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(54) Process and machine to engrave the main surfaces of a pane of glass with slightly deep grooves.

(57) Each of the three or more tools (50, 50', 50") engraves the pane of glass to be worked, by running, individually, the whole track, one or more times and than is substituted by the next tool (50'), which, also starting substantially from the same point, succeeding to the first (50) runs itself again the whole track and so on, until the latter of the tools is run, wherein the control of the tool succession and the common successive repeated running of the track is provided by the program set, which is each time repeated. The tools (50, 50', 50"), run and run again rectilinear tracks, in the direction perpendicular to the pane carrier table (2) by mutual engagement of the tool and/or the panes of glass. The machine is in the form of a machine tool and comprises at least three shafts (5, 5', 5"), contemporaneously rotatable, in the form of a revolver (05), wherein the revolver of grinding wheels is horizontally mounted, substantially radial to a platform, pivoted (at 106) around a revolvable chariot (60), about a radius (r) to be controlled by hand.

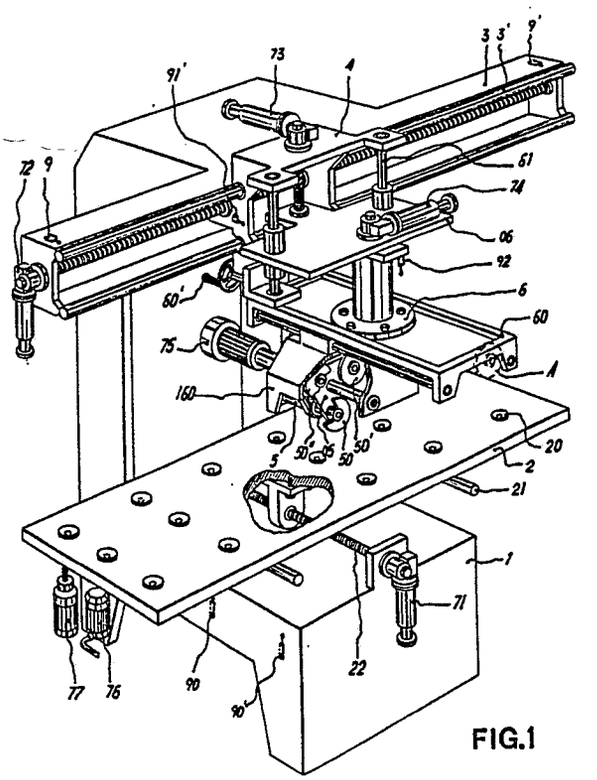

FIG.1

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Process and machine to engrave the main surfaces of a pane of glass with slightly deep grooves

The present invention relates to a process and a machine to engrave the main surfaces, of the pane of glass, with grooves, slightly deep, possibly blind, according, mixtilinear designs including also curves, circumferences and the like,and combinations and repetitions thereof. It is also an object of the present invention the pane of glass obtained with such process and machine.

At the present state of the art the machines to engrave the main surfaces of the pane of glass with grooves, slightly deep, provides only rectilinear grooves and are substantially characterized by the movement of pane of glass with respect to the engraving tools, which tools provide a battery, comprising at least three members, in series. The possibility to obtain designs, with particular ornamental or practical effects, in such a limited field, where scarce, above all in consideration of the increasing demand of glass products, similar to those of once, when this workings were handmade, substantially without any limitation as variety of designs. The reasons of this poorness of the known machines, is to be found in the difficulty to lead more tools, exactly on the same track, more than once using the same tools, in parallel, i.e. with the chance to intervene in further times. In fact, each groove must be at least rough-engraved, with at least one tool and at least smooth finished, with at least another tool, the use of two tools for each step being of course advantageous. The invention as claimed is intended to remedy thse drawbacks. It solves the problem of how engrave the main surfaces of the pane of glass with grooves, slightly deep, possibly blind, according mixtilinear, repetitive designs, and combinations thereof, whereby a machine tool, with at least three shafts, contemporaneously rotatable, in the form of a revolver, substantially in parallel and exactly one for rough-engraving and two for finishing or vice versa, working in succession, one after the other, each driven to repeat, exactly, the same track, from the beginning to the end, with reverse to the starting point. The pivot of the grinding wheel tool revolver is horizontally mounted, substantially radial, to a platform, pivoted around a revolvable chariot, about a radius to be controlled by hand, by an hand-wheel and a screw of the like, a saddle, mounted with sliding arrangement on said chariot, adapted to position the revolver of grinding wheels at a distance, from the stationary axis, of rotation of the platform, corresponding to that chosen as radius, wherein the platform, in turn, is mounted on a traverse chariot, which, in turn, is mounted, by guides, on a longitudinally movable slide which carries each and all the tools longitudinally to run the pane of glass to be worked. The transverse chariot (4) provides, by hand, only the starting point from which the tool begins its work, as the relative transverse feeding movement, between the tool and the pane of glass is obtained by positioning the latter, as the same pane of glass is laid down on a table, with cupping glass, which fasten it thereto and the latter is transversely movable by a driven screw on guides thereof. The driving system powering the machine comprises seven electric motors and is associated to the pneumatic system for driving an eighth pneumatic alternative motor. The pneumatic system, for driving the pneumatic, alternative, cylinder-pistion-like motor, comprises a racket which meshes with a pinion keyed on an idly pivoted shaft which has fixedly mounted a sprocket wheel, connected to a roller chain meshing with a sprocket wheel coaxially mounted as a free wheel on the shaft of revolver tool carrier and that the same pneumatic motor works in conjunction with two rectilinear motors providing the fastening of the revolvable tool carrier during stoppings and the corresponding releasings during the temporary steps of revolution thereof. The machine is provided with manual and semiautomatic controls, wherein the semiautomatic ones are set on a keyboard connected with a computer, included therein which complies at least with the task to lead, any of the tools, exactly along the same track. The PLC comprises an analogic base unit, with an extendible memory up to at least 4 Kwords residing in epron, e.g. corresponding to Hitachi P 250 E model, as well as twenty-four output connections and thirty input connections; by an expansion module, e.g. Hitachi EXBE model, comprising an input expansion module as well as four modules, for quick counting, e.g. of the XECUA model; two analogic output modules, e.g., of the Hitachi YEAGB model, providing the d.c. driving of motors. Of course the computer included has the task to lead the tools exactly on the same track, however it can provide important functions such as the storage of programs of modular and elementary tracks. In particular the inventor has devised twelve modular elementary tracks by composition of which substantially any design may be obtained.

According to an essential feature of the present invention, as the platform of revolution carries the electric, hydraulic and pneumatic connections, which cannot undergo angular twists, generally of more than 180[, each program, involving angular turnings exceeding such angle, is started by reversing of the same angle of 180[, thus, even turning of 360[, do not involve angular turnings in both directions of more than a straight angle. Ac-

cording to a preferred embodiment of the present invention, the execution of a continuous track, including more arcs, starts with the work of such arc and goes on, with other steps, both rectilinear or arched, always by reverse balancing the rotations so as to provide a round angle.

One way of carrying out the invention is described in detail below with reference to drawings which illustrate only one specific embodiment thereof, in which:

Figure 1 is a perspective view of a machine, according to the present invention, in intermediate position of setting and stroke. Some parts thereof are broken away and/or shown in cross-section, for clearness of drawings.

Figure 2 is a detailed perspective view of the shafts-carrier unit and inherent pivot determining the revolution radius of the tools. Also here some parts thereof are broken away and/or shown in cross-section, for clearness of drawings.

Figure 3 is the electric system sketch of the machine for actuation of the process.

Figure 4 is a flow chart giving a general idea of machine operation.

Figure 5 shows the paradigm of twelve substantially elementary tracks, from A to N,, obtainable by setting a few keys on the keyboard of the machine.

With reference to the figures of the drawings, a machine to engrave the main surfaces of panes of glass, comprises, conventionally, a frame 1, extending substantially upright, with supports, at the bottom, a flat table 2, and at the top a beam 3, extending substantially over the table 2 and provided with guides 3'. On the guides 3' a slide 4 is mounted which is provided with the operating tools 50, 50', 50", generally three or more.

According to the present invention, the three shafts 5, 5', 5", respectively, carrying the grinding wheels 50, 50', 50", are contemporaneously rotatable around their axis and are arranged to revolve on the revolver 05. They are there mounted, substantially in parallel, and exactly one of them, 50, is devoted to rough-engraving and two 50', 50" to finishing or vice versa. They work, in succession, one after the other, driven to repeat, correctly, the same track, from the beginning to the end, with operating reverse to the starting point generally at A. The pivot 51 of the revolver 05 of the grinding wheels is horizontally mounted on a slide 160 i.e. substantially radial, to a revolvable chariot 60, according to a radius to be controlled, by a handwheel 60'. By sliding the slide 160, along the chariot 60, the battery of three grinding wheels, 50, 50', 50" it can be positioned at a distance, from the fixed axis 106, wherein the platform 6 is pivoted, corresponding to that chosen as a radius. This platform 6, is mounted, in turn, on a transverse chariot 06 which, in turn, is mounted, by the guides 61, on the longitudinal slide 4, which carries, each and all the tools to engage, longitudinally, the pane of glass to be worked, not shown. On the other hand, the transverse chariot 4, is adapted only to position, by hand, the starting point, from which the tool 50 must begin its working. In fact, the relative, transverse feeding, between the tool 50, 50', 50" and the pane of glass,not shown, or the table 2 is obtained by moving the latter, as the same pane of glass is laid on the top thereof, with cuppings 20 which keeps it stationary. In fact, the latter can be transversely moved, as it is mounted, on guides 21, in such direction, by a screw 22 driven by motor 71. The device is driven by seven electric motors 71, 72, 73, 74, 75, 76, 77 and comprises a pneumatic system, not shown, for driving an eighth pneumatic, alternative, motor 78, in the form of cylinder - piston. The pneumatic motor 78 is provided with a racket 178, which meshes with a pinion 278, keyed on an idly pivoted shaft 378, which has fixedly mounted a sprocket wheel 478, connected to a roller chain 578, meshing with a sprocket wheel 678, coaxially mounted as a free wheel, fixedly mounted on the shaft 51. The machine comprises a control board 0, including the electronic computer, including twofold: manual and semiautomatic controls. The semiautomatic ones are set on a keyboard 8, which controlled by a PLC, 80, included, which provides at least the driving, of the three tools 50, 50', 50", precisely, along the same track. According to an essential feature of the present invention, as the platform 6 of revolution carries the electric 66, hydraulic 66' and pneumatic 66" connections, which cannot undergo angular twists, generally of more than 180[, each program, involving angular turnings exceeding such angle, is started by reversing of the same angle of 180[, thus, even turning of 360[, do not involve angular turnings in both directions of more than a straight angle. According to a preferred embodiment of the present invention, the execution of a continuous track, including more arches, starts with the work of such arc and goes on, with other steps, both rectilinear or arched, always by reverse balancing the rotations so as to provide a round angle. It will be appreciated that the electric and electro-mechanical members which provide the operation of the machine and which are in connection with the computer included therein comprises: left limit switch 9, working rectilinear; right limit switch 9', working rectilinear; left limit switch 90, glass feeding; right limit switch 90', glass feeding; limit switch 91, shaft revolution; vertical limit switch 91', shaft stroke; limit switch 92, platform (6) rotation; automatic-manual selector 93; rough-smooth finishing selector 94; cycle start push-button 95; push-button 96 for vacuum pump 97; cycle end push-

(05) during stoppings and the corresponding releasings during the temporary steps of revolution thereof.

8. Machine, as claimed in claims from 3 to 8, characterized in that it is provided with manual and semiautomatic controls, wherein the semiautomatic ones are set on a keyboard connected with a computer (80'), included therein which complies at least with the task to lead, any of the tools, exactly along the same track.

9. Machine, as claimed in claims from 3 to 8, characterized in that the electric and electro-mechanical members controlling it together with the embodied computer comprising a PLC (80) with inputs, outputs and C.P.U. includes: left limit switch (9), working rectilinear; right limit switch (9'), working rectilinear; left limit switch (90), glass feeding; right limit switch (90'), glass feeding; limit switch (91), shaft revolution; vertical limit switch (91'), shaft stroke; limit switch (920, platform (6) rotation; automatic-manual selector (93); rough-smooth finishing selector (94); cycle start push-button (95); push-button (96) for vacuum pump (97); cycle end push-button (98); emergency push-button (98'); right rectilinear feeding push-button (98"); left rectilinear feeding push-button (99); right glass feeding push-button (99'); left glass feeding push-button (99"); revolver anticlockwise rotation push-button (97'); revolver clockwise rotation push-button (97"); vertical shaft revolver push-button (96'); shaft rotation push-button (96"); shaft revolution push-button (95'); contact (95") for cycle counter relays; three-phase asynchronous motor (75) for shaft rotation; cooling pump asynchronous three-phase motor (77); asynchronous three-phase motor (76) for vacuum pump driving for cupping fastening the glass to be worked; permanent magnet motor (72), or longitudinal transfer of head carrier slide; permanent magnet motor (71), for transverse transfer glass carrier table (2); permanent magnet motor (74) for revolver tool carrier (05) rotation; permanent magnet motor (73) for approaching of head carrier slide to the glass to be worked and for deepening the groove, including deceleration and brake; pneumatic alternative motor (78); command revolution tool axis; alphanumeric keyboard (8'), with nineteen keys.

10. Machine, as claimed in claim 9, characterized in that the PLC (80) comprises an analogic base unit (80'), with the extendible memory (80") up to at least 4 Kwords residing in epron, e.g. corresponding to Hitachi P 250 E model, as well as twenty-four output connections and thirty input connections; by an expansion module, e.g. Hitachi EXBE model, comprising an input expansion module as well as four modules, for quick counting, e.g. of the XECUA model; two analogic output modules, e.g., of the Hitachi YEAGB model, providing the d.c. driving of motors (71, 72, 73, 74).

button 98; emergency push-button 98'; right rectilinear feeding push-button 98"; left rectilinear feeding push-button 99; right glass feeding push-button 99'; left glass feeding push-button 99"; revolver anticlockwise rotation push-button 97'; revolver clockwise rotation push-button 97"; vertical shaft revolver push-button 96'; shaft rotation push-button 96"; shaft revolution push-button 95'; contact 95" for cycle counter relays; three-phase asynchronous motor 75 for shaft rotation; cooling pump asynchronous three-phase motor; asynchronous three-phase motor 76 for vacuum pump driving for cupping fastening the glass to be worked; permanent magnet motor 72, for longitudinal transfer of head carrier slide; permanent magnet motor 71, for transverse transfer glass carrier table; permanent magnet motor 74 for revolver tool carrier rotation; permanent magnet motor 73 for approaching of head carrier slide to the glass to be worked and for deepening the groove, including deceleration and brake; pneumatic alternative motor 78; command revolution tool axis; alphanumeric keyboard 8', with nineteen keys; PLC 80 with input, output and C.P.U. The particulars enumerated here above are partially included in the machine and partially included in the control board 0.

In particular the PLC, 80, (figure 4) comprises an analogic base unit (80'), with an extendible memory (80") up to at least 4 Kwords residing in epron, e.g. corresponding to Hitachi P 250 E model, as well as twenty-four output connections and thirty input connections: by an expansion module, e.g. Hitachi EXBE model, comprising an input expansion module as well as four modules, for quick counting, e.g. of the XECUA model; two analogic output modules, e.g., of the Hitachi YEAGB model, providing the d.c. driving of motors (71, 72, 73, 74).

From the foregoing the operation of the machine should be evident, however in the following a description thereof will be given: How to engrave, on a pane of glass, not shown, a track of the kind indicated at G (figure 5) will be described herewith. To comply with this the pane of glass is laid down on the table 2, in touch with the cuppings 20 and a depression is established therein by connecting them with the vacuum system including the vacuum pump 76. The position of pane of glass, on the table 2, is not critical but an approximated one, as the table 2 may be precisely set, by controlling the motor 71. By acting on the latter and in addition positioning the grinding wheel 50 or all the unit included in the slide 4 and subjected to motor 72, a position, e.g. A, is established for the start of the working. Since the track G, to be cut, comprises a continuous path, including two semicircular arcs, of radius r and two rectilinear segments, positioning of the starting point must be preceded by setting of radius r, of curvature thereof, which is obtained by controlling the hand wheel 60', setting a distance, between the axis of the platform 6 and the plane of symmetry of the grinding wheel 50, equivalent to the radius r. At this stage, on the control board 0 are set: 1) the lengths of the rectilinear segments of the track G; 2) the degree of finishing: rough or smooth; 3) the cut depot giving, for each tool, the corresponding quote of descent. Then, the cycle is started, by setting into rotation motors 72, 73, 74, 75. Exactly, the motor 75 provides the rotation of all the tools 50, 50', 50", only one of which, at a time, is in a working position. The motor 74 rotates the platform 6 including the tool unit 05, in anticlockwise direction, of an angle of 180[. In the meantime the motor 73 begins to provide the descent of the first tool 50, to a partial corresponding depth. With this descent, initiates the engraving of the pane of glass, by the tool 50, firstly in a vertical direction, at least until the motor-reduction unit 74 is involved, whereby providing the rotation of the platform 6 and correspondingly, the revolution, in clockwise direction, by radius r, of the tool 50 whereby an inherent cut with the depth determined by the tool 50, is obtained in the pane of glass, not shown. When the tool has accomplished the semi-revolution, providing the semicircular section of track G, the driving motor 74 which provided it stops and in its place intervenes the motor 72, which slides the slide 4, as well as the tool 50, along the first rectilinear segment adjacent the track G. When this segment of the track G is ended the preceding cycle is contrarily repeated, with stopping of the motor 72 and restart of motor 74, leading the tool 50 to engrave the pane of glass, while accomplishing also the second segment of semi-revolution, starting to engrave the second rectilinear segment of the track, wherein a new inversion of tasks, between the motor 74 and the motor 72 is provided. When the tool reaches the starting point, the first step has came to an end and a second step can be started. The second step substantially repeats the first one, in anticlockwise direction, i.e. starting from a rectilinear segment of the track G and exactly from the last segment thereof. In case that the rough finish was chosen, this second step, takes place consecutively, by the same tool 50. Whereas, if a smooth finishing, was chosen the tool 50 is given up and in its place intervenes the tool 50'. This substitution takes place substantially in three times. In a first time, motor 73 is set into operation, with an inverted direction of rotation, with respect to the previous one; this takes off the tool from the pane of glass and rises it over the same, in a position wherein the pneumatic motor 78 is expected to intervene for the second step. Compressing of pneumatic motor 78 results in an opening of rectilinear motors 078, 078',whose

shoes, by closing, keep stationary, the position of revolution of revolver 05, while the stroke of the racket 178 provides the final rotation of 120[of shaft 51 and consequently of revolver 05, which corresponds to the pitch, between a grinding wheel and the next, in this case: between the grinding wheel 50 and the grinding wheel 50'; Then, the shoes 078, 078' are closed fastening the position of revolver 05 and thus that of tool 50'. In a third time, the motor 73, with a still inverted rotation, provides the level established for this second tool (50'), which was said of second rough-engraving or first finishing. At the end also of this second step, begins the third step which is of smooth finishing too, and which substantially repeat the second step, including the substitution of the grinding wheel 50' with the grinding wheel 50". Whereas, being advisable for a good operation of the machine, to keep even the number of the steps, when as in this case, it is odd, an additional back stroke is performed with the meaning of further additional finishing.

Claims

1. Process to engrave the main surfaces of panes of glass with grooves, slightly deep, of the kind comprising at least the running of three or more tools (50, 50', 50") in the same groove track, in part for rough-engraving and in part for finishing, characterized in that each (50, 50', 50") of the three or more tools engraves the pane of glass to be worked, by running individually the whole track one or more times and then is substituted by the next tool, which, also starting substantially from the same point (A), succeed to the first and runs the whole track and so on until the latter of the tools is run, wherein the control of the tool succession and the common successive repeated running of the track is provided by the program set, which is each time repeated particularly according to twelve tracks (from A to N).

2. Process to engrave the main surfaces of the pane of glass, as claimed in claim 1, characterized in that the tools (50, 50', 50") run and run again rectilinear tracks in the direction perpendicular to the table (2) pane carrier, by mutual sliding of the tool and/or panes of glass, and circular tracks possibly consecutive, to provide a continuous track, $_1$wherein closed tracks requiring revolver tool carrier revolutions, of a number of round angles as many are the tools or the strokes totalled thereby, are obtained through balanced alternative rotations in clockwise and anticlockwise directions and vice versa.

3. Machine to engrave the main surfaces of the pane of glass with grooves, slightly deep, of the kind adapted to actuate the process as claimed in claims 1 and 2, characterized in that it is in the form of a machine tool, with at least three shafts (5, 5', 5"), contemporaneously rotatable, in the form of a revolver (05), substantially in parallel and exactly one (5) for rough-engraving and two (5' and 5") for finishing or vice versa, working in succession, one after the other, each driven to repeat, exactly, the same track, from the beginning to the end, with reverse to the starting point (A).

4. Machine, as claimed in claim 3, characterized in that the pivot (51) of the revolver (05) of grinding wheels is horizontally mounted, substantially radial, to a platform (6), pivoted (at 106) around a revolvable chariot (60), about a radius (r) to be controlled by hand, by an hand wheel (60') and a screw or the like, on a saddle (160), sliding on said chariot (60), adapted to position the revolver of grinding wheels (50, 50', 50") at a distance, from the stationary axis (106), of rotation of the platform (6), corresponding to that chosen as radius, wherein the platform (6), in turn, is mounted on a transverse chariot (06), which, in turn, is mounted, by guides (61), on a longitudinally movable slide (4) which carries each and all the tools longitudinally to run the pane of glass to be worked.

5. Machine, as claimed in claims 3 and 4, characterized in that the transverse chariot (4) provides, by hand, only the starting point from which the tool (50) begins its work, as the relative transverse feeding movement, between the tool and the pane of glass is obtained by positioning the latter, as the same pane of glass is laid down on a table (2), with cupping glass (20), which fasten it thereto and the latter is transversely movable by a driven screw (22) on guides (21) thereof.

6. Machine, as claimed in claims from 3 to 5, characterized in that the driving system powering the machine comprises$_2$ seven electric motors (71, 72, 73, 74, 75, 76, 77) and is associated to the pneumatic system for driving an eighth pneumatic alternative motor (78).

7. Machine, as claimed in claim 5, characterized in that the pneumatic system, for driving the pneumatic, alternative, cylinder-piston-like motor (78), comprises a racket (178) which meshes with a pinion (278) keyed on an idly pivoted shaft (378) which has fixedly mounted a sprocket wheel (478), connected to a roller chain (578) meshing with a sprocket wheel (678) coaxially mounted as a free wheel on the shaft (51) of revolver tool carrier and that the same pneumatic motor (78) works in conjunction with two rectilinear motors (078, 078') providing the fastening of the revolvable tool carrier

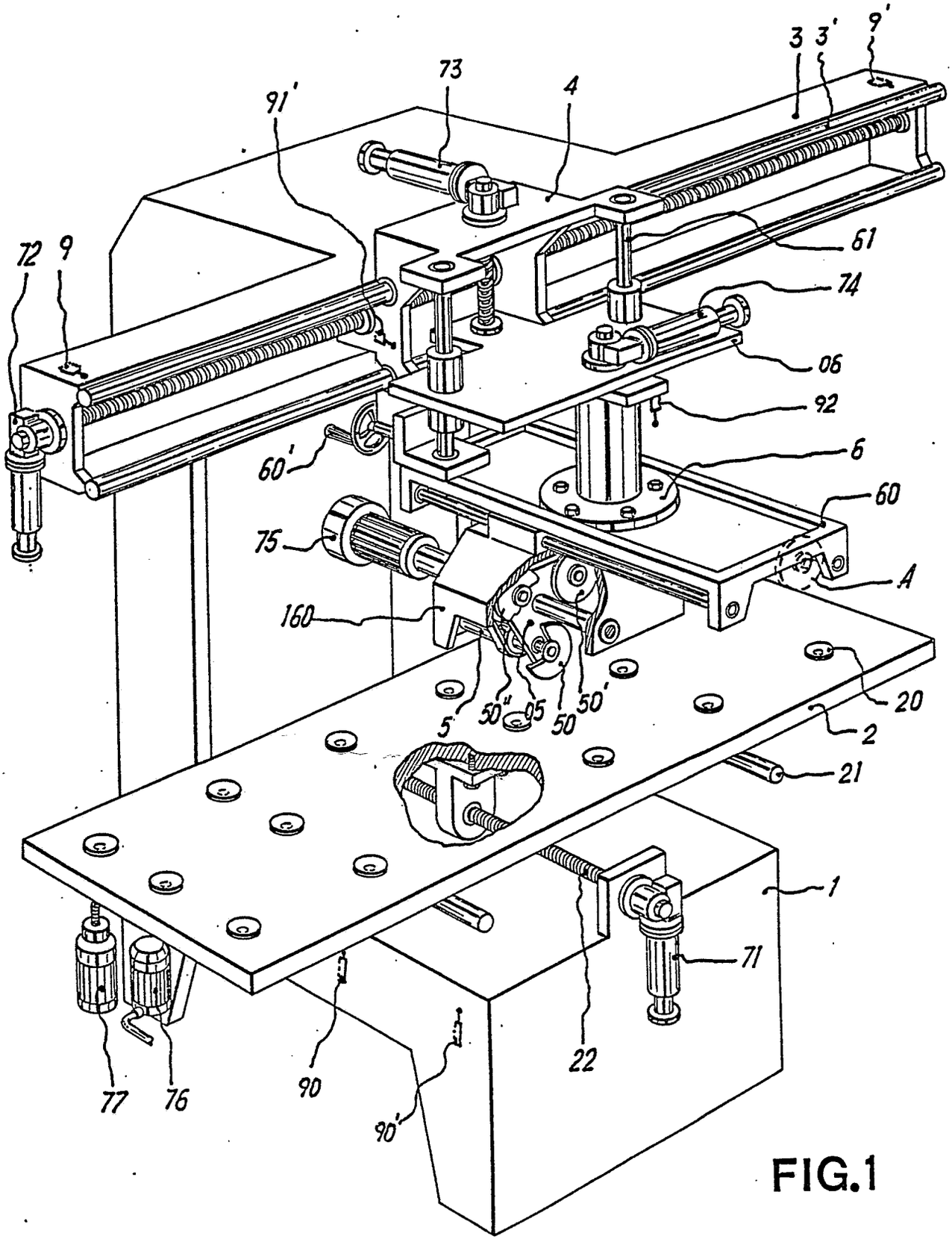
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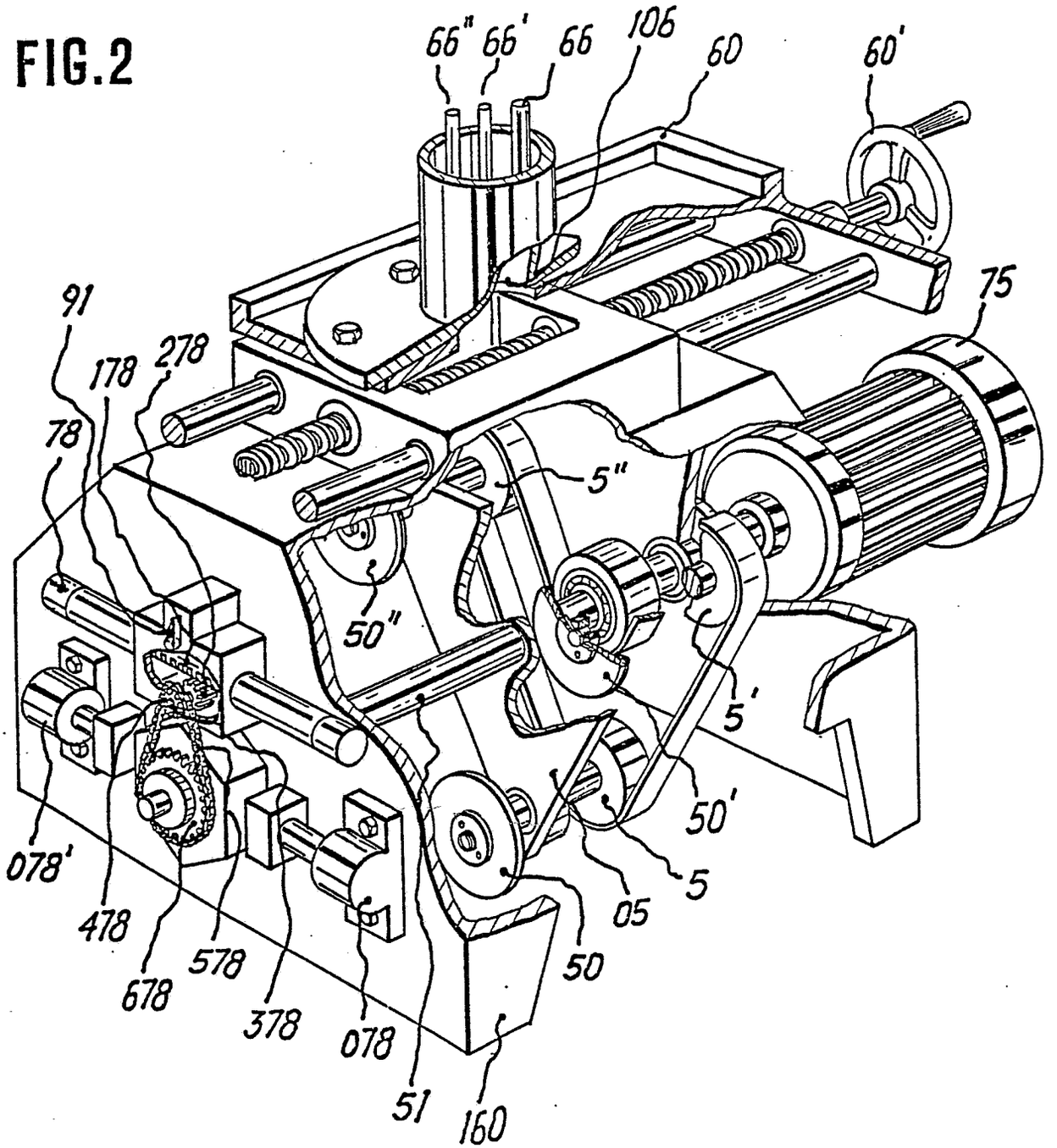
FIG.1

FIG.2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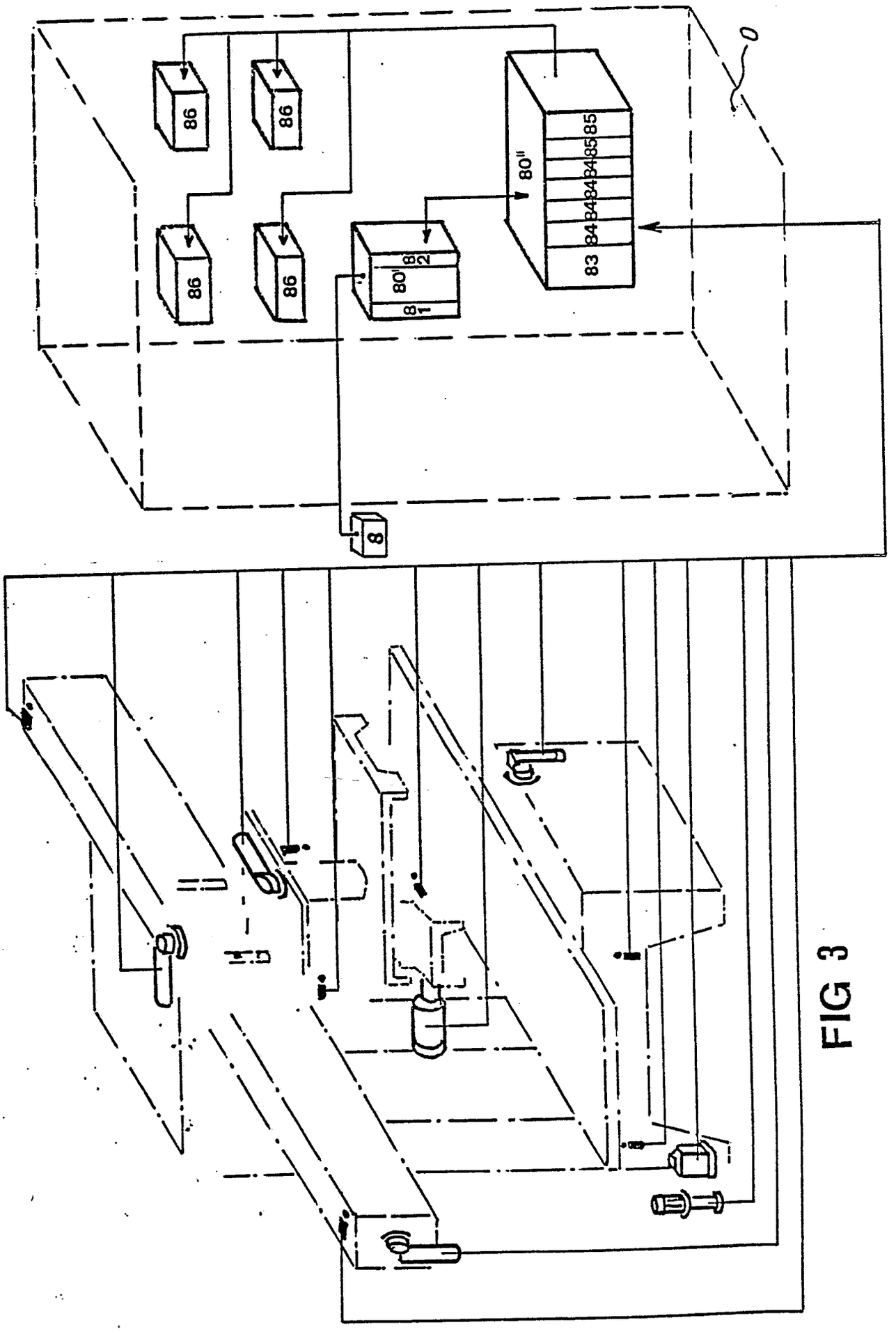

FIG 3

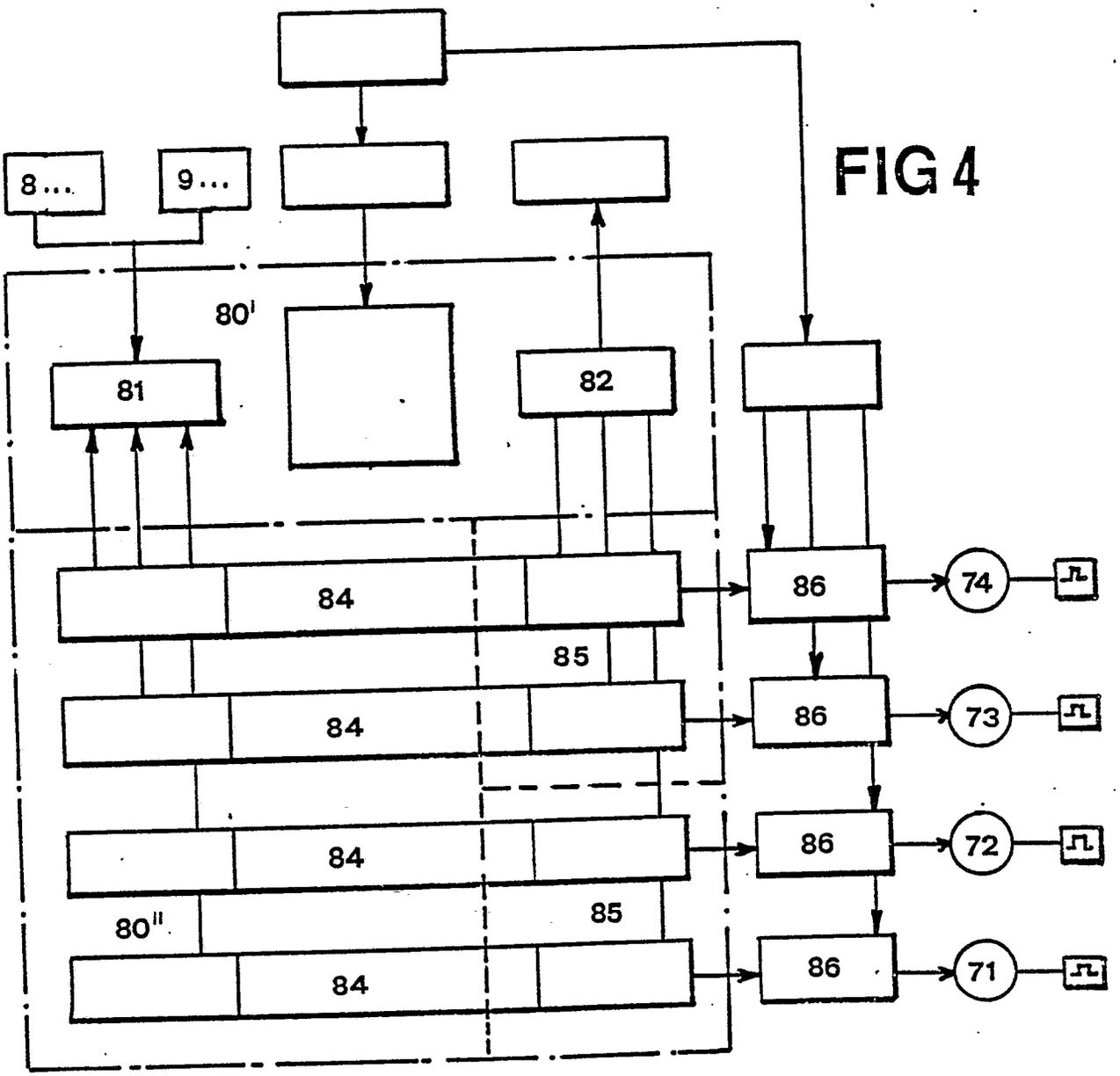
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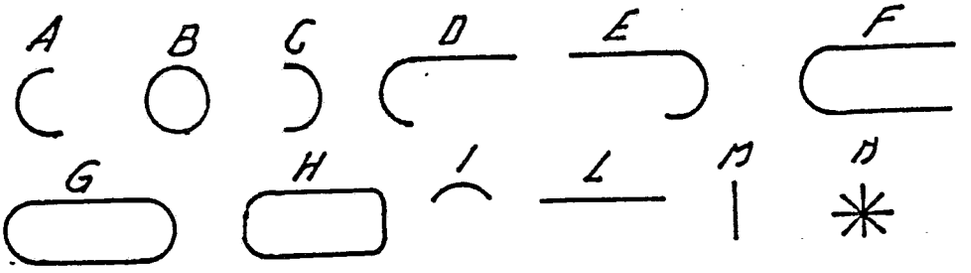
FIG 4

FIG 5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EUROPEAN SEARCH REPORT

Application Number

EP 87 20 1963

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	DE-C- 196 587 (HANS MULLER-HICKLER) * Page 1, line 1 - page 2, line 21; figures 1-3 *	1	B 24 B 19/02 B 24 B 27/00 B 23 Q 39/02 // B 44 B 3/00
X	DE-C- 350 854 (FRANZ LIEBC) * Page 1, line 1 - page 3, line 88; figures 1-3 *	1,2	
X	DE-A-2 623 812 (WALTER PÖTING) * Page 5, line 1 - page 6, line 13; page 8, line 13 - page 9, line 17; figures 1-4 *	1	
X	DE-A-3 207 873 (RIEBESAM HEINZ) * Page 9, line 27 - page 12, line 31; claims 1,4,5; figures 1,3 *	3,6,8-10	
X	EP-A-0 172 299 (MASCHINENFABRIK DIEDESHEIM GmbH) * Page 3, "Aufgabe"; claim 1; figure 3 *	3,8-10	
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A	DE-A-3 338 240 (Z. BAVELLONI S.p.A.) * Page 5, line 13 - page 8, line 20; claims 1-7; figures 1-4 *	1,3,4,7	B 23 D B 23 Q B 24 B B 27 C B 44 B C 03 B
A	US-A-4 589 174 (ALLEN) * Column 3, line 40 - column 4, line 24; figures 1,3,4 *	3,8-10	
A	PATENT ABSTRACTS OF JAPAN, vol. 7, no. 106 (M-213)[1251], 10th May 1983; & JP-A-58 28 459 (NORITAKE KANPANII RIMITEDO K.K.) 19-02-1983 * Figure 4 *	1,3,7	

-/-

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-03-1988	CUNY J.M.J.C.

CATEGORY OF CITED DOCUMENTS

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Application Number

EP 87 20 1963

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
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A	US-A-4 503 739 (KONIECZKA) * Column 1, "Summary of the invention"; figure 1 *	1,3,7	
A	CH-A- 142 220 (OTTO STAMPFLI) * Claim; figure 1 *	7	
A	DE-A-3 213 546 (Z. BAVELLONI S.p.A.) * Abstract; figures 1-3 *	5	
A	GB-A-2 002 694 (ROLLS ROYCE LTD) * Abstract; page 1, line 89 - page 3, line 124; figures 1-3 *	1,3,8-10	
A	DE-C- 919 659 (FA. EUGEN WALDRICH) * Page 2; figure 1 *	1,3,4	TECHNICAL FIELDS SEARCHED (Int. Cl.4)
A	DE-C- 184 592 (KARFUNKEL & WOLF) * Page 1, lines 1-21; figures 5-7 *	1,3	
A	US-A-1 727 318 (P.H. JAMES et al.) * Page 1, lines 1-25; figures 1,2,4 *	1,3	
A	DE-C- 839 610 (PROKASKY et al.) * Claims 1-9; figures 1,2 *	1,3	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24-03-1988	CUNY J.M.J.C.

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