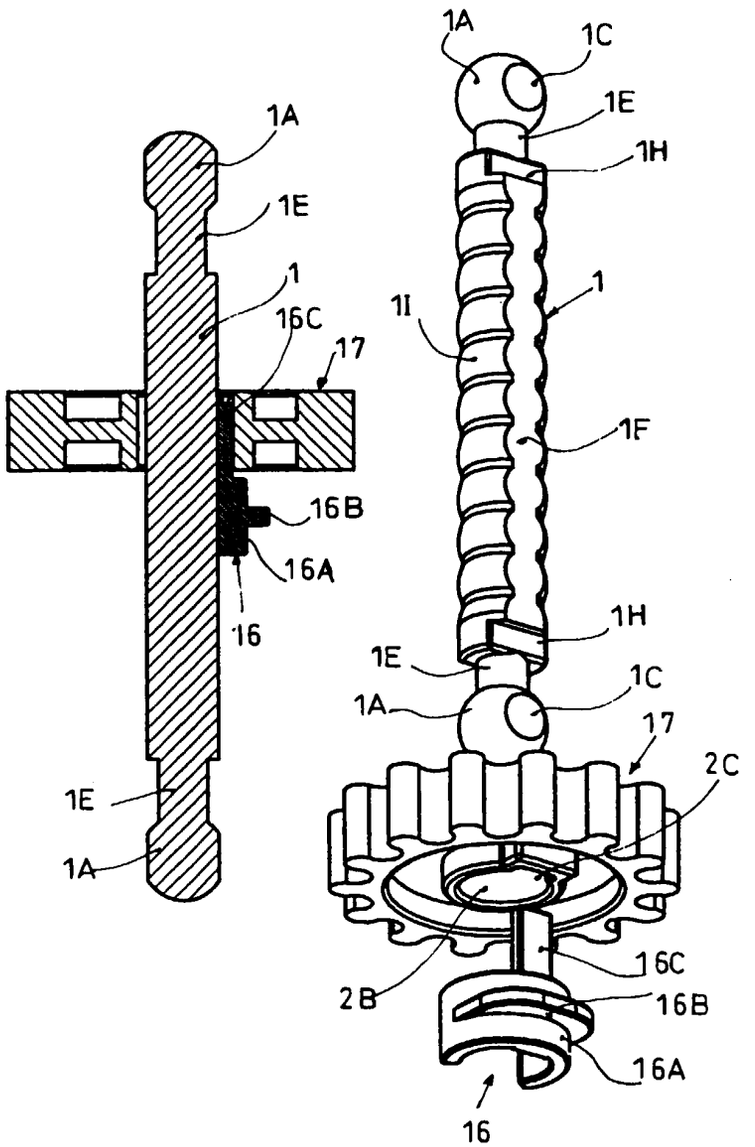


Fig.-17C

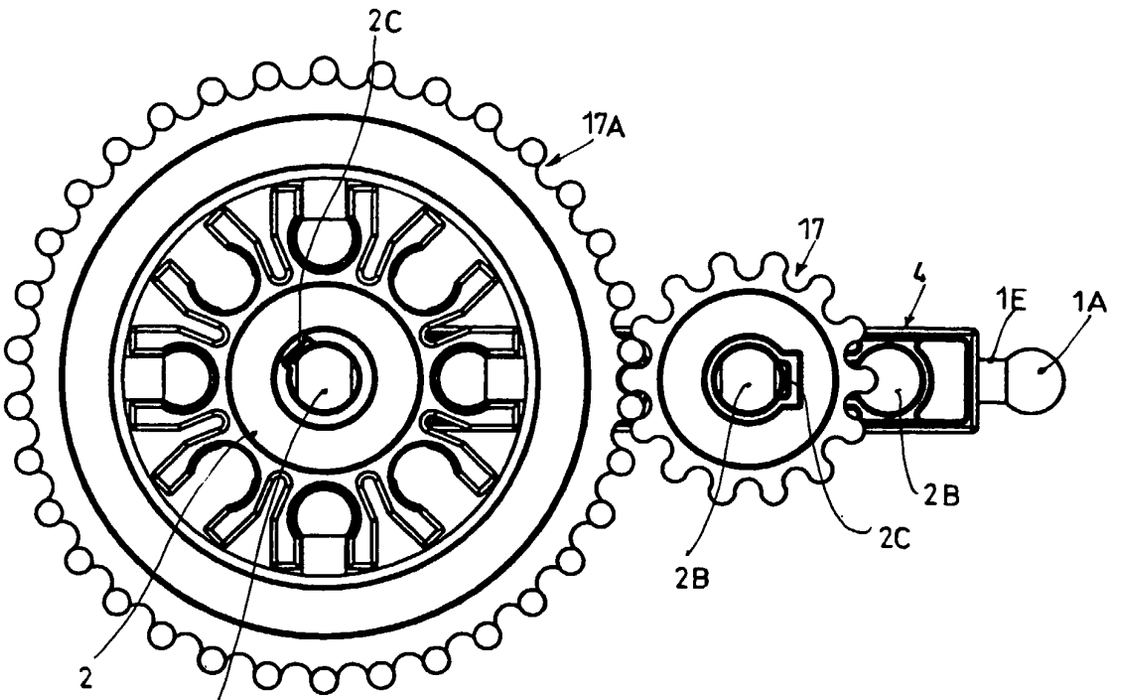


Fig-17D

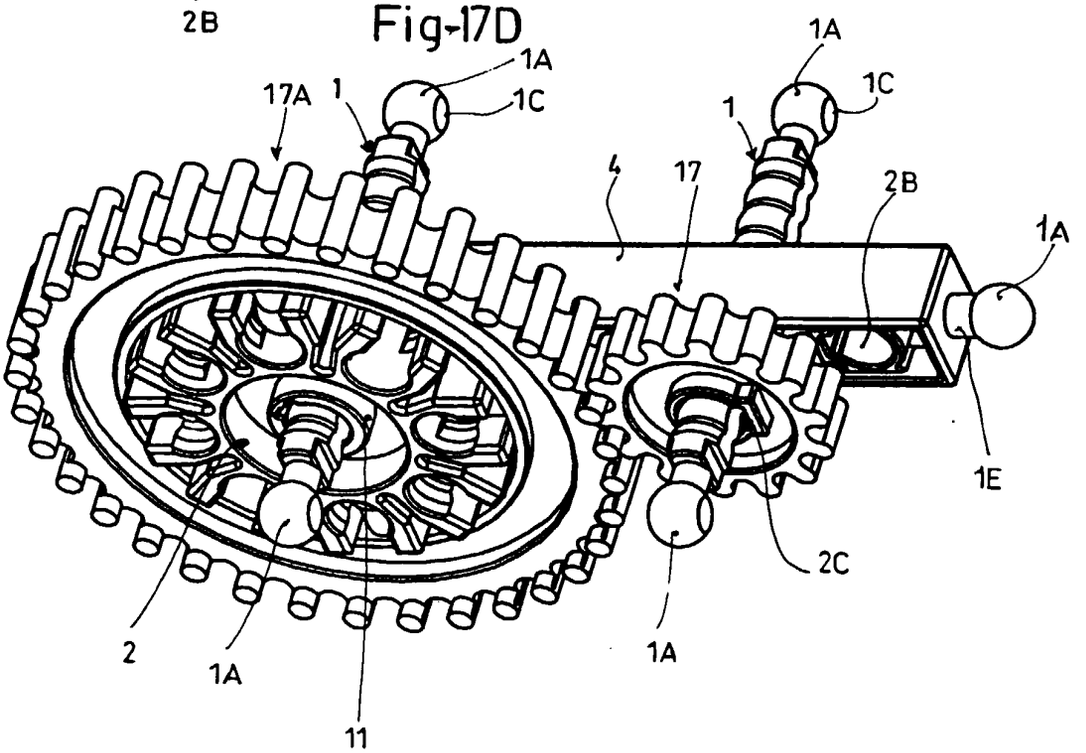


Fig-17-E

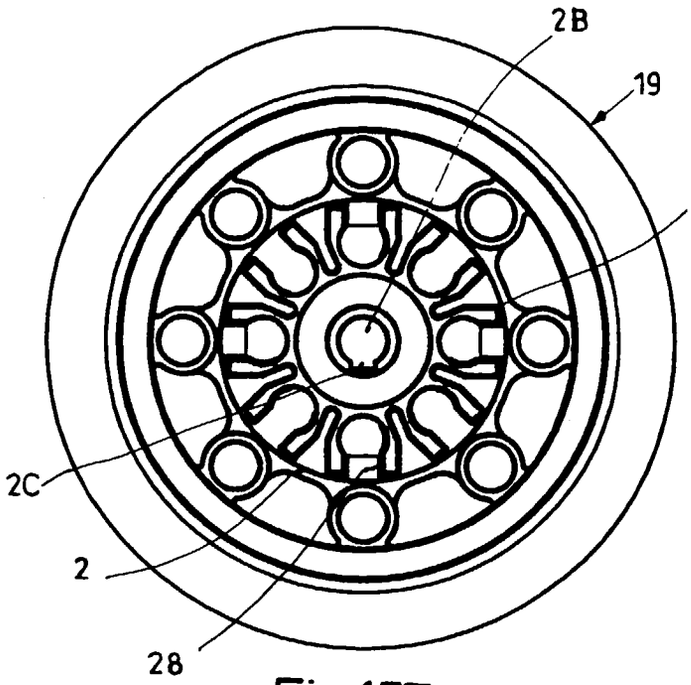


Fig-17F

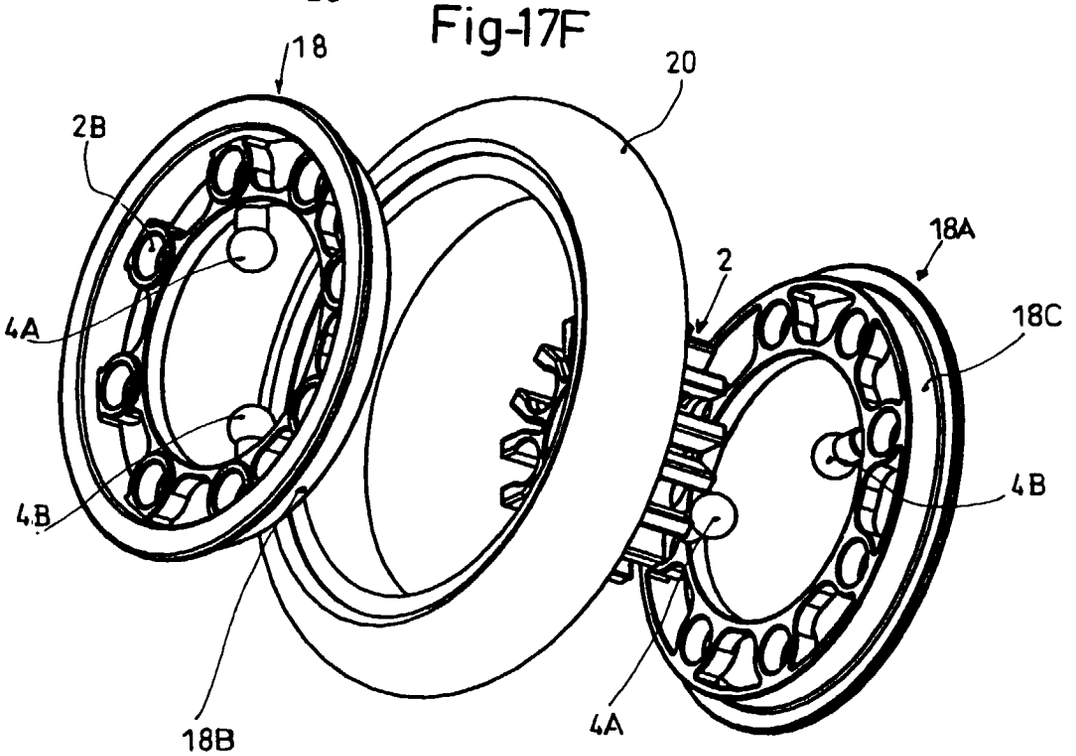


Fig-17-G

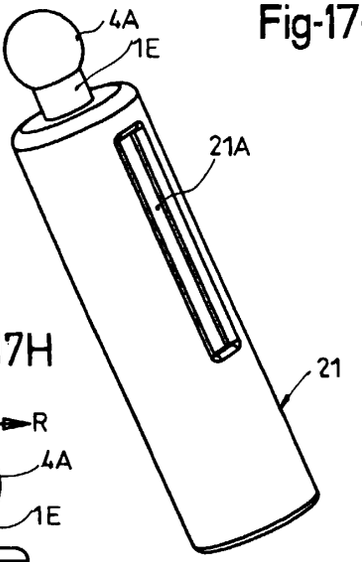
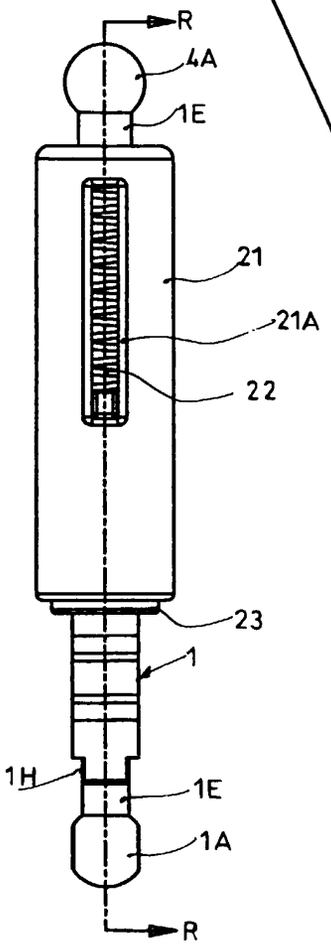
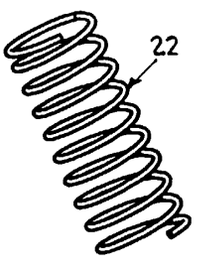


Fig-17H





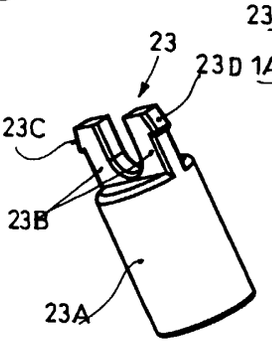


Fig-17I

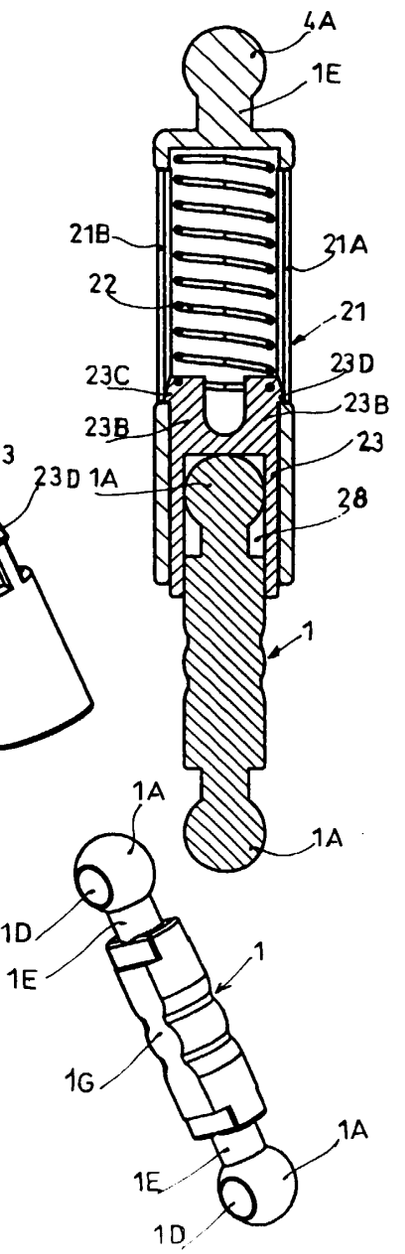


Fig-18A Fig-18 Fi -18B

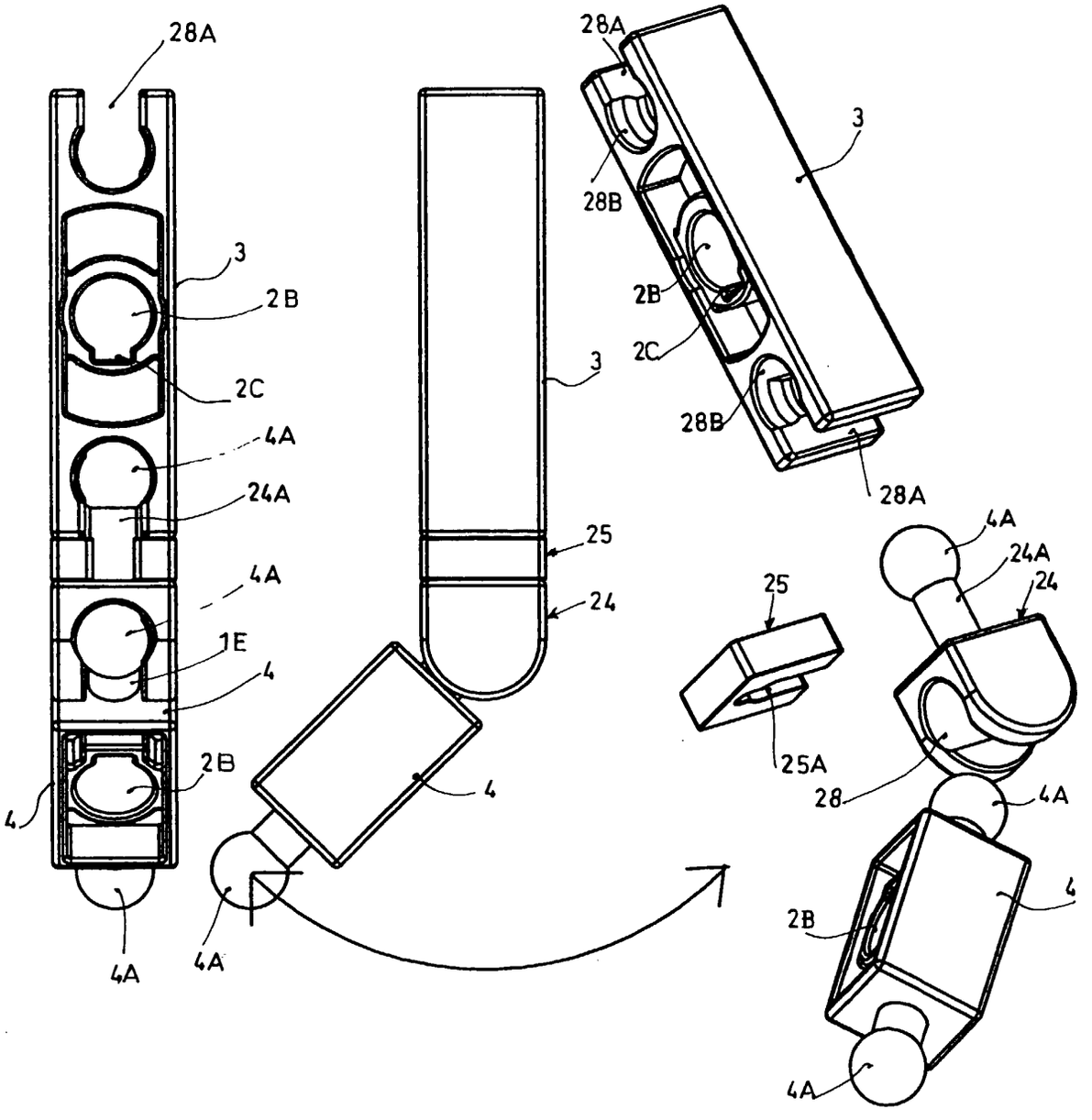


Fig-19

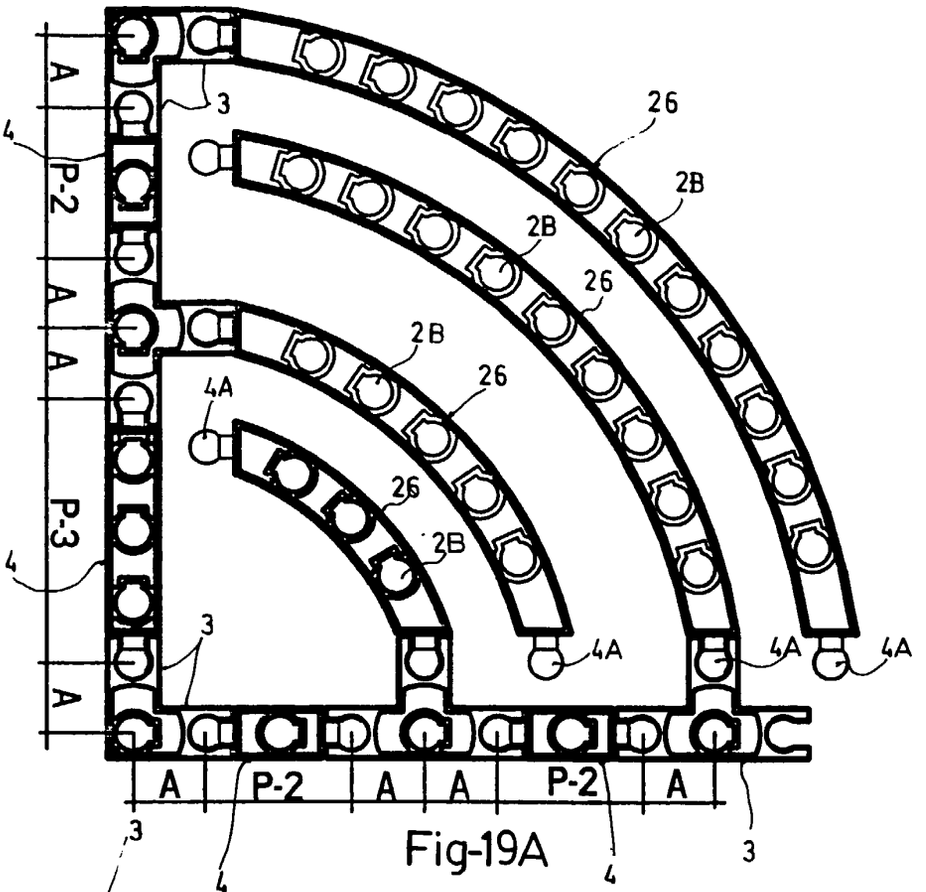


Fig-19A

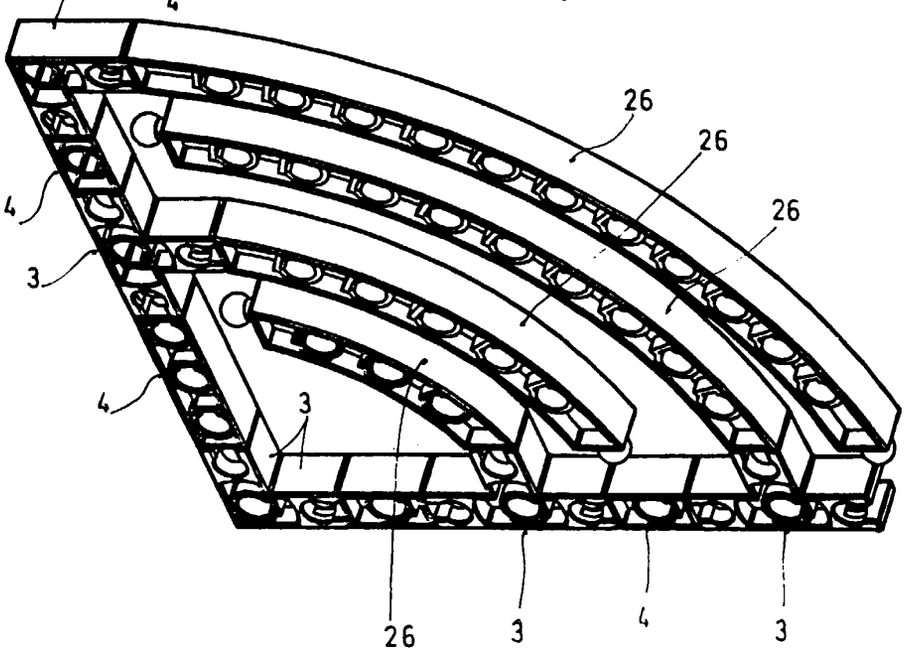


Fig-20

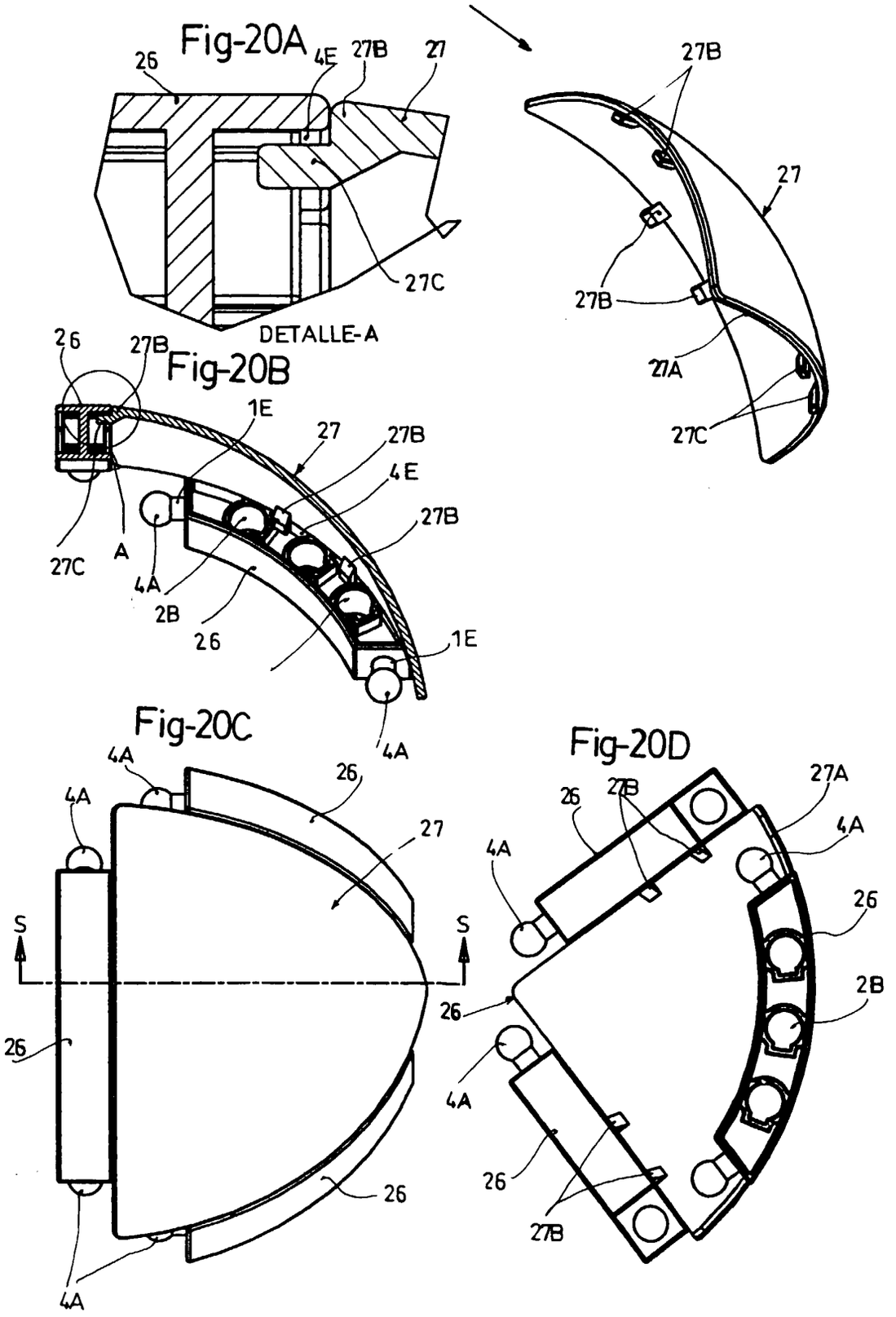


Fig-20A
26
4E
27B
27
27C
DETALLE-A
27B
27
27B
27A
27C
Fig-20B
26
27B
1E
27
27B
4E
27B
A
27C
4A
2B
26
1E
4A
Fig-20C
4A
4A
26
27
S
S
26
26
4A
Fig-20D
27A
26
27B
4A
4A
26
26
2B
4A
26
27B

Fig-20E

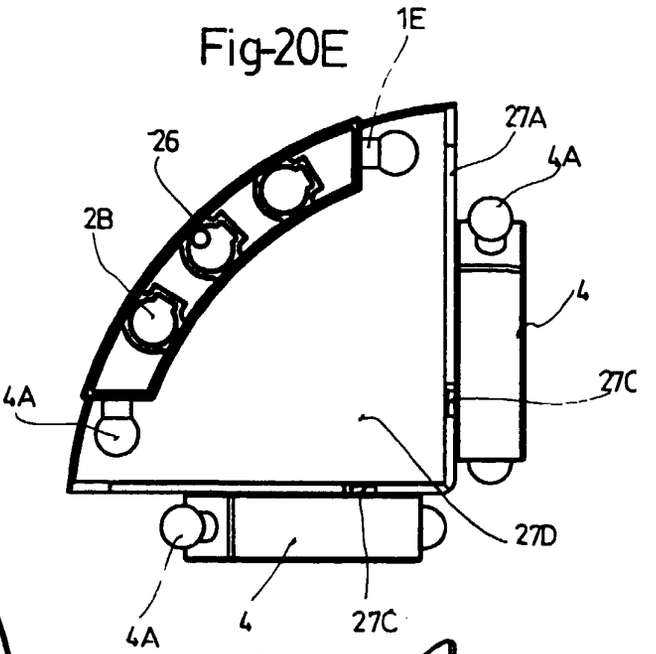


Fig-20F

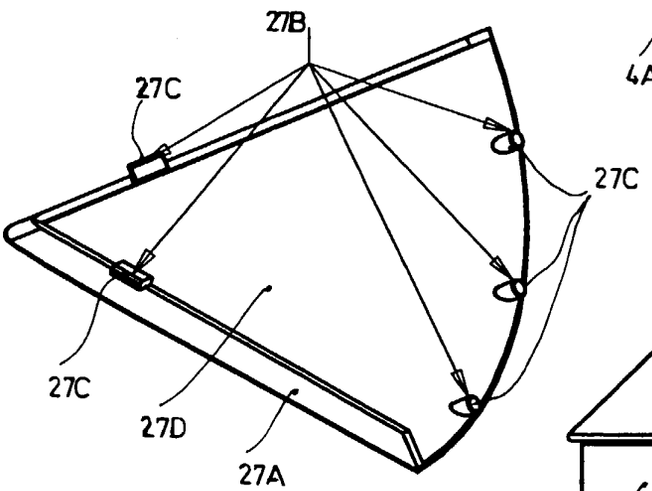


Fig-20G

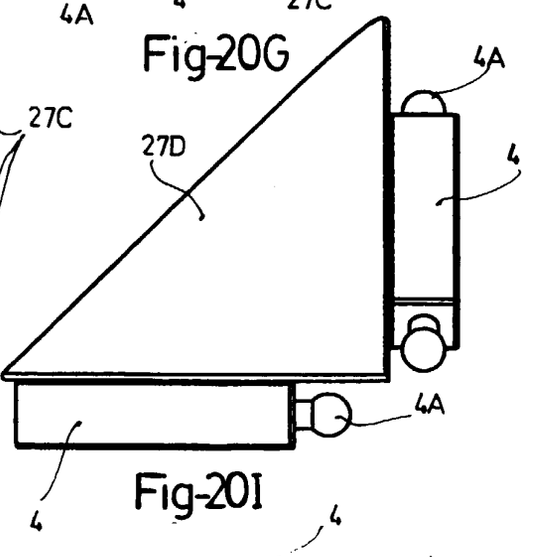


Fig-20H

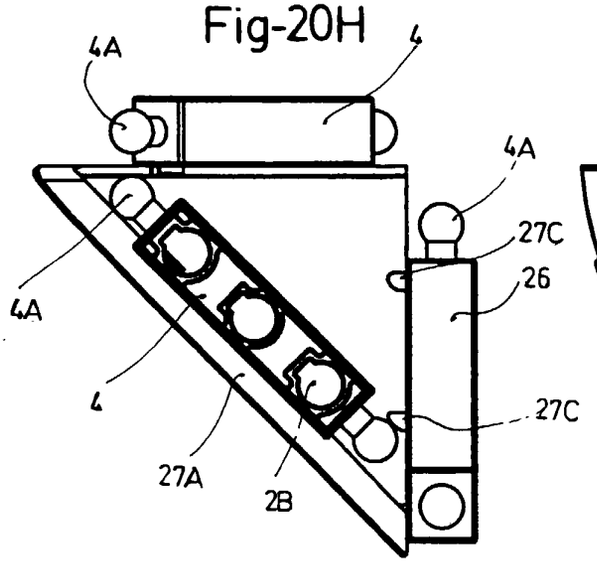


Fig-20I

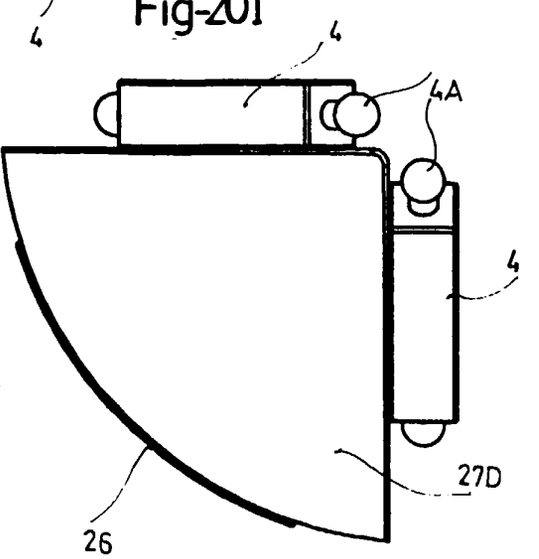


Fig.-21

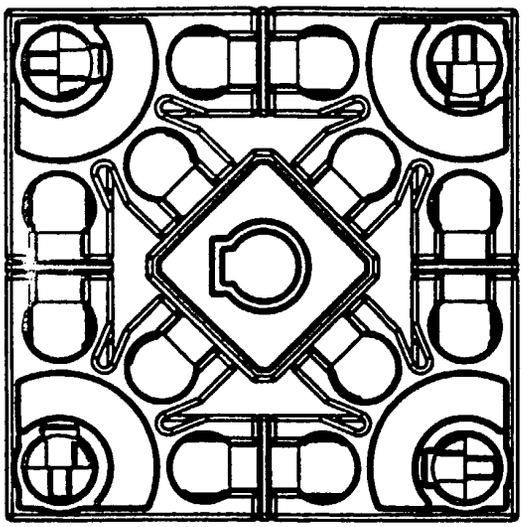


Fig-21A

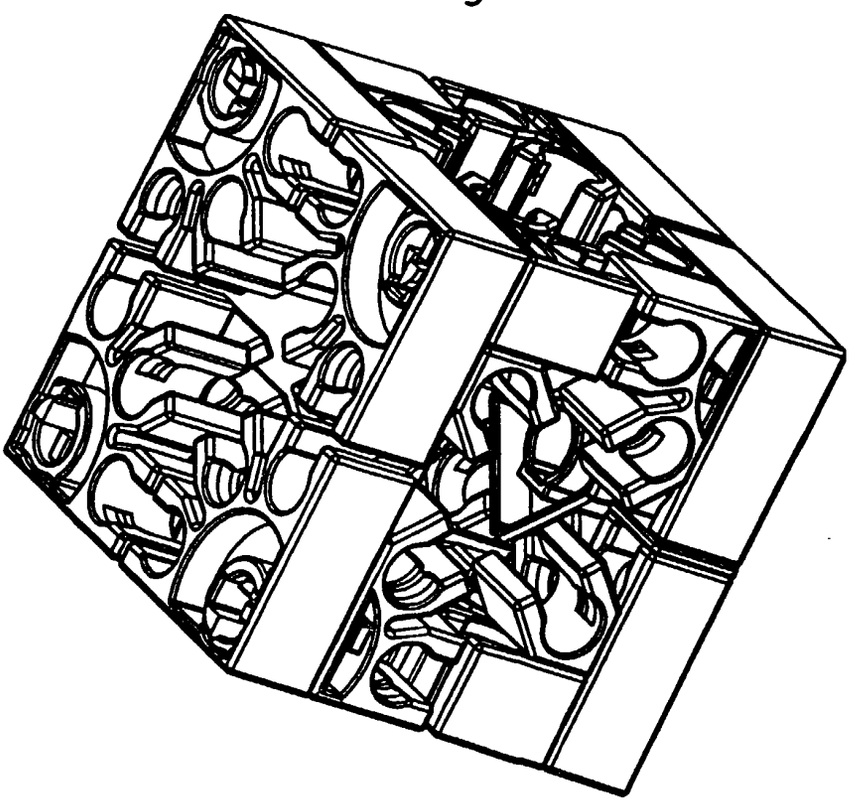


Fig-21B

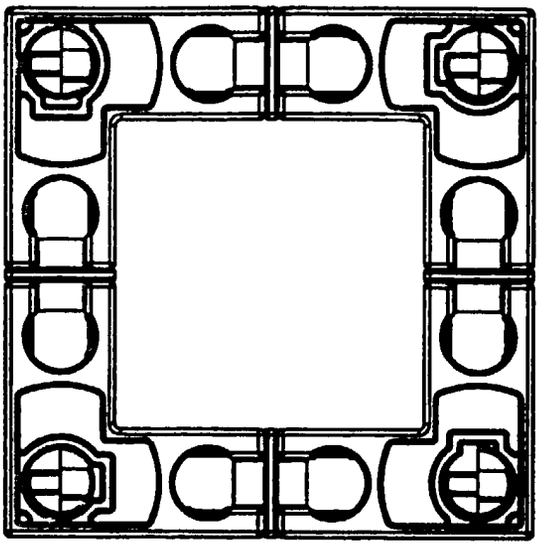


Fig-21C

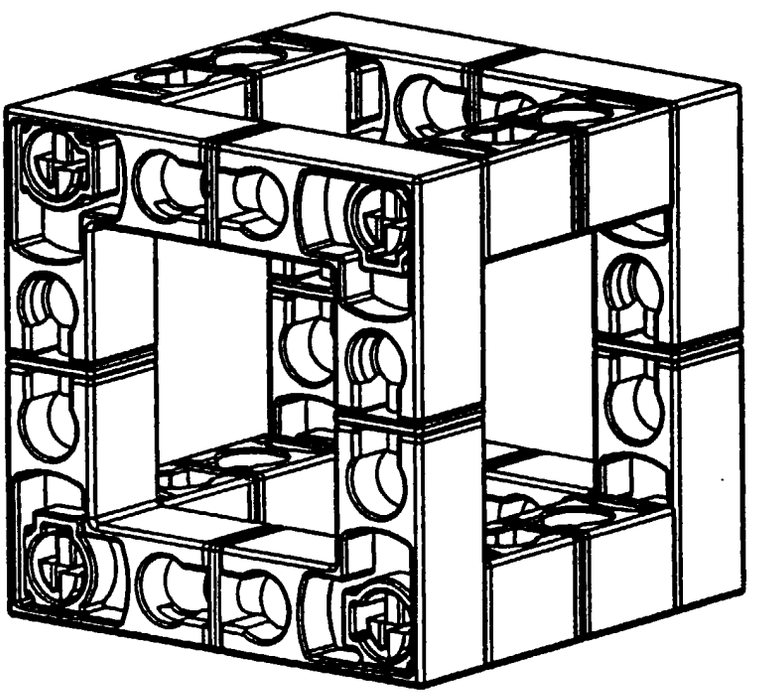


Fig.-21D

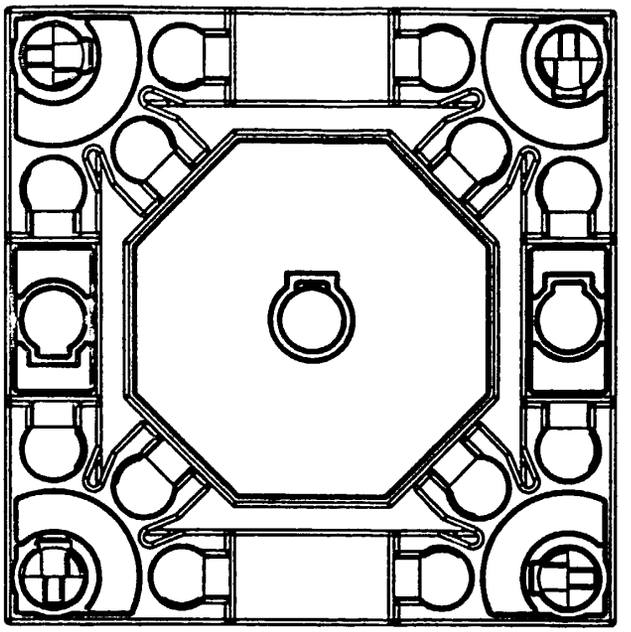


Fig-21E

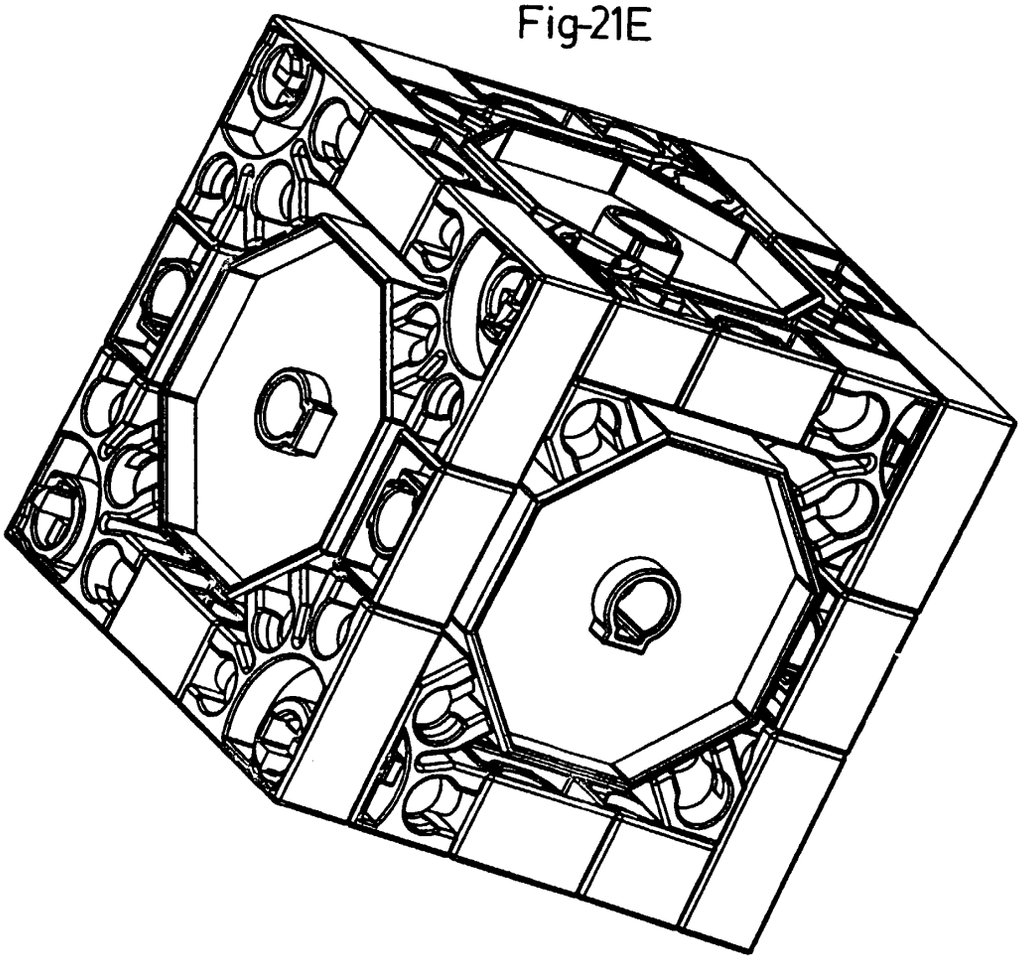


Fig.-22

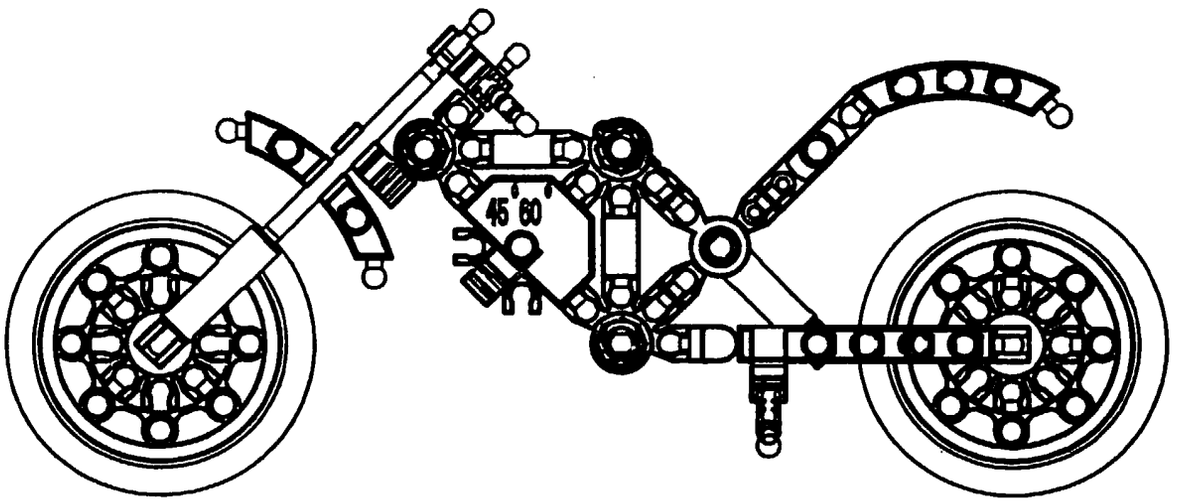
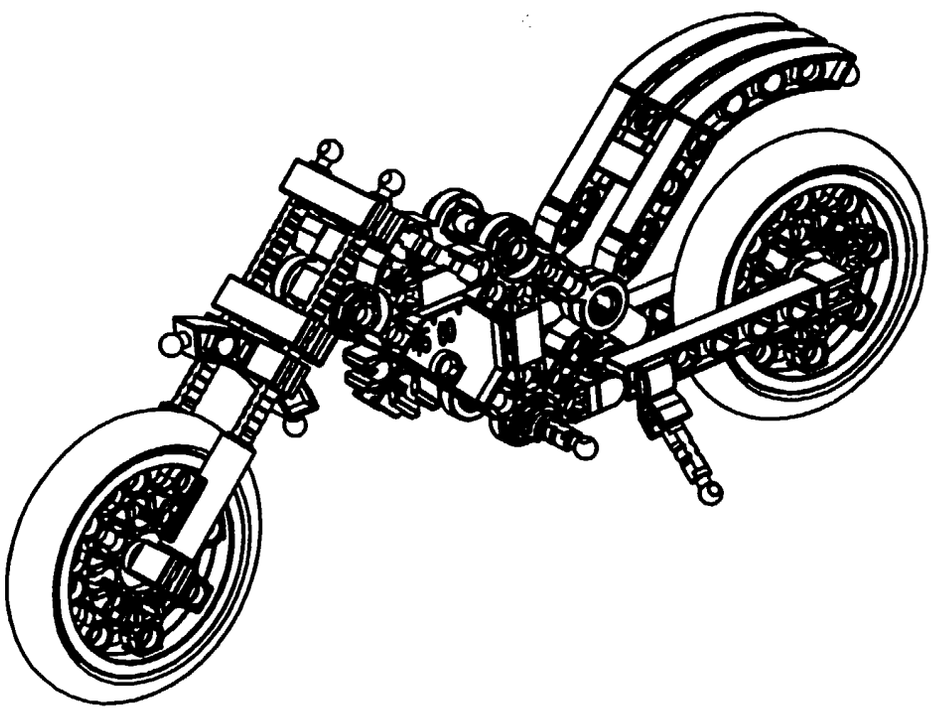


Fig-22A



Fig,-23A

Fig-23

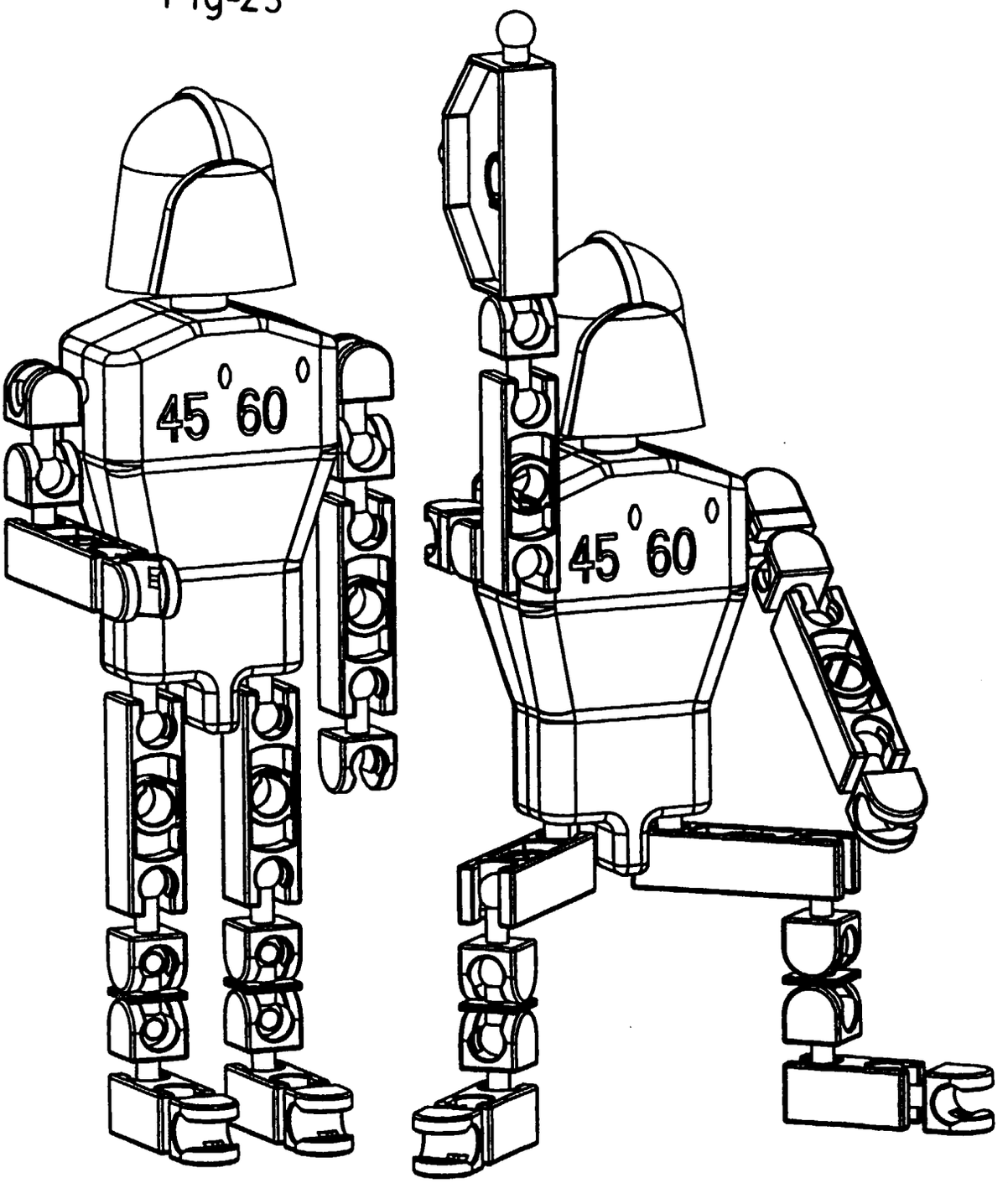


Fig.-24

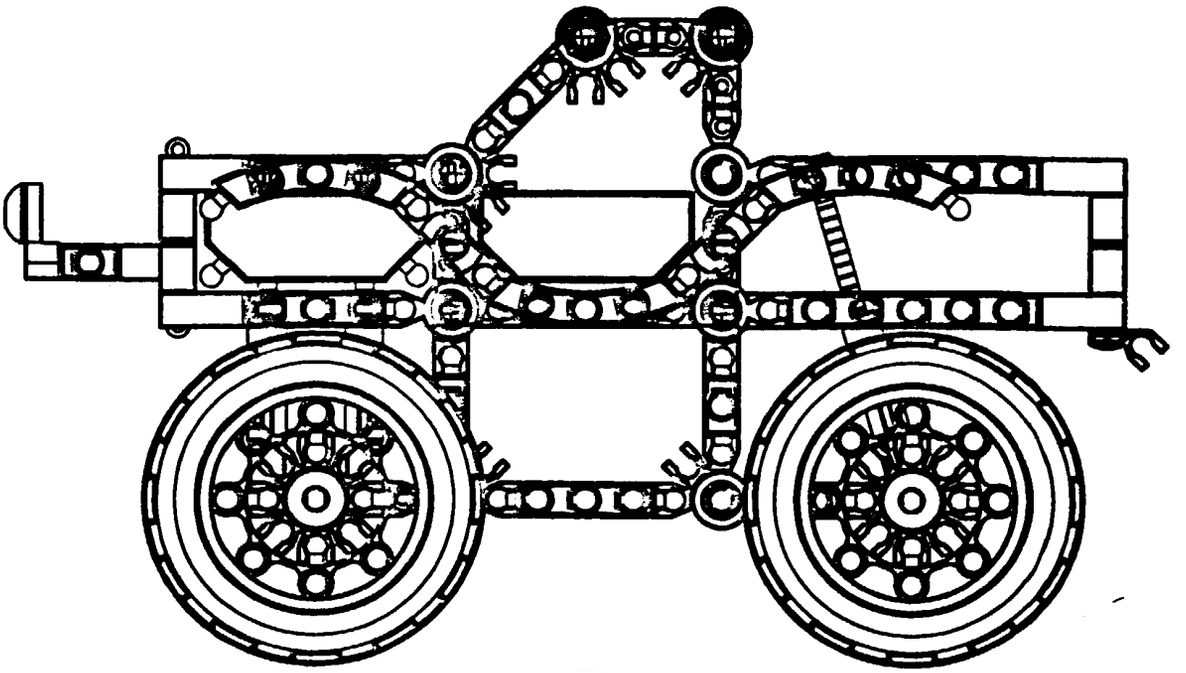


Fig-24A

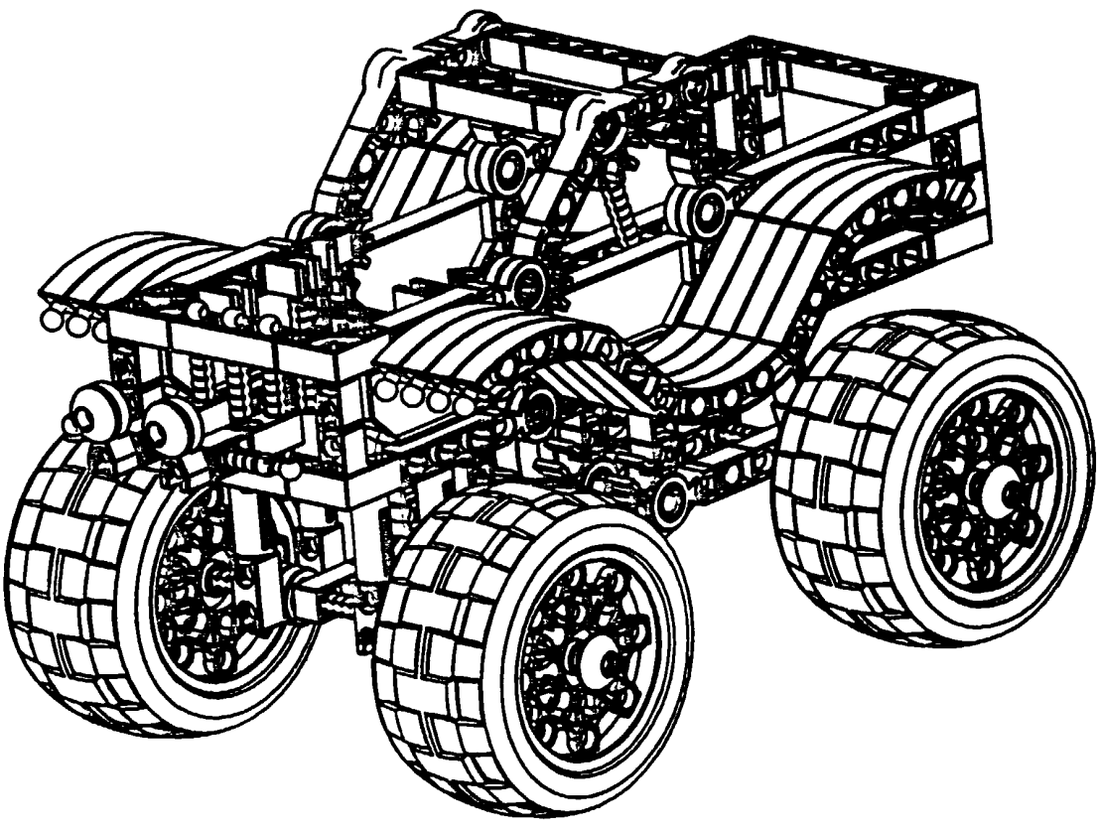


Fig.-25

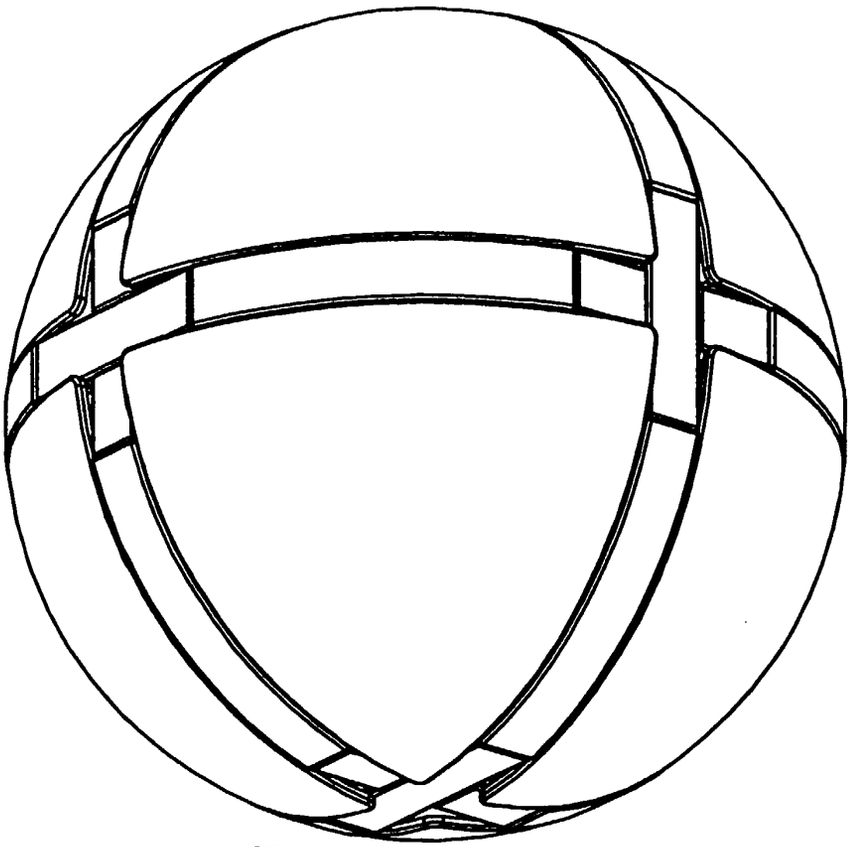


Fig-26

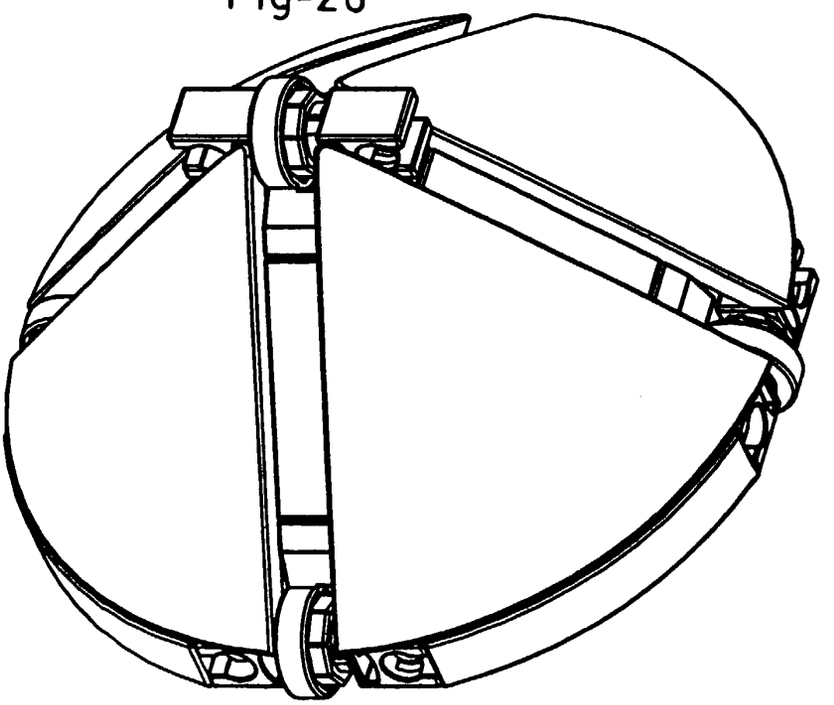


Fig.-27

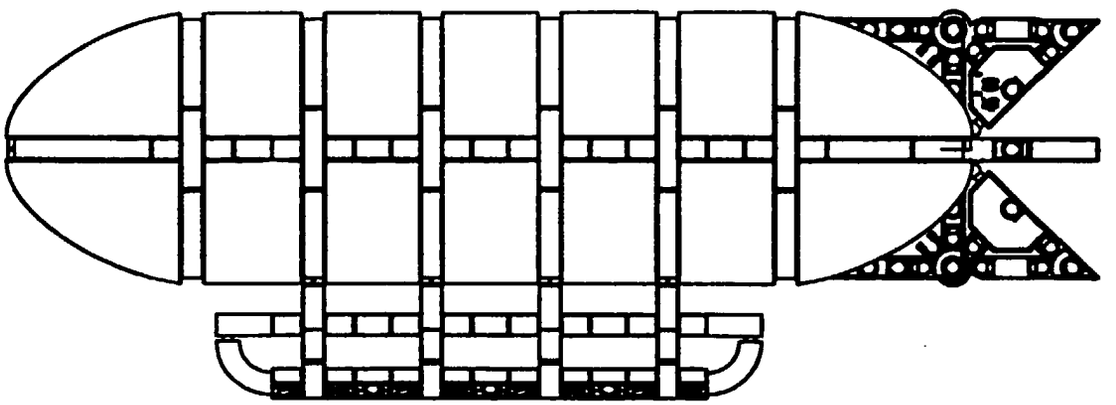


Fig-27A

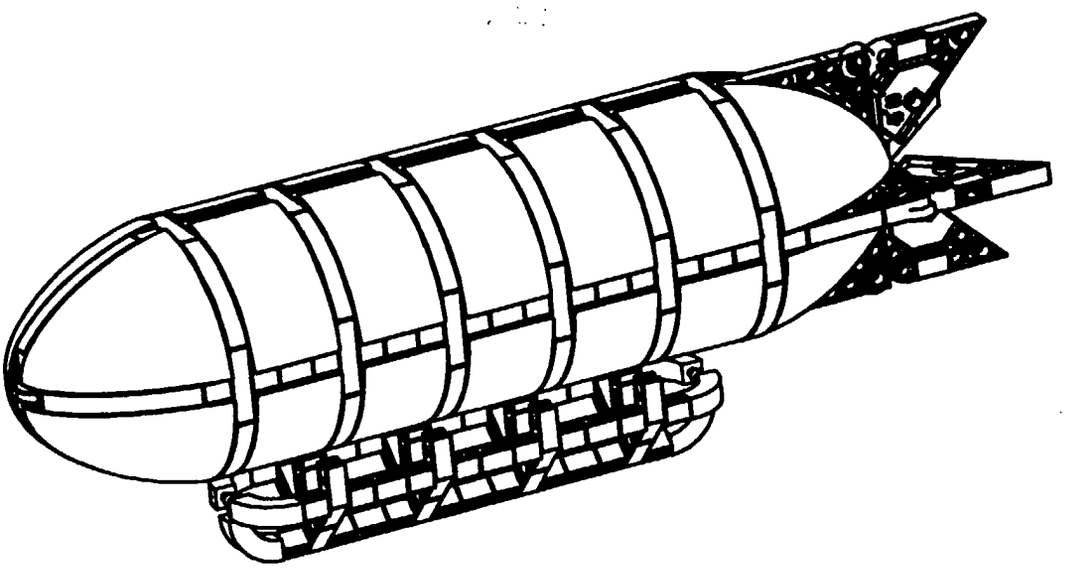


Fig.-28

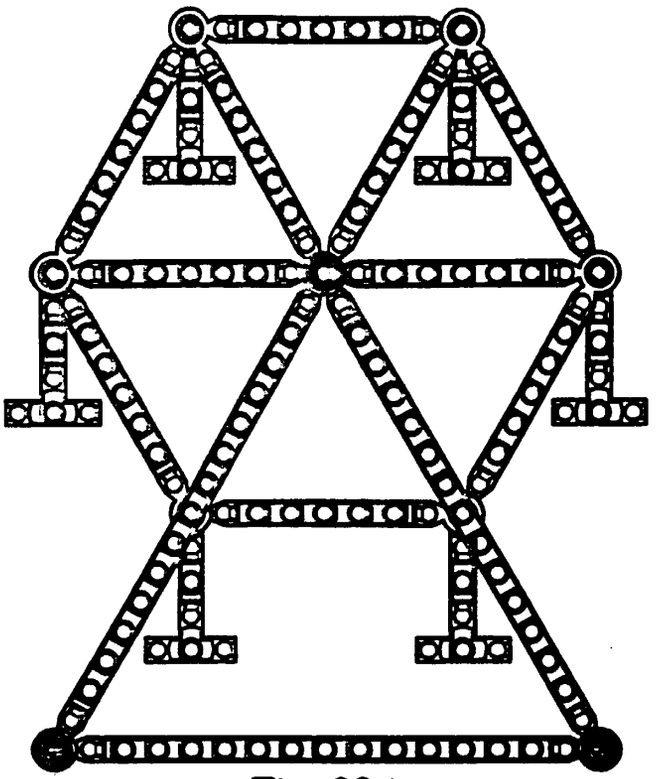


Fig-28A

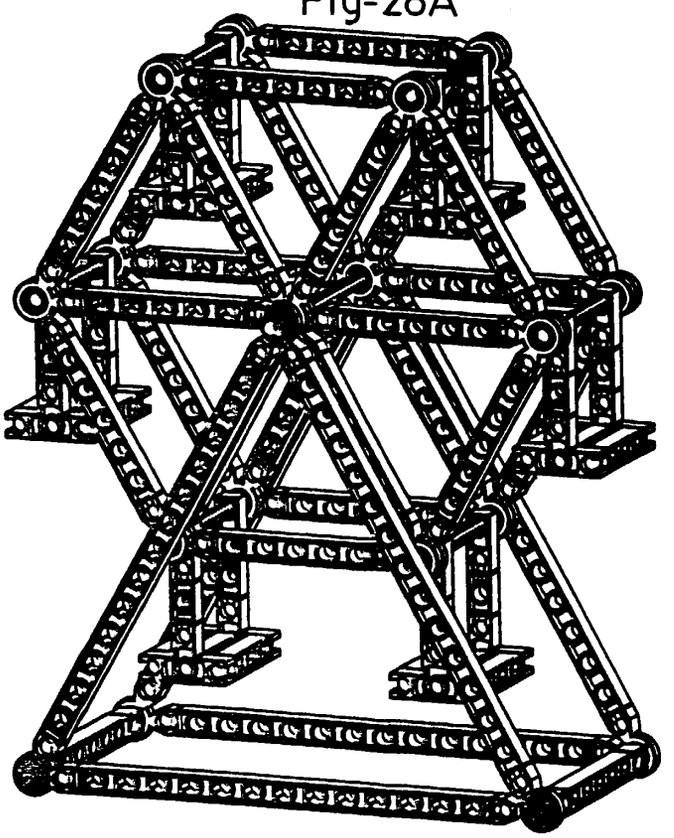


Fig.-29

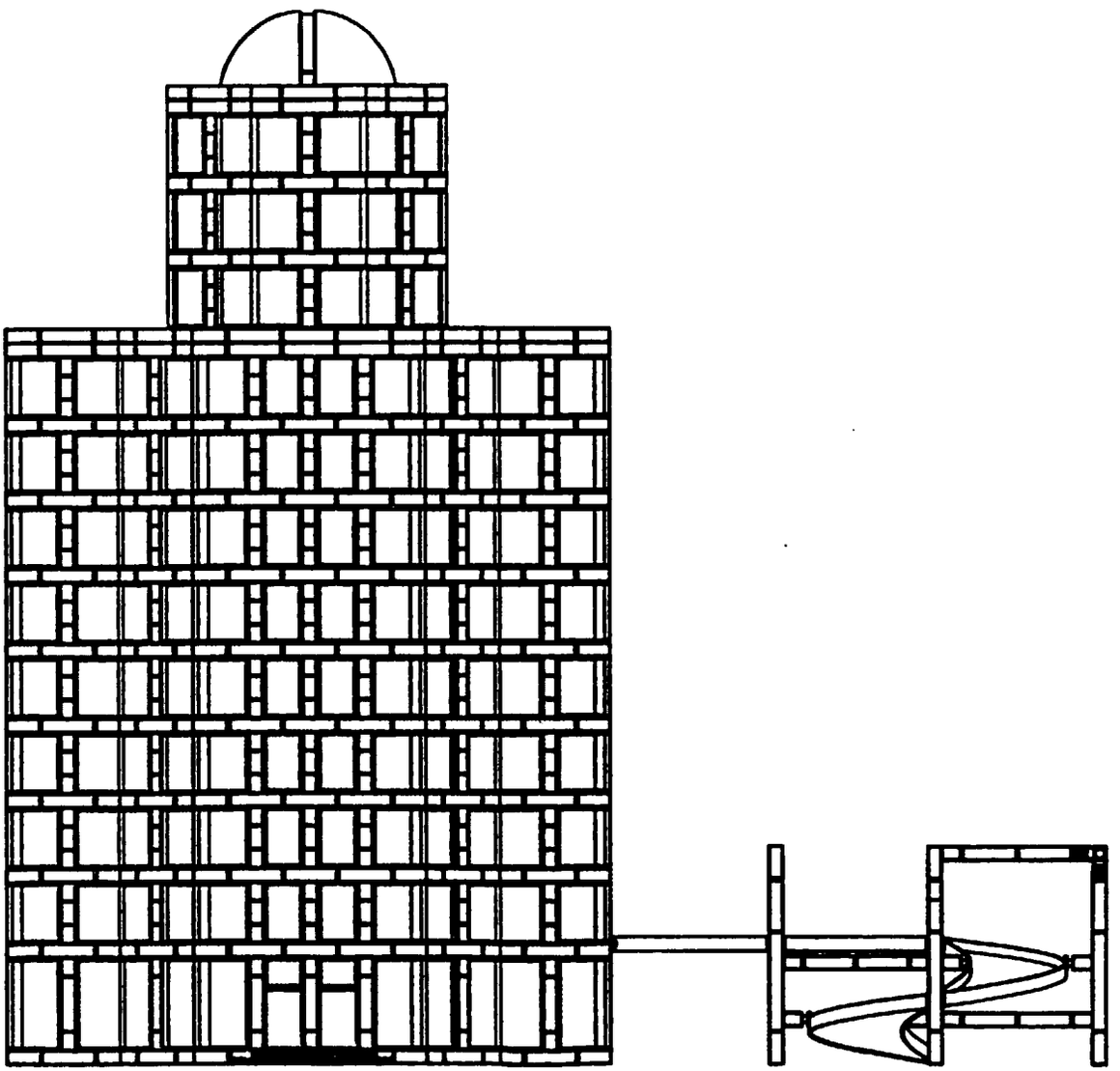


Fig-30

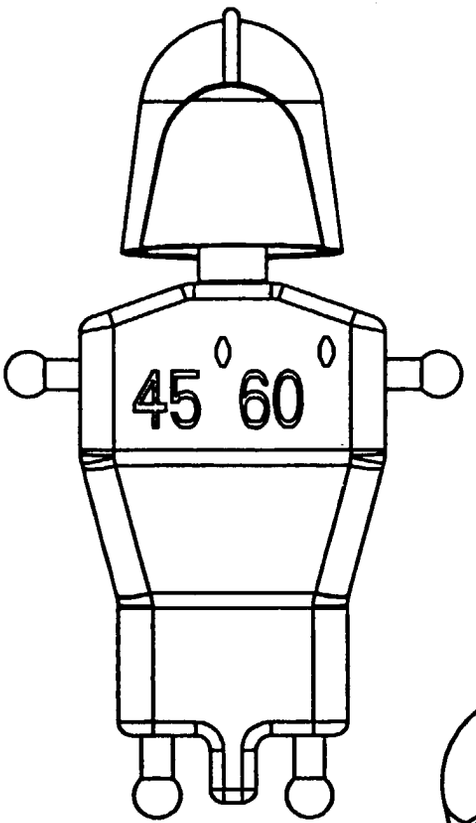


Fig-30A

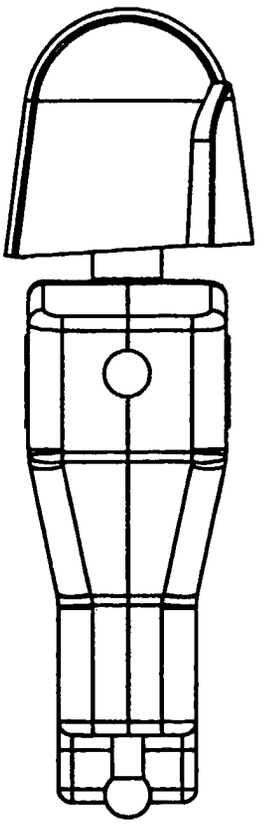


Fig-30B

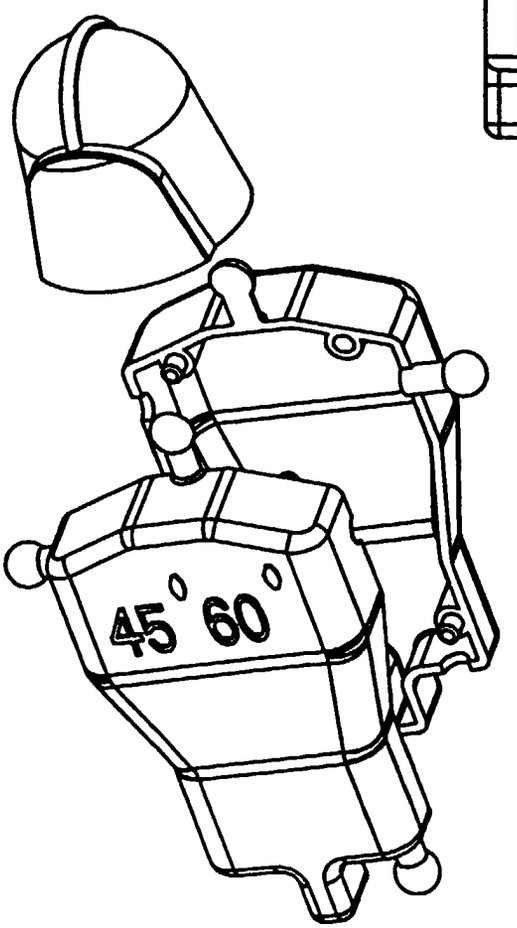


Fig-31

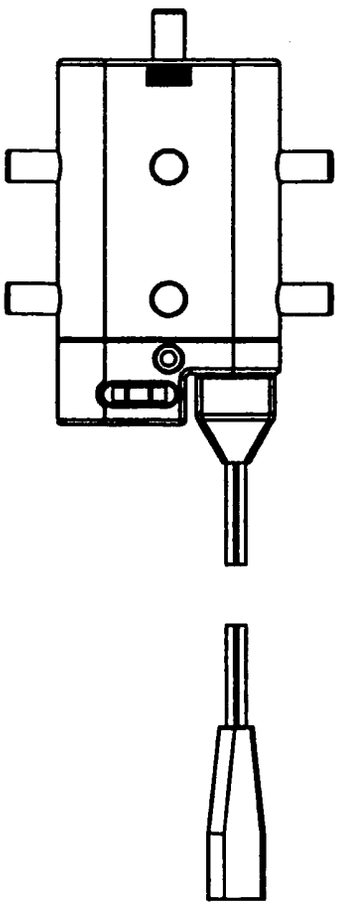


Fig-31A

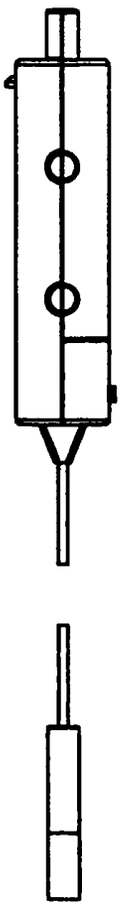


Fig-31B

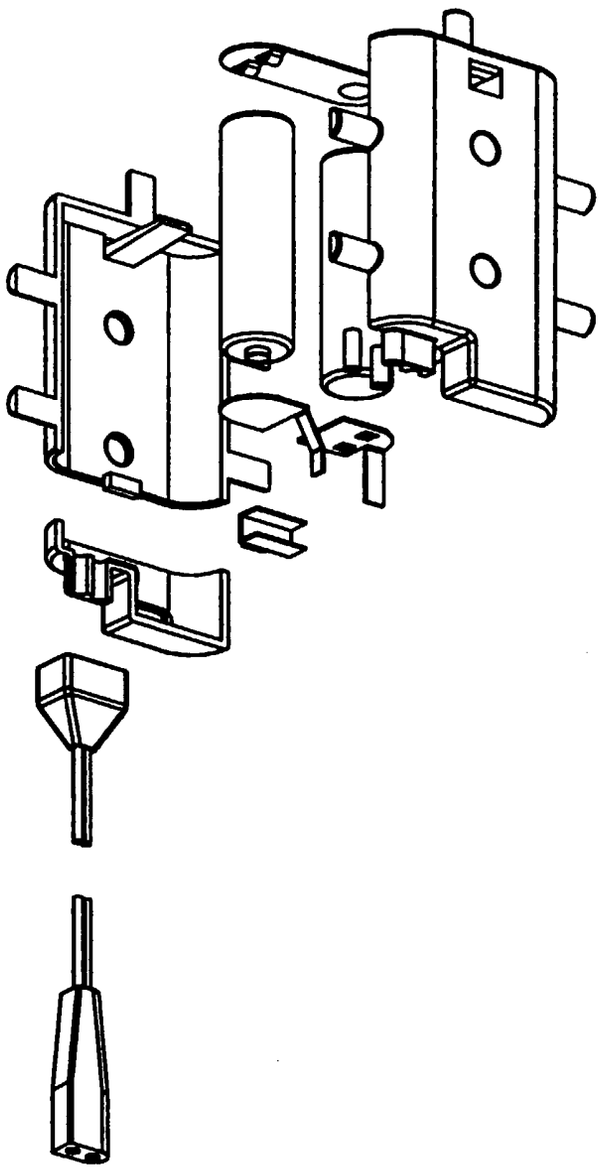


Fig-32

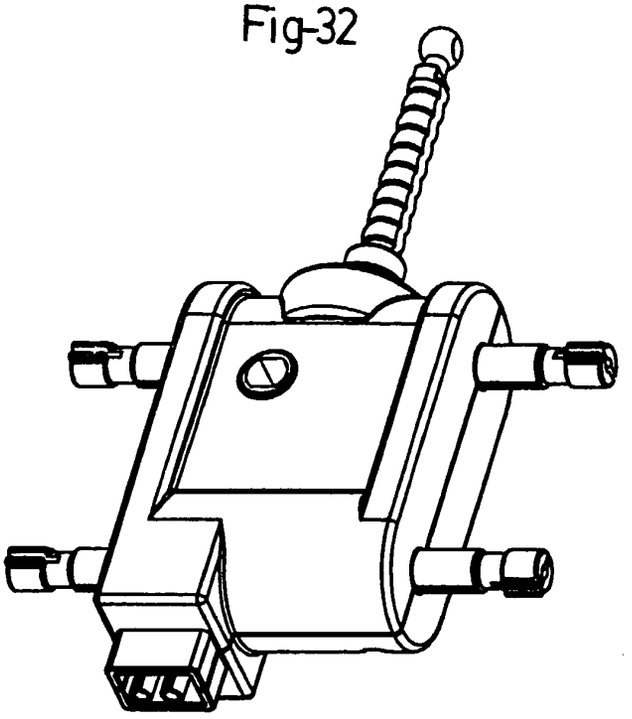


Fig-32A

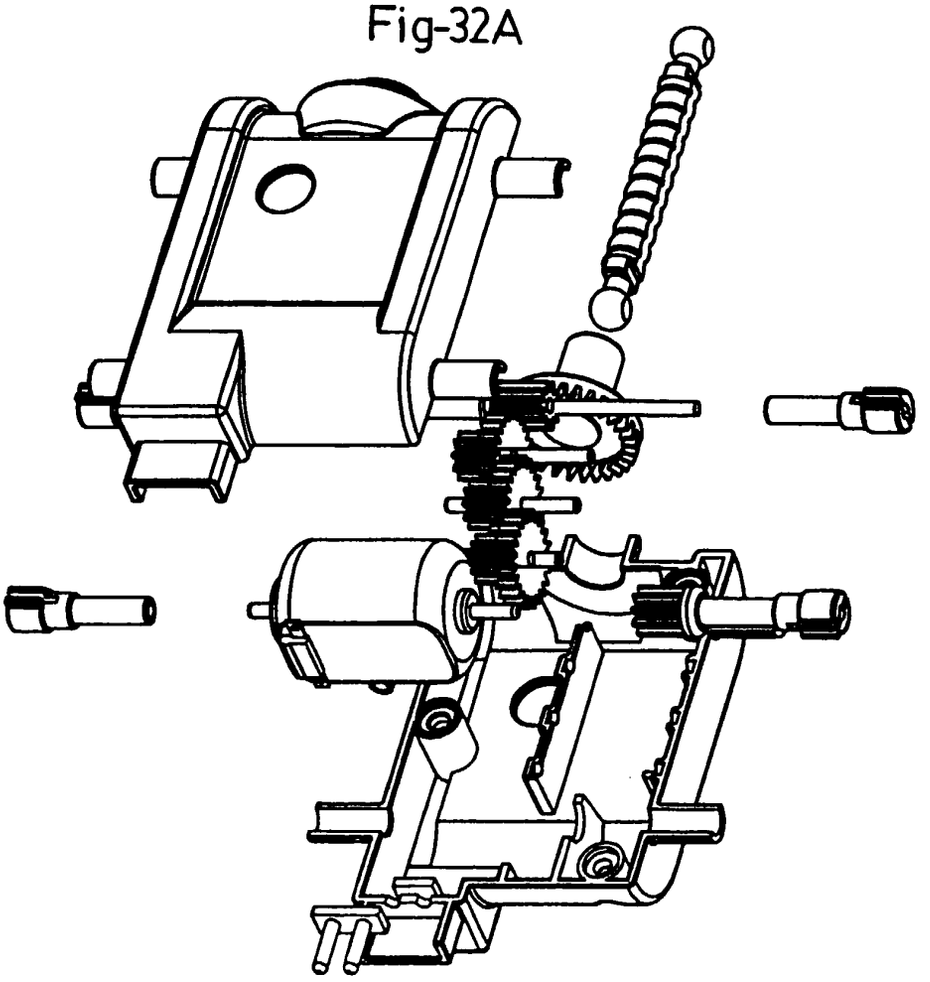


Fig-33

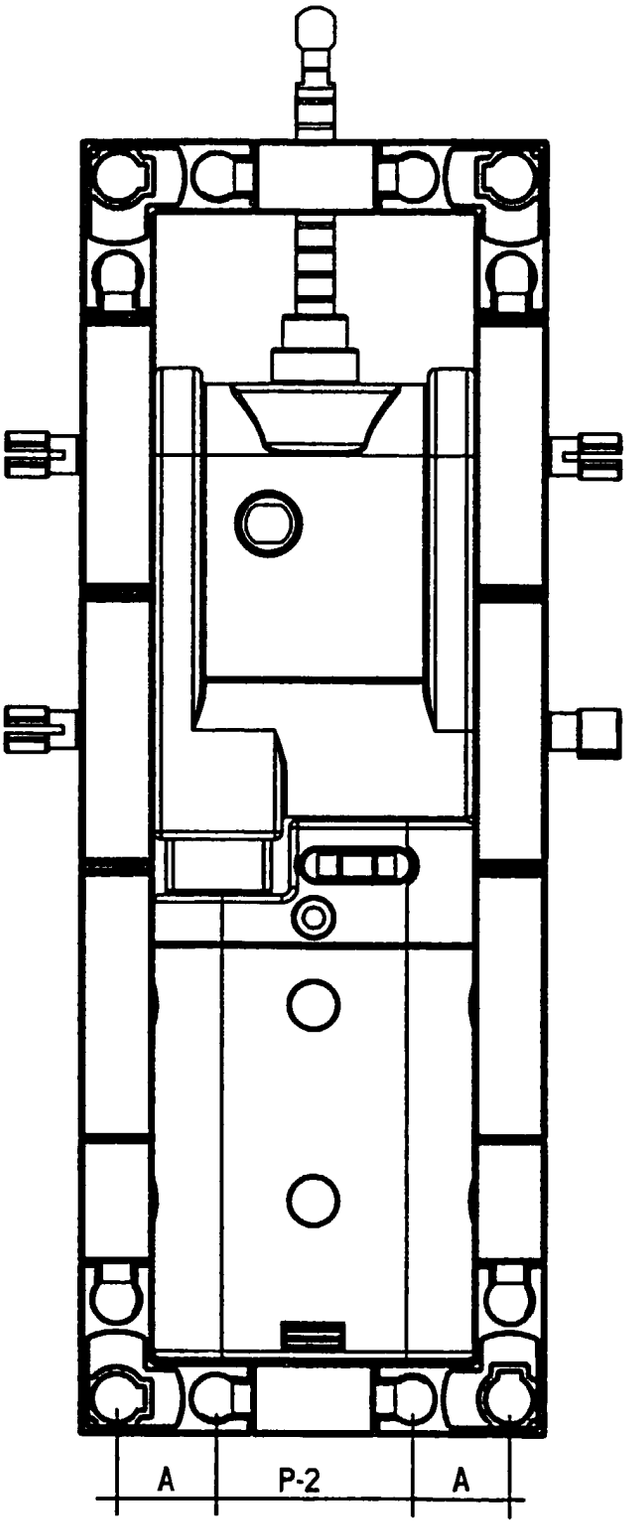


Fig-33A

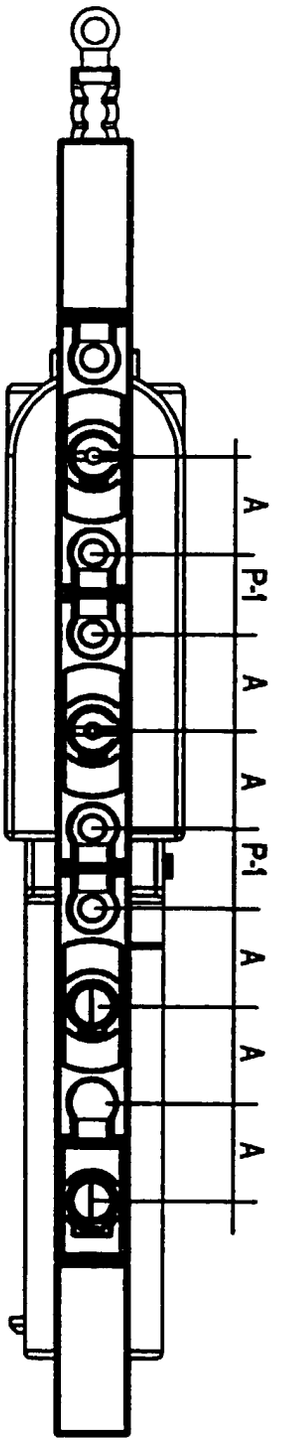


Fig-34

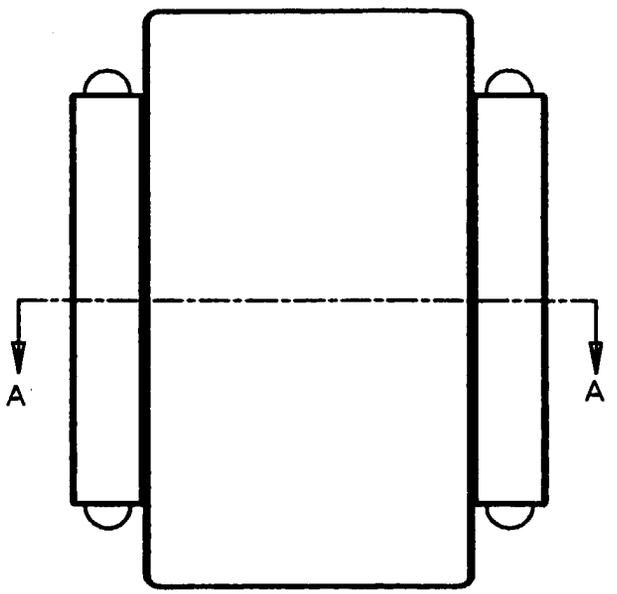


Fig-34A

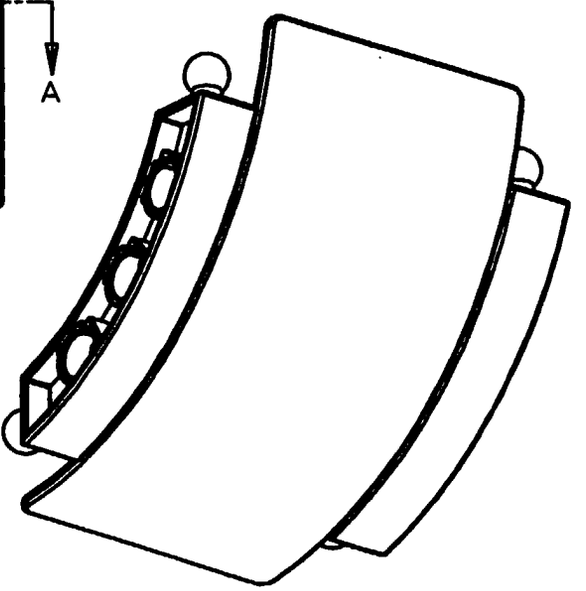


Fig-34B

Fig-35

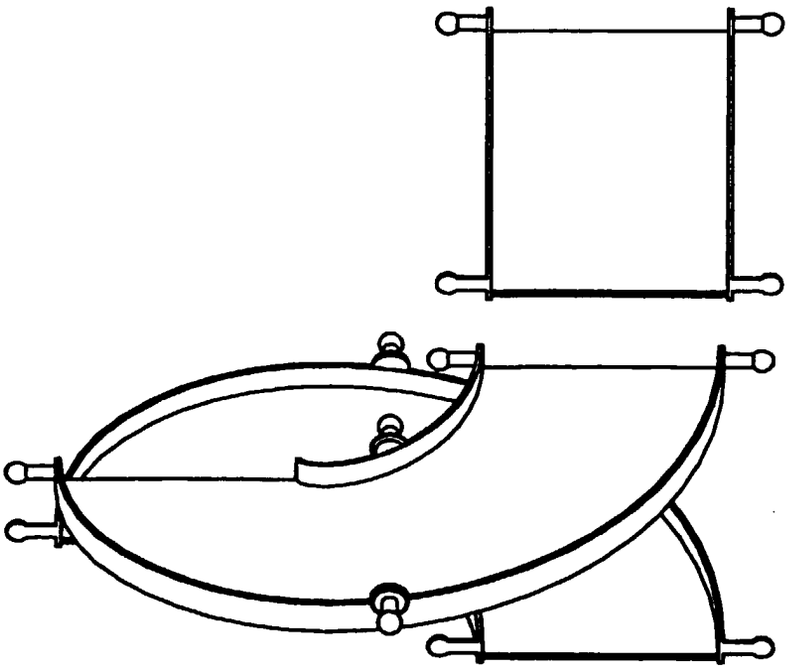


Fig-35A

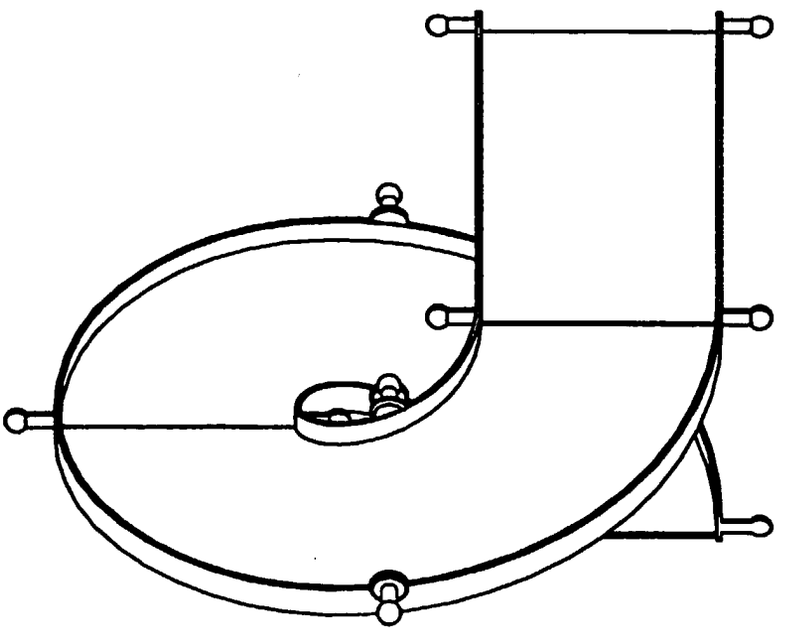


Fig.-36

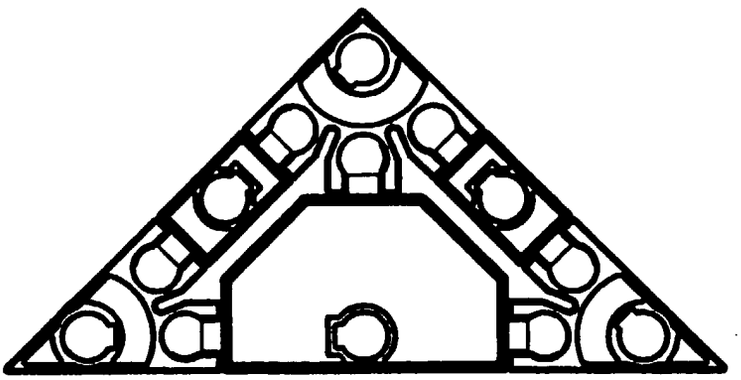


Fig-36A

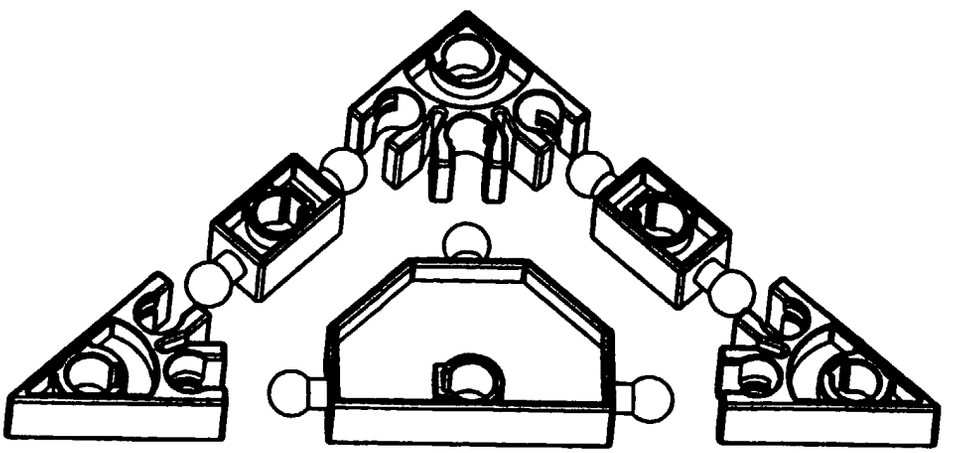


Fig.-37

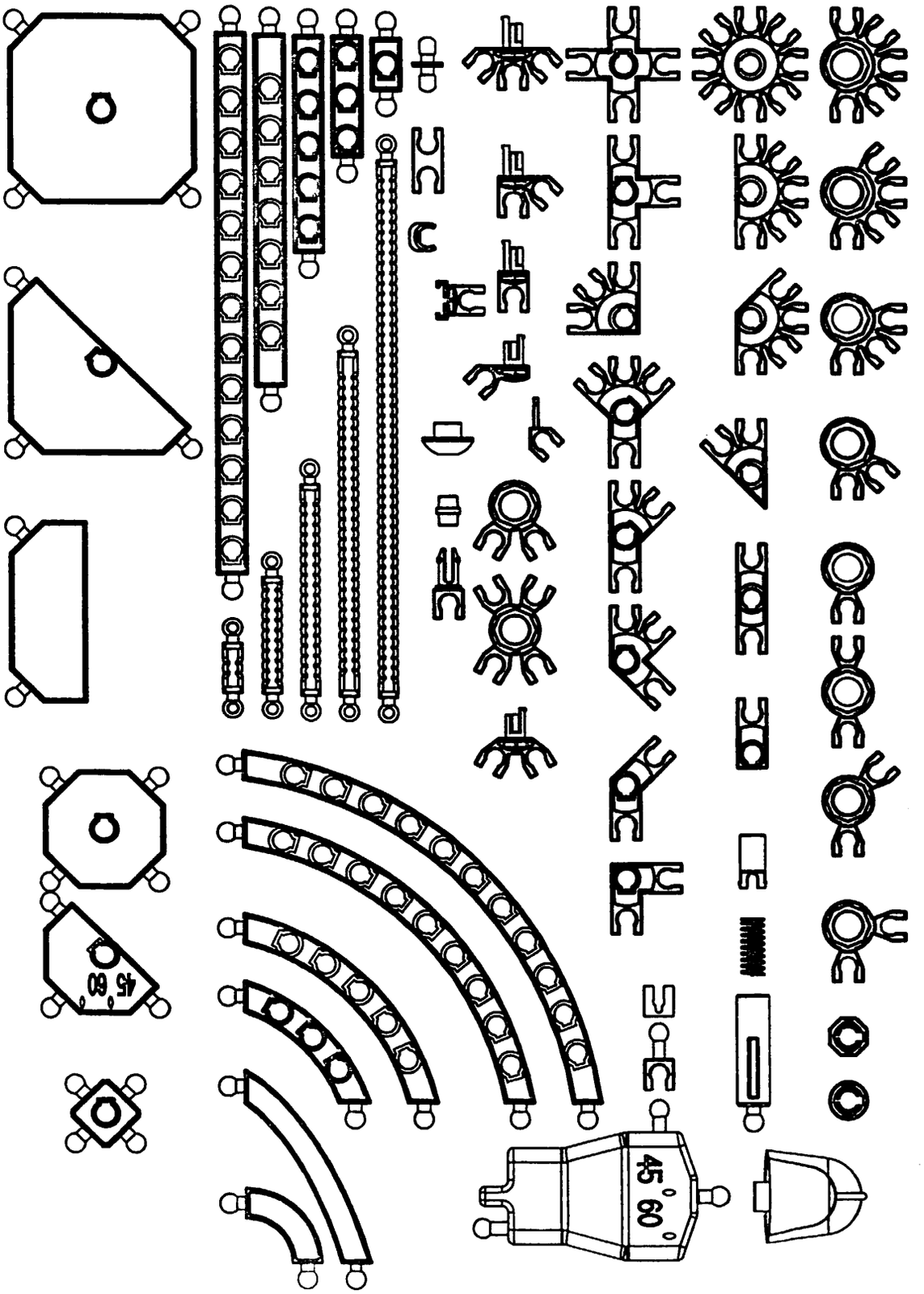


Fig.-38

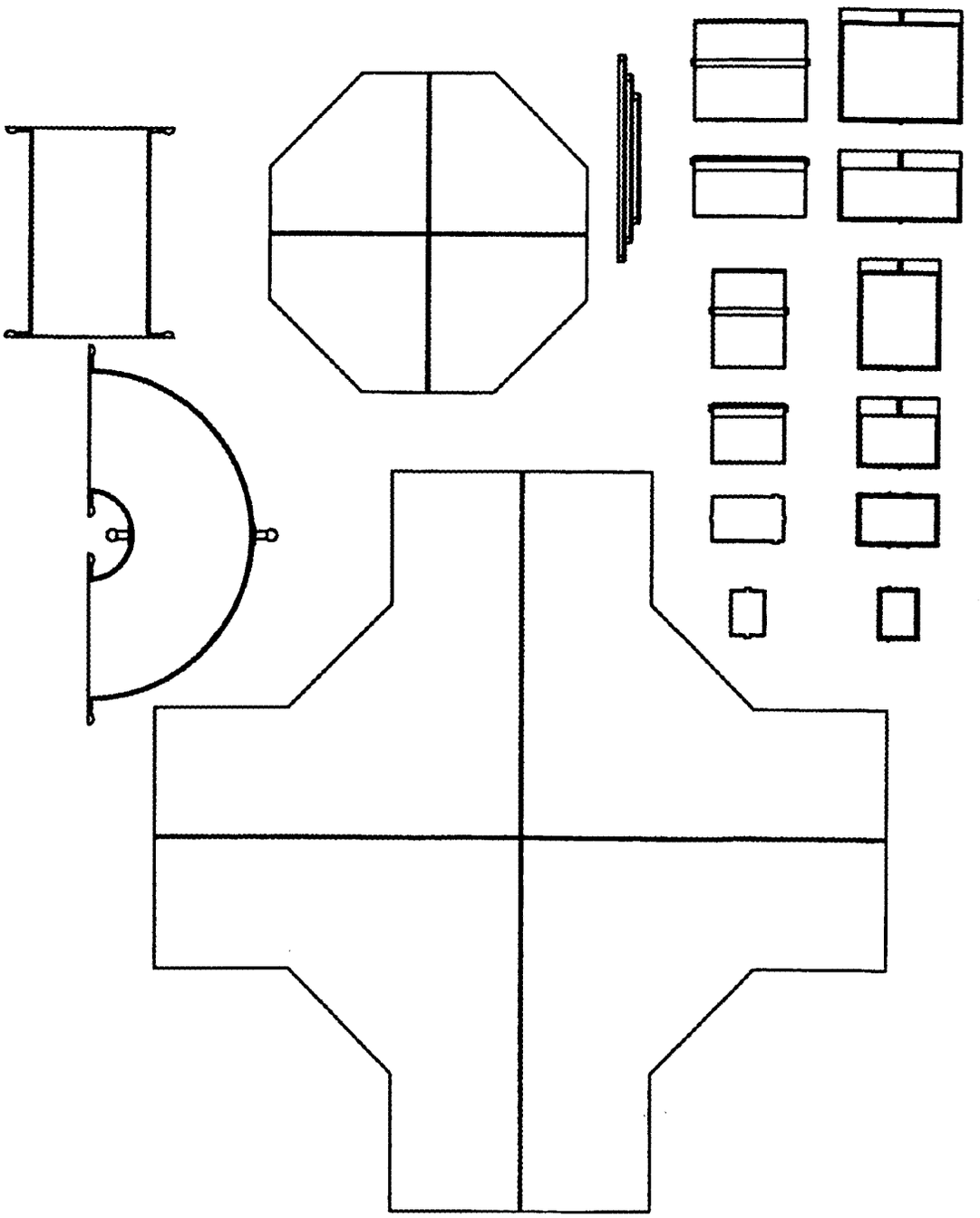


Fig.-39