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(54) Automatic machine for making protective envelopes and the like

(57) An automatic machine for making protective envelopes comprising a sloped hopper storage (6) for feeding previously-cut envelope blanks (F); a pneumatic feeding assembly with suction cups (3) for picking up and then positioning envelope blanks with respect to an operating plate (5), to which a forming pocket (24) is connected; a device for making the envelope by means of a blade (31), provided with vertical movement; two pairs of sealers (13-13') (13''-13''') for finally closing the envelopes; and mechanical, pneumatic and electric devices for contemporaneously and synchronizingly operating various operating stations.

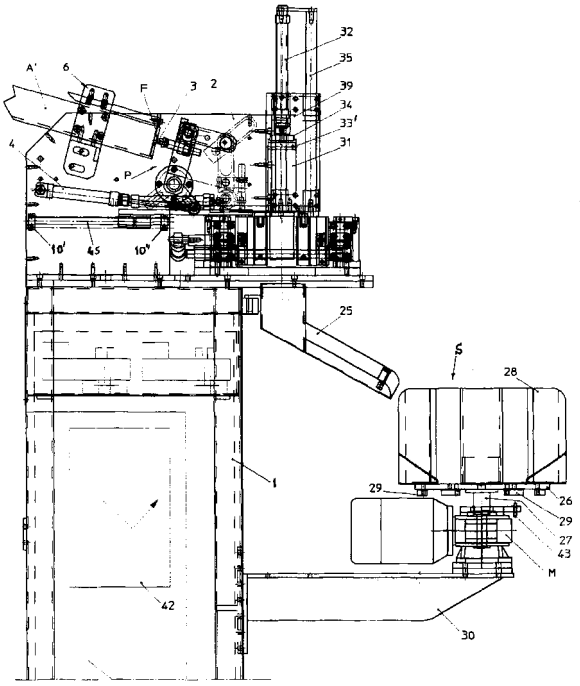

Fig.1

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Description

[0001] The present improvement relates to feeding, positioning, forming and sealing devices in automatic machines, particularly for making protective envelopes and the like, composed of coupled materials with multilayers, at least one of which can be heat sealed.

[0002] Patent N. 01285934 to the same applicant discloses an envelope-like protective case, made of quite flexible, rigid or semi-rigid material, having a size that substantially corresponds to the one of cards, having at least a side that is open or can be opened for the introduction of the card.

[0003] Patent N. 01298351 to the same applicant discloses a method for making envelopes, for magnetic cards and the like for thin articles, particularly as floppy disks, magnetic or microprocessor cards, CD or other similar objects.

[0004] Prior art drawbacks are eliminated in the present invention improvement by using completely novel arrangements.

[0005] For example, by positioning the feeding storage containing previously-cut shapes, obtained by blanked multi-layer material sheets, in a slightly sloped position towards the positioning plate, comprising the forming pocket, the pack will weigh on the lower wall of the hopper, avoiding sticking among various pieces.

[0006] Moreover by positioning two side stopping pins, at the hopper entrance, a small resistance in drawing the individual blank occurs, such that if holding suction cups of puller took only the gluing polyethene layer, the machine would notice the abnormal run and it would stop.

[0007] The hopper storage is further provided with fixed guides for positioning the envelope such that it is always placed in the center of two side sealers for a proper sealing. The positioning is furhter guaranteed by a mechanical pusher, driven by a pneumatic cylinder, pushing the blank against said positioning guides.

[0008] The device for drawing blanks is placed laterally to the hopper and it allows the blank positioning directly at the forming pocket.

[0009] Moreover it is still possible to carry out interventions on sealers without having to disassemble suction cup feeding assembly, as it will be better disclosed in the following.

[0010] Sinche the suction cup feeding assembly is supported by a slide, it is sufficient to rotate it towards a side in order to freely reach sealers below.

[0011] Sealers, that are the object of the present improvement, can be easily adjusted, since are manufactured in order to be self-centering and self-aligning.

[0012] This is accomplished by using a single driving pneumatic cylinder and a plurality of levers and transmissions that, once adjusted, allow to close sealing bars in a contemporaneous and coplanar manner.

[0013] Moreover, since sealing bars are manufactured with a U-shaped section, each one has two contact surfaces, and not only one, this being a great advantage as regards life and maintenance.

[0014] When the anti-adherent coating of one of the two contact surfaces of sealers that is used for the operation is worn, it is possible to take away the sealing bar from the support and to reinsert it inside its housing by rotating it such to use the portion hot still used.

[0015] This action is carried out very quickly and it does not require the adjustement of the sealing assembly, since sealing bars are perfectly inserted in their housings and therefore the rotation does not lead to any movements with respect to positionings made during the first installation.

[0016] Similarly, if the whole sealing bar has to be replaced, that can be quickly made, with very short machine block time, and without any further adjusting actions.

[0017] It is clear that disclosed assemblies, that are the object of the present improvement, are novel for their advantages as regards manufacturing, application to the machine as a whole, as well as great reliability during operation, easiness and quickness in manufacturing, mounting, maintanance and/or replacement, thus reducing slack blocking time due to technical interventions.

[0018] Further advantages derive from modularity features of said assemblies, which can be mounted on the same frame in any number, such to have machines with various identical stations.

[0019] It is also possible to replace assemblies that have been provided for an envelope size, with other ones for different size, still in an easy and quick way.

[0020] The proper operation and movement of various assemblies in synchronism is guaranteed by an electric-pneumatic control unit and by a control board with programmable microprocessor not shown being of known type.

[0021] Particularly a two-station machine will be now disclosed, as a practical example of a possible application of the finding, that is the object of the present improvement, but it is not to be considered limitative.

[0022] Features of the invention and advantages derived therefrom will appear more clearly by the following description and by annexed drawing tables that schematically:

Fig.1 is an elevation side view of the machine according to the invention;
Fig.2 is an elevation front view of the same machine;
Fig. 3 is a front view of sealing assembly;
Fig. 4 is a plant view of sealing assembly and relevant operation;
Fig.5 is a side view of the assembly of fig.4;
Fig.6 is a side view of feeding storage/hopper and drawing/positioning assembly with suction cups;
Fig.7 is a front view of assemblies of fig.6.
Fig.8 is a plant view of blank centering assembly;
Fig.9 is a plant view of assembly of fig.8.

[0023] Referring to figures, a two-station machine, according to the invention, has a frame 1 upon which two

by two operating assemblies are secured in the upper part and precisely: storage/hopper, suction cup feeder, forming pocket, sealing assembly.

[0024] In the center of the bed 1 two parallel plates 2 are applied each one supporting a feeding storage assembly 6 and an assembly P for drawing and trasferring the blank F.

[0025] Feeding storage 6 for blanks F is mounted in a sloped position, from the top to the bottom, and it has two side guides A'-A" parallel one with respect to the other defining a passageway.

[0026] Blanks F, one at a time, are taken from the drawing assembly P, provided with suction cups 3, which, by means of a two-articolation lever transmission 40, 41 puts the blank F on the plate 5 at the forming pocket 24.

[0027] In order to avoid that suction cups 3 take more than one blank F at a time because of sticking reasons, there are provided two abutment pins R-R', arranged at the entrance of hopper 6 and positioned laterally at ends of side guides A-A'.

[0028] The translating/rotating movement of suction cups 3, moved by two-articulation levers 40, 41, is provided by a single double-acting, pneumatic cylinder 4 connected to the end of the lever 40.

[0029] In annexed drawings there are shown two configurations taken by levers and suction cups of the drawing assembly P: the starting one, by continuous lines and the final one, by dashed lines.

[0030] On the horizontal plate 5 there are provided two fixed guides 7-7', parallel one with respect to the other and are equidistant from the forming pocket 24, for positioning the blank F in a centered position with respect to the forming pocket.

[0031] The positioning of the blank F is further guaranteed by a third fixed guide 8, horizontally arranged, placed on the plate 5 in a direction orthogonal to the entrance of the pocket 24.

[0032] The blank F is pushed against the reference plate 8, by means of pushing plate 11, operated by the pneumatic cylinder 12.

[0033] In order to avoid the plate 11 to diagonally move forward and the blank F to get stuck between said plate 11 and the plane below 50, the plane 50 is provided with prismatic grooves 51 for the engagement inside thereof of corresponding teeth 52 projecting in the lower part of the pushing plate 11.

[0034] The pocket 24 is delimited by two funnel-shaped plates 9-9', in order to help the introduction of the blank F, under the vertical action of blade 31, being of known type.

[0035] Below the plate 5, there is provided the sealing assembly composed of four sealing bodies, operating two by two, faced two at a time, 13-13' and 13" -13" ' respectively.

[0036] The opening and closing movement of said sealing bodies is guaranteed by a dual rod pneumatic cylinder 14, connected to sealing bodies with a rigid configuration, by pairs of levers, pins and transmissions, provided with adjustable members, guaranteeing the contemporaneous closing of sealing bodies.

[0037] Sealing bodies 13-13' and 13" -13"' are positioned laterally to the forming pocket 24, outside it, and engage edges of the blank F, that project from the pocket 24, causing vertical sides to be sealed, since said pocket 24 has transverse dimensions slightly smaller than the blank F.

[0038] Mobile sealing bodies 13-13' and 13 " -13 " ' support sealing heads, 15-15' and 15" -15"' respectively, composed of steel bars with U-shaped section, covered by a layer of renowable,anti-adherent material; inside said sealing bars armored heating elements are inserted for heating, they are not indicated being of known type.

[0039] Each sealing body 13-13' -13" -13" ' is thermically insulated from remaining supporting mechanical members, by interposing thermically insulating material composed of bodies 16-16'-16"-16"', 17-17', 18-18' -18" -18" ' .

[0040] Each sealing body is mounted on supports fulcrumed on pins 19 and 19', allowing movements by means of connecting rods 20-21, mounted on shafts 22 and 23, each one driven by the pneumatic cylinder 14.

[0041] Inside sealing bars 15-15' and 15 " -15 " ' in vertical direction there are provided two prismatic guides, 46 and 47 respectively, secured to plane 5.

[0042] The task of these guides 46 and 47 is to keep the blank F centered, inside sealing bars 15-15' and 15" -15 " ', such to guarantee the proper sealing of vertical edges of the envelope.

[0043] In the lower part of the supporting frame 1, there is provided a hopper-wise discharging chute 25, extending symmetrically below the forming pockets 24.

[0044] This hopper chute 25 leads on the upper part at a rotating storage with boxes collecting finished envelopes.

[0045] The rotating storage is composed of a preferably octagonal shaped horizontal plate 26, oriented parallely to the plate 5 and splined on the shaft 27 coming from a gearmotor M.

[0046] The gearmotor M is operated by a photocell, not shown being of known type, placed on the chute 25 that in turn transmits pulses to a production counter, also of known type.

[0047] When a certain predetermined number of pulses is reached, that corresponds to a number of finished envelopes, the counter controls the angular rotation of plate 26, corresponding to a step of the storage S.

[0048] On the octagon periphery, composing said storage S, there are provided housings for finished envelopes, composed of shaped boxes 28.

[0049] The station discharging finished envelopes from the rotating storage can be provided at any angular position; in the example shown it is in a front position and opposite to the chute 25.

[0050] In the area under the plate 26 there is provided a photocell 43 that, by detecting the presence of references 29, placed at boxes 28, determines then the stop-

ping position of the turntable at the entrance of hopper chute 25.

[0051] The rotating storage is fully overhangly supported by the wall of frame 1 by means of an arm 30.

[0052] Points where the arm 30 is attached to the frame 1 are provided in different positions in the vertical direction, such that the turntable can be height adjusted.

[0053] Individual assemblies, as shown in annexed drawings, have separated driving means and are individually independently supported by the frame.

[0054] This technical arrangement allows to reach quickly individual assemblies for maintenance and/or repairing in case of failure, without having to block the machine and to stop the production run.

[0055] If an operating station is blocked for technical interventions or the like, it is still possible hence to go on with operation with the second station that works independently.

[0056] More particularly and referring to one of the two by two assemblies on the same machine, the forming blade 31 is secured to the shaft of the driving cylinder 32 by a first plate 33', that in turn is secured to a second plate 33'' such to make a clamp.

[0057] In order to avoid the rotation of the blade 31 on its axis, a second fastening clamp 34, integrally connected to the previous clamp 33'-33 " , is supported by a bracket 36 that, by means of ball bearings arranged therein, slides on two parallel guiding rods 35-35' extending parallely to the driving cylinder 32.

[0058] Morover the supporting bracket 36 is secured to the supporting plane 5, comprising the forming pocket 24 and positioning assembly P with suction cups 3, all overhanged on a carriage composed of two bushings 37-37' connected to a bracket 38, slidable on a vertical rod 44, secured to the frame 1.

[0059] In order to easily reach sealing assembly 15-15'-15" -15"' , for maintenance or replacement, it is thus possible to manually move upwards said carriage, sliding in the guide 44, thus freeing the entrance of sealers below.

[0060] Similarly it is possible to pull back the carriage, composed of the plate 50 with ball bushings 48, manually sliding on horizontal and parallel bars 45, supported by two supports 10'-10 " , freeing the sealing assembly below.

[0061] It is very important the possibility to move quickly said carriages, containing the feeding assembly and the blank centering assembly , in order to reach quickly the sealing assembly, without having to disassemble the assemblies.

[0062] In order to properly position the whole envelope forming assembly, there is provided a reference plate 39 secured to clamps 36 (36') on one side and to supports 37'(37 ") on the other side; a tightening handle 49 makes possible the manual stopping.

[0063] What has been said referring to half of the machine, obviously is also for the second half of it, feeding, forming and sealing assemblies being symmetrically the same.

[0064] Controls for synchronizing movements of various assemblies are provided by a control unit 42, comprising electric and pneumatic devices of known type, which is positioned inside the frame 1.

[0065] The present improvement, shown and disclosed according to one of its possible constructive configuration by way of example, but not as a limitative one, has to be extended to all additional variants as regards shape, materials and members, as such, fall within the scope of the following claims.

Claims

1. Improvement of automatic machines for forming protective envelopes and the like comprising a sloped hopper storage (6) for feeding previously-cut envelopes (F) (blanks); a pneumatic feeding assembly with suction cups (3) for picking up and then positioning envelopes with respect to the operating plane (5), to which the forming pocket (24) is connected; a device for forming the envelope by means of a blade (31), provided with vertical movement; two pairs of sealers (13-13') (13" - 13"') for finally closing enevelopes; mechanical, pneumatic and electric devices for contemporaneously and synchronizingly operating variuos operating stations.

2. Improvement according to claim 1, **characterized in that** the hopper storage (6) comprises two side guides (A'-A") defining a passageway sloped towards the operating plate (5).

3. Improvement according to claim 1, **characterized in that** blanks (F) are picked up, one at a time, by a drawing assembly (P), provided with suction cups (3) that by means of a two articulation lever transmission (40-41) places the blank (F) on the operating plate (5) at the forming pocket (24).

4. Improvement according to claim 1, **characterized in that** the hopper storage (6) provides two abutment pins R-R', placed at the entrance of the hopper (6) and positioned laterally at the ends of side guides (A-A').

5. Improvement according to claim 3, **characterized in that** the drawing assembly (P), two articulation levers (40-41) are driven by a double-acting penumatic cylinder (4).

6. Improvement according to claim 3 and 4, **characterized in that** on the operating plane (5) there are provided two fixed abutment members (7-7') placed parallely to the introduction slot of the pocket (24) and a fixed abutment member (8) that is orthogonal to the two previously mentioned mem-

bers.

7. Improvement according to claim 1, **characterized in that** there provided means (11) for pushing the blank against fixed abutments (7-7'-8).

8. Improvement according to claim 6, **characterized in that** the pushing movement is provided by a double-acting pneumatic cylinder (12).

9. Improvement according to claim 6, **characterized in that** pushing means (11) are supported by a carriage (50) that can be manually moved in the horizontal direction; said carriage being slidable on parallel guides (45), placed below said pushing means.

10. Improvement according to claim 1, **characterized in that** to the two pairs of sealers (13-13') and (13 " -13 " ') there are associated a plurality of levers and pins, all mechanically connected one to the other with synchronized movements for contact and closing; said levers being length adjustable.

11. Improvement according to claim 8, **characterized in that** synchronized movements of sealers are provided by a single double-acting pneumatic cylinder (14).

12. Improvement according to claim 8 and 9, **characterized in that** sealers comprise heat sealing bars, composed of linear members with U-shaped section (15-15') and (15" -15'").

13. Improvement according to claims 8 to 10, **characterized in that** thermically insulating bodies are interposed between heat sealing bars and moving linkage.

14. Improvement according to claim 8, **characterized in that** in the centre of pairs of sealing bars there are provided fixed prismatic abutments (46-47) for positioning envelopes (F) under sealing.

15. Improvement according to claim 1, **characterized in that** the forming blade (31) is supported by a mobile carriage, that can be manually moved on two guides (44), parallel one with respect to the other and arranged in the vertical direction with respect to the machine frame (1).

16. Improvement according to one or more of the preceding claims, **characterized in that** to the forming pocket (24) there are further associated a storage (S) for collecting finished envelopes, made like an octogonal turntable, moved by a gearmotor (M); said storage being divided in a plurality of boxes (28), wherein envelopes are fed by gravity by means of a Y-shaped sloped chute hopper (25),

17. Improvement according to claim 15, **characterized in that** to the plate (26) supporting boxes (28) and below it, there are applied reference blocks (29), each one at each box.

18. Improvement according to claims 15 and 16, **characterized in that** there is associated a photocell (43) to the upper part of the gearmotor (M) and it is placed on the vertical of reference blocks (29).

19. Improvement according to one or more of the preceding claims, **characterized in that** each operating units comprises its own support and its own assembly driving operating movements, the support being adjustably and movably secured to the bearing frame (1), and said driving assemblies being synchronizingly controlled by a single control unit (42).

20. Improvement according to one or more of the preceding claims, **characterized in that** for each envelope size, or for sets comprising envelopes with similar sizes, there are provided operating assemblies, suited for different size features, that are identical one with respect to the other as far as structure and construction are concerned and they have means for securing to the machine supporting structure (1) that are identical one with respect to the other.

21. Improvement according to one or more of the preceding claims, **characterized in that** in a preferred but not exclusive, embodiment operating assemblies are mounted two by two, in positions that are symetrically opposite on the same supporting frame (1).

22. Improvement of feeding, positioning, forming and sealing devices in automatic machine, for making thin envelopes, all or partly as disclosed, shown and for the above aims.

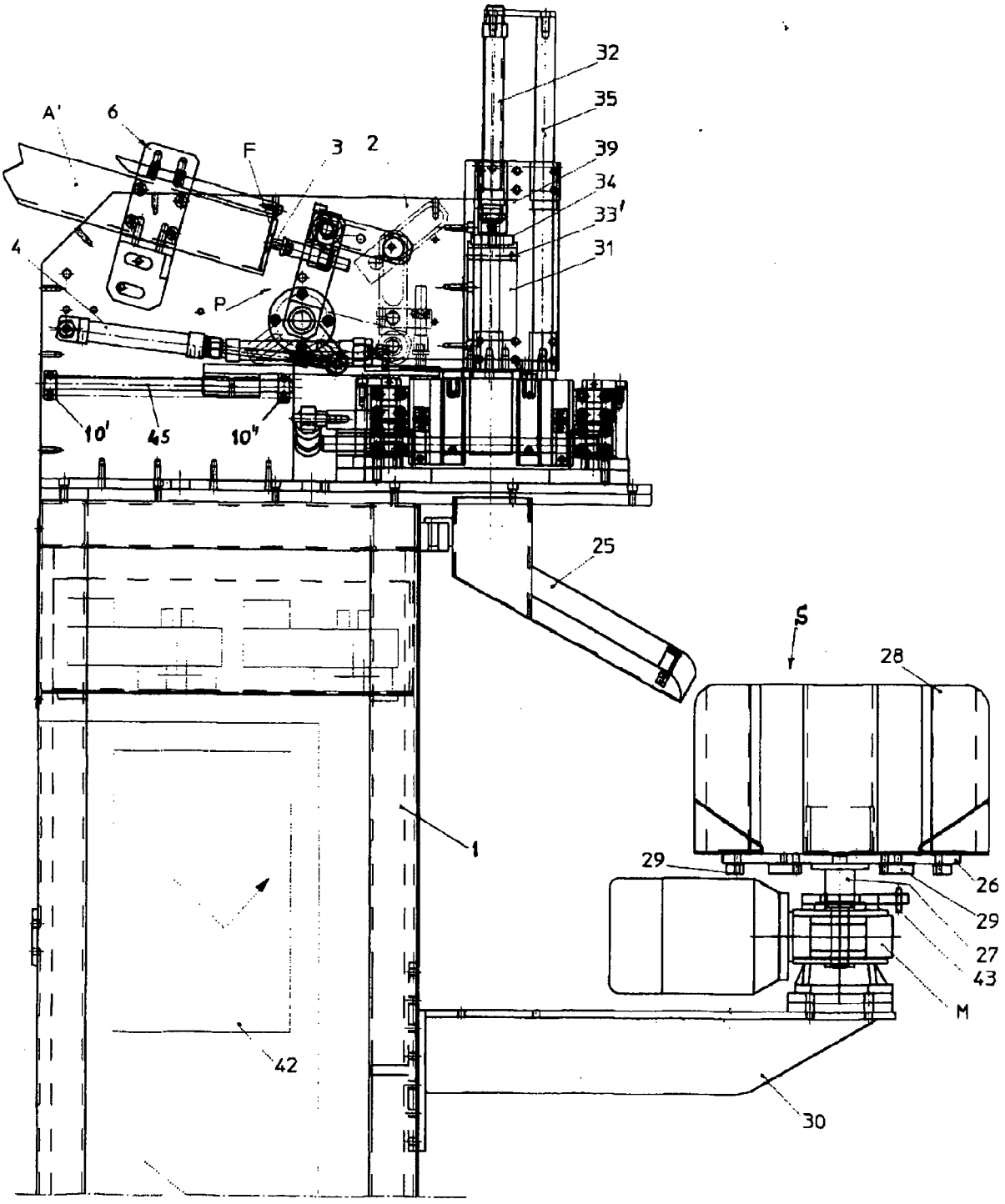

Fig.1

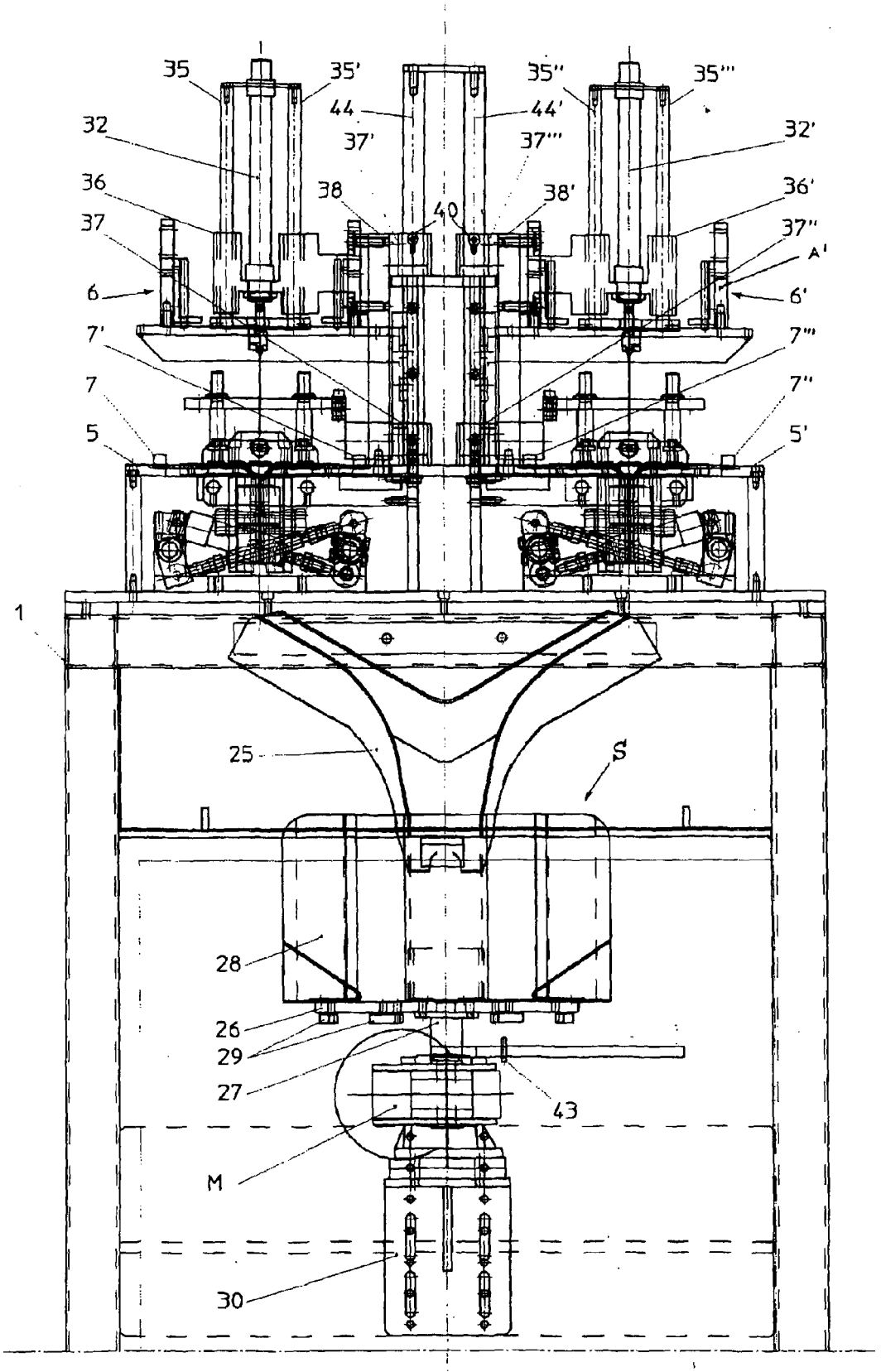
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Fig.2

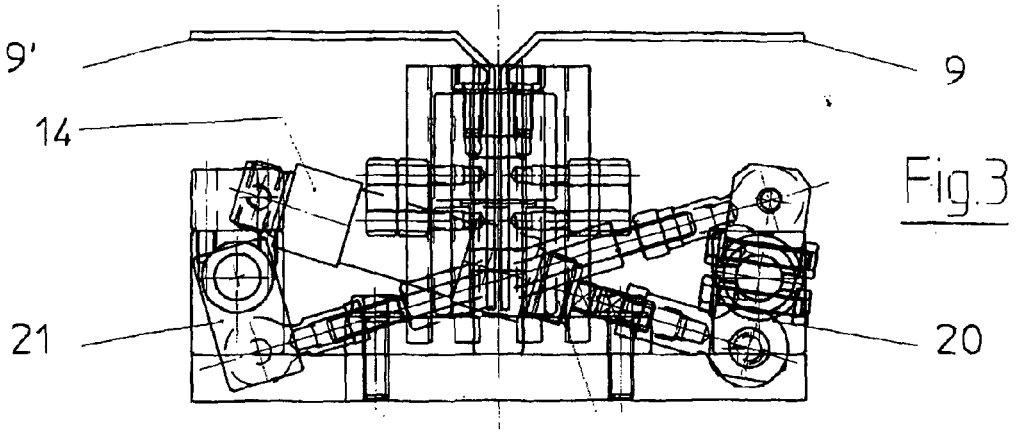
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Fig.3

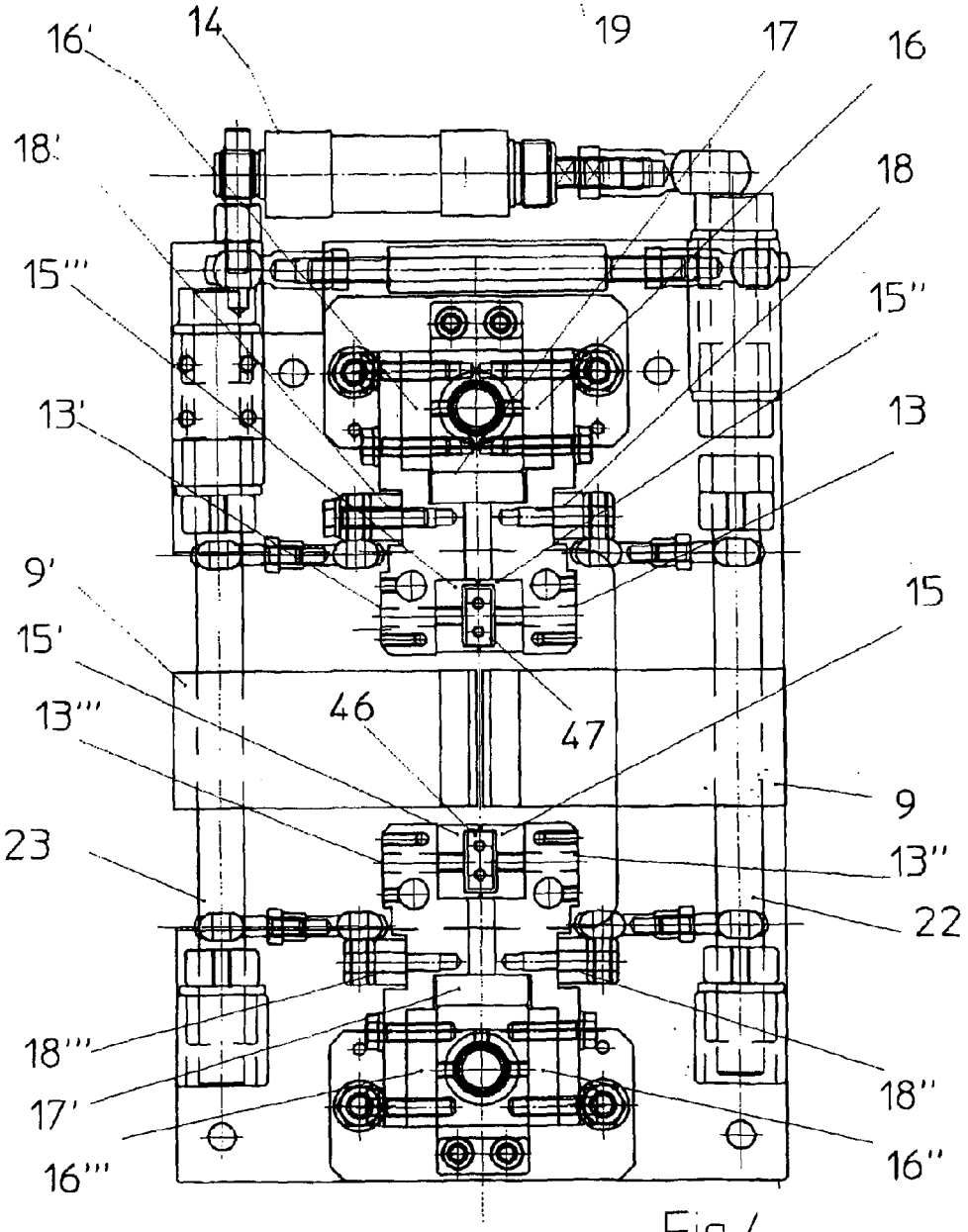
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Fig.4

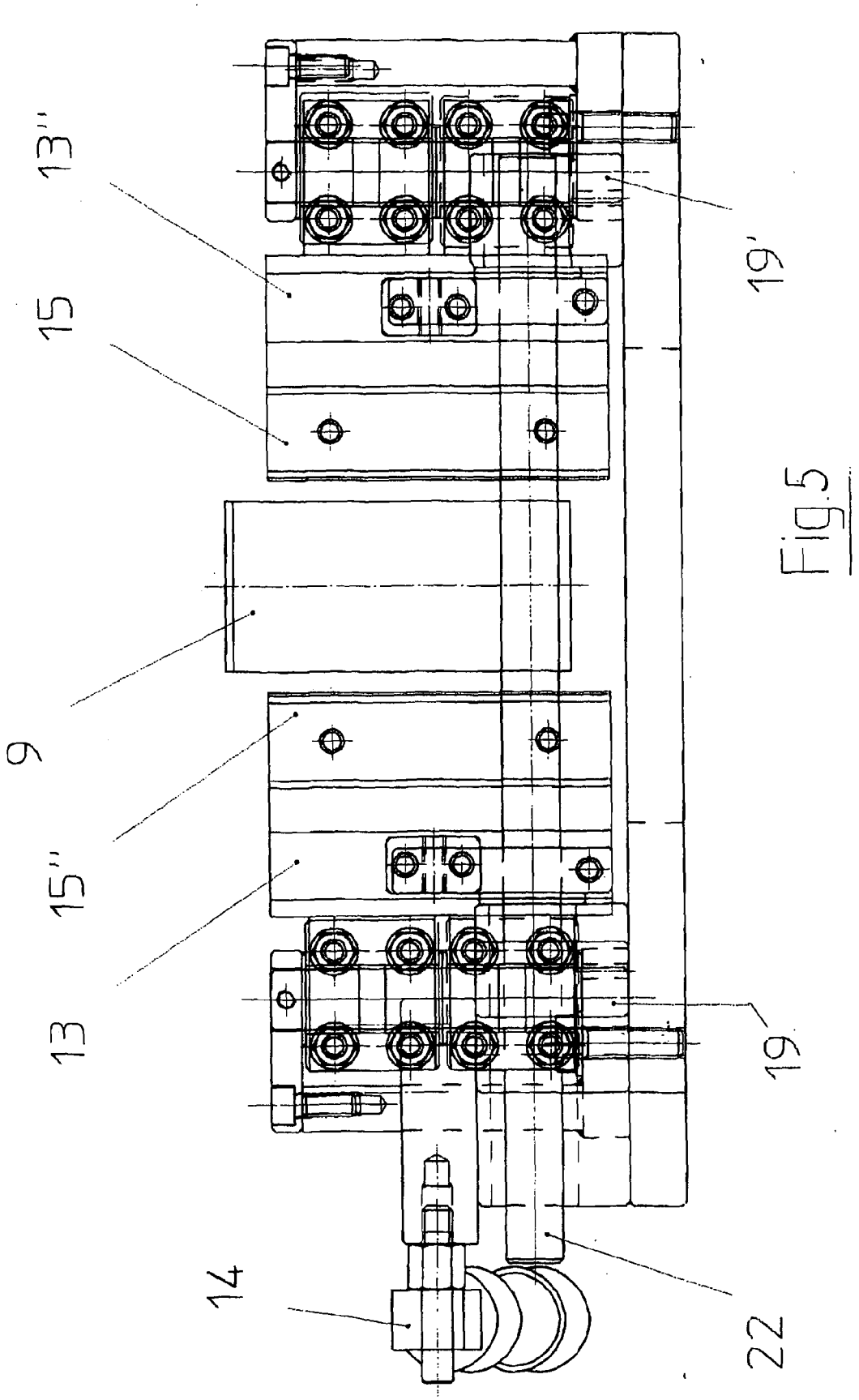


Fig.5

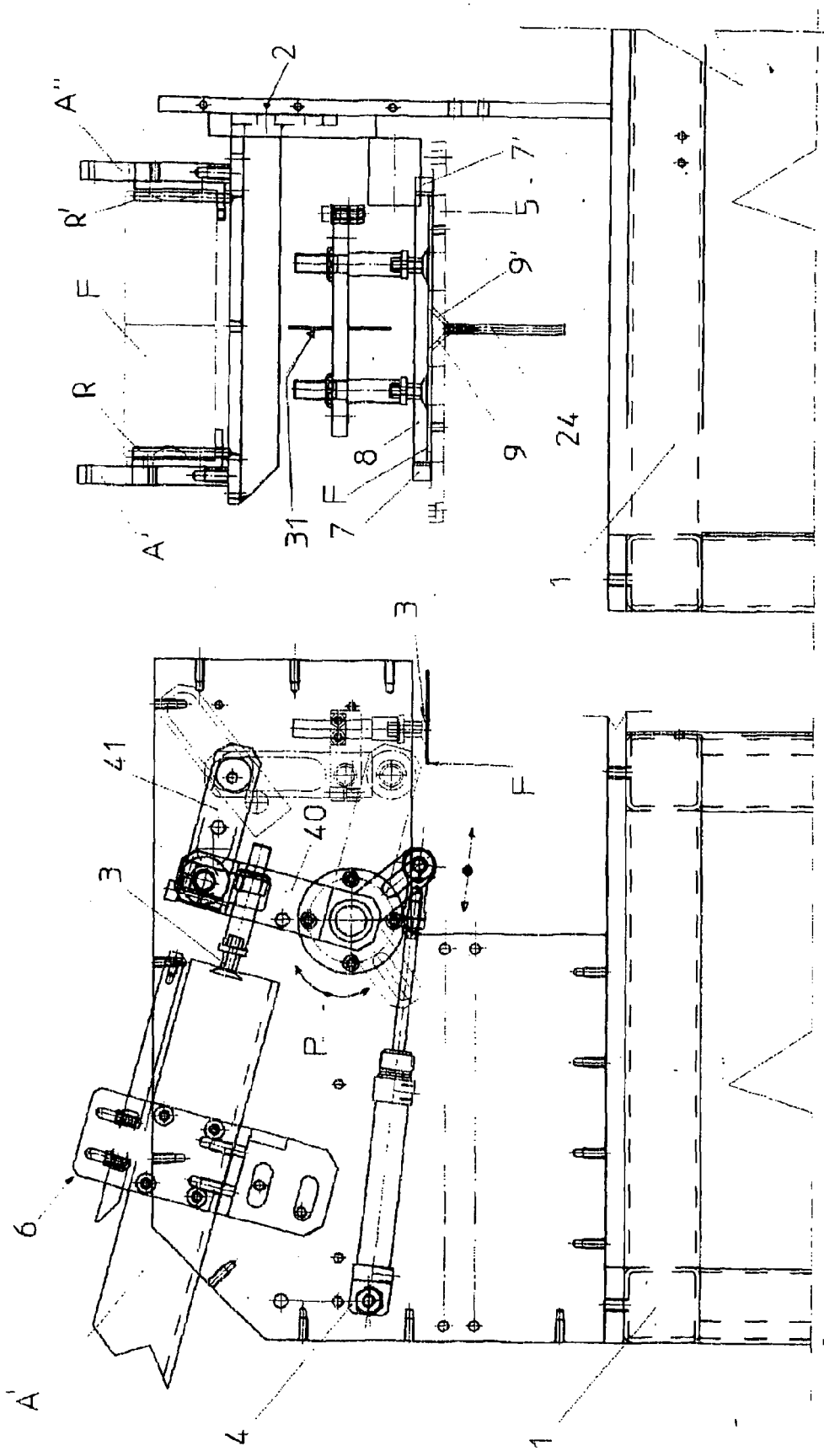
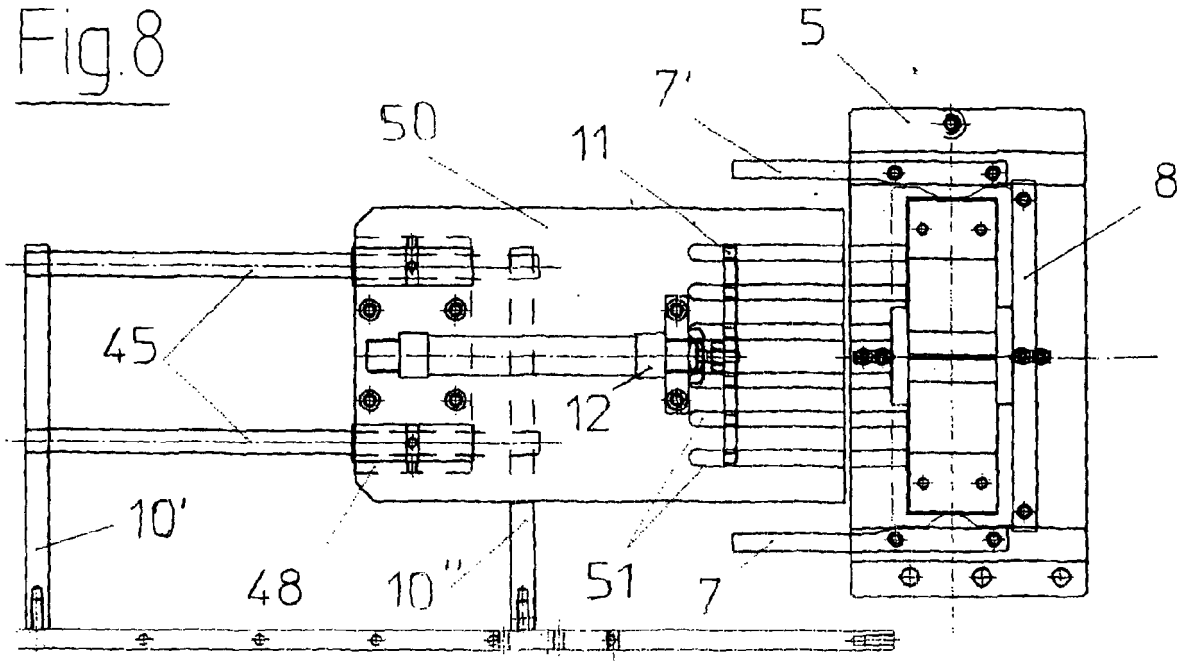


Fig.7

Fig.6

Fig.8



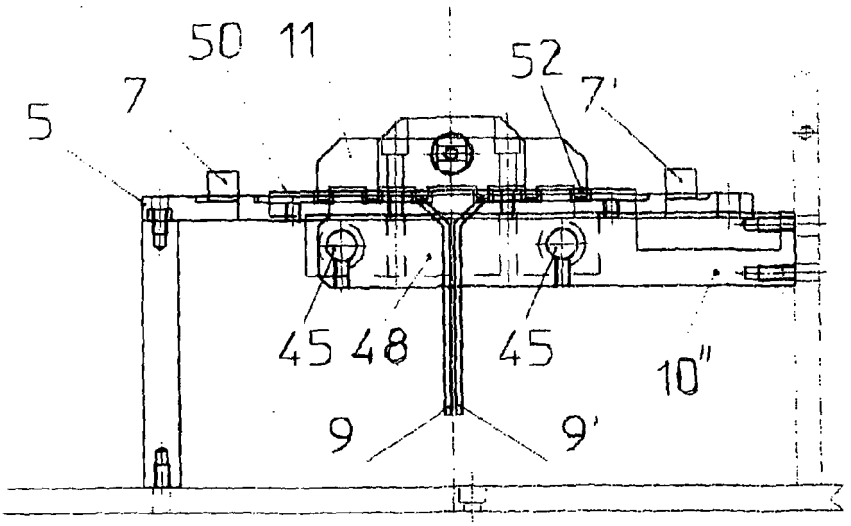


Fig.9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 05 02 2411

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	DE 572 988 C (KURT HARTENFELS) 25 March 1933 (1933-03-25) * the whole document *	1,2,7	B31B19/00
A	GB 550 690 A (F.L. SMITHE MACHINE COMPANY INCORPORATED) 20 January 1943 (1943-01-20) * figure 1 *	1	
A	US 3 210 072 A (BAKER THOMAS R ET AL) 5 October 1965 (1965-10-05) * figures 2-5 *	2-5	

TECHNICAL FIELDS SEARCHED (IPC)

B65H
B31B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 February 2006	Pollet, D

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 05 02 2411

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10-02-2006

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 572988 C	25-03-1933	NONE	
GB 550690 A	20-01-1943	NONE	
US 3210072 A	05-10-1965	DK 115906 B	17-11-1969
		GB 1011180 A	24-11-1965
		SE 307885 B	20-01-1969

EPO FORM P0459

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