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

(11) Publication number: **0 300 417 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **88111562.0**

(51) Int. Cl.[4]: **B26D 5/16 , //B26D1/08**

(22) Date of filing: **19.07.88**

(30) Priority: **20.07.87 IT 2136287**

(43) Date of publication of application:
25.01.89 Bulletin 89/04

(84) Designated Contracting States:
DE ES FR

(71) Applicant: **De Angiolini, Roberto**
Via Vittorio Emanuele 21
I-20094 Buccinasco (Milan)(IT)

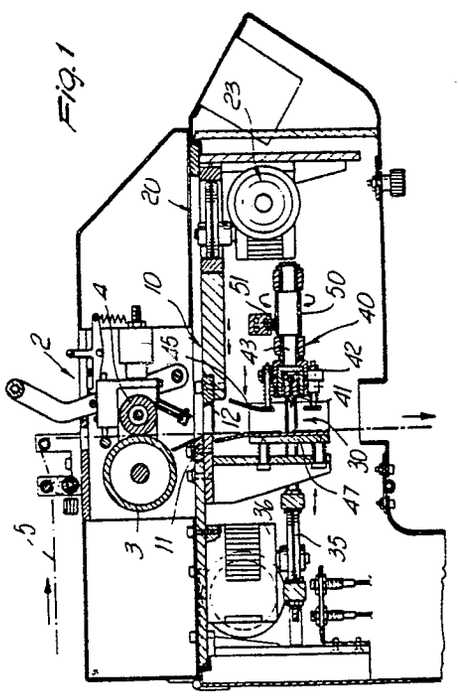
Applicant: **Motti, Mario**
Via del Cornicione 3
I-20083 Gaggiano (Milan)(IT)

(72) Inventor: **De Angiolini, Roberto**
Via Vittorio Emanuele 21
I-20094 Buccinasco (Milan)(IT)
Inventor: **Motti, Mario**
Via del Cornicione 3
I-20083 Gaggiano (Milan)(IT)

(74) Representative: **Modiano, Guido et al**
MODIANO, JOSIF, PISANTY & STAUB
Modiano & Associati Via Meravigli, 16
I-20123 Milan(IT)

(54) Automatic machine for cutting to size, particularly for tapes and the like.

(57) The present invention relates to an automatic machine for cutting to size, particularly for tapes and the like, which comprises an assembly (2) feeding portions of tape (15) to at least one cutting assembly (10) constituted by a fixed blade (11) operatively engageable by a movable blade (12). The peculiarity of the invention resides in that it comprises eccentric means (20) interacting with said movable blade (12) for its translatory motion with respect to said fixed blade (11) from a resting position, wherein said movable blade (12) is spaced from said fixed blade (11) for the insertion of the portion of tape (5) to be cut, to a cutting position, wherein said movable blade (12) interacts with said fixed blade (11) to perform the cutting of the tape (5), and/or vice versa.



EP 0 300 417 A2

AUTOMATIC MACHINE FOR CUTTING TO SIZE, PARTICULARLY FOR TAPES AND THE LIKE

The present invention relates to an automatic machine for cutting to size, particularly for tapes and the like.

As is known, in many industrial fields there is the need to provide the cutting to size of tapes, belts, strips and the like arriving from feeder reels.

A machine for the automatic execution of these operations is commercially available and has a scissor-like cutting assembly constituted by a fixed blade and by a movable blade pivoted at one end of the fixed blade which is alternatively moved by means of a kinematic transmission of the connecting rod-crank type.

This kind of solution, besides being considerably complicated from a constructive point of view, has the severe disadvantage of requiring long replacement operations if so-called hot cutting, i.e. the localized melting of the tape and the like by means of a hot edge, is to be performed.

Another known commercially available solution provides the use of a plane on which a blade cutting assembly and a hot-cutting assembly are arranged laterally side by side and are movable in a lateral direction, according to the type of cutting to be performed.

This type of solution is scarcely reliable and mechanically complicated, and it furthermore has considerable lateral bulk due to the mutual arrangement of the blade cutting assembly and the hot-edge cutting assembly.

The aim proposed by the invention is indeed to eliminate the disadvantages described above by providing an automatic machine for cutting to size, particularly for tapes and the like, which allows to selectively perform blade cutting and hot-edge cutting without having to resort to modifications or variations in the position of the components of the machine.

Within the scope of the above described aim, a particular object of the invention is to provide an automatic machine wherein the movement of the cutting assemblies is effected with extreme precision and high speed, thus allowing to obtain extremely sharp and precise-length cuts.

Still another object of the present invention is to provide an automatic machine which is electronically controllable in all its operating steps, thus contributing to the obtainment of a machine which is very compact and practical in use.

A further object of the present invention is to provide an automatic machine which, by virtue of its peculiar constructive characteristics, is capable of giving the greatest assurances of reliabilility and safety in use.

The above described aim, as well as the mentioned objects and others which will become apparent hereinafter, are achieved by an automatic machine for cutting to size, particularly for tapes and the like, according to the invention, comprising an assembly for feeding portions of tape to at least one cutting assembly constituted by a fixed blade operatively engageable by a movable blade, characterized in that it comprises eccentric means interacting with said movable blade for its translatory motion with respect to said fixed blade from a resting position, wherein said movable blade is spaced from said fixed blade for the insertion of the portion of tape to be cut, to a cutting position, wherein said movable blade interacts with said fixed blade to perform the cutting of the tape, and/or vice versa.

Further characteristics and advantages of the invention will become apparent from the description of a preferred but not exclusive embodiment of an automatic machine for cutting to size, particularly for tapes and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a schematic sectional view of the automatic machine according to the invention taken along a vertical plane, illustrating its constituent assemblies;

figures 2 and 3 illustrate, respectively in a rest position and in a cutting position, the mutual positioning of the movable blade with respect to the fixed blade;

figure 4 is a sectional view of the movable blade taken along a vertical plane, illustrating the eccentric means for its translatory motion;

figure 5 is a plan view of the hot-cutting assembly;

figure 6 is a sectional front view of the machine, illustrating the possibility of rotation of the hot-cutting assembly for performing an inclined cut.

With reference to the above described figures, the automatic machine for cutting to size, particularly for tapes and the like, according to the invention, comprises a supporting frame, generally indicated by the reference numeral 1, which has, in its upper part, a feeder assembly, generally indicated by the reference numeral 2, which in a preferred but non-limitative embodiment has a first roller 3 on which there acts a presser roller 4, arranged counter-rotating and together effecting traction of the required portion of tape 5 arriving from a feeder reel, not illustrated in the drawing.

The tape fed by the assembly 2 is conveyed to a blade cutting assembly, generally indicated by the reference numeral 10, which in the embodiment illustrated in the drawings is arranged below the

feeder assembly 2.

The blade cutting assembly, as more clearly illustrated in figures 2, 3 and 4, comprises a fixed blade 11 and a facing movable blade 12 which may have a straight or inclined profile.

The movable blade 12 is movable with respect to the fixed blade 11, maintaining parallelism, so as to move from a rest position whereat the blade 12 is spaced from the fixed blade 11 (figure 2), allowing the passage of the portion of fed tape therebetween, to a cutting position (figure 3), whereat the movable blade interacts with the fixed blade to perform the cutting.

The peculiarity of the invention resides in that the movable blade 12 is connected to a sliding plate 15 which is slideable on opposite horizontal guides 16 having a substantially V-shaped guide profile 17.

The translatory motion of the sliding plate 15 is provided by eccentric means, generally indicated by the reference numeral 20, which are constituted by a disk 21 which is eccentrically keyed on a small shaft 22 which draws its motion from a first motor, motor-reducer assembly 23; externally to the disk 21 there is a ring of ball bearings 25 which acts between the opposite edges 26 of an opening 27 provided on the sliding plate 15.

With this arrangement, the rotary movement of the shaft 22 causes rotation of the disk 21 which, by virtue of its eccentric connection, generates an alternate translatory motion of the sliding plate 15 in the horizontal plane, with consequent approach and spacing of the movable blade 12 with respect to the fixed blade 11.

The motor, motor-reducer assembly 23 is servo-controlled by controls of the electronic type which allow, at each impulse, the execution of a complete turn, consequently obtaining the step of approach and tape cutting and the return to resting position to allow the successive insertion of another portion of tape to be cut.

Below the blade cutting assembly 10 and parallel thereto there is a hot-cutting assembly, generally indicated by the reference numeral 30, which is constituted by a sliding frame 31 which is slideably guided on a pair of horizontal rods 32 and is also actuated by eccentric means which are conceptually similar to those used to move the movable blade.

In detail, there is a front disk 35 which is eccentrically keyed to the output shaft of a front motor, motor-reducer assembly 36 which is positioned on the opposite side with respect to the motor, motor-reducer assembly 23, thus compacting the overall dimensions of the apparatus.

A front ring of bearings 37 is provided on the disk 35 and acts in a front opening 38 of the frame 31 which is delimited by a pair of front crosspieces 39.

The frame 31 furthermore defines a pair of rear crosspieces 40 which support a wedge-like cutting bar 41 connected to a heating resistor 42 which is supported by a central shaft 43 connected to said rear crosspieces 40.

Laterally of the cutting bar 41 there are movable pressers 45 which yield elastically with respect to the support of the edge and engage with a facing elastically yielding abutment plate 47.

The coupling between the presser 45 and the abutment 47 allows to retain the tape during the hot-cutting step.

In practice, when the front motor, motor-reducer assembly 37 is actuated, the bar 41 moves towards the tape 5 with an initial mutual engagement of the presser 45 and the abutment plate 47, which retains the tape for all the time during which the localized melting occurs for the cutting of the tape.

As previously mentioned, the hot cutting edge 41 is supported by a central shaft 43 which is connected to the crosspieces.

The central shaft 43 is provided, in a middle portion, with a toothed region indicated at 50, which engages with a rack portion 51 which is movable perpendicular to the direction of extension of the shaft, so as to obtain rotation of the hot-cutting assembly along a direction perpendicular to the tape advancement direction, thus allowing to obtain the inclined cutting of the tape, both in one direction and in the opposite one, since the simple translatory motion of the rack causes the rotation of the central shaft and accordingly the rotation of the cutting edge supported thereby.

In practical operation, by virtue of the electronic presetting of the machine it is sufficient to select the size of the portion of tape to be cut and the type of cutting to be performed, i.e. cold-cutting with the blades or hot-cutting with the bar 41, and then start the operating cycle.

If the cutting is performed with the blades, the tape is initially fed between the blades 11 and 12, which are mutually spaced when in resting position, and when the required portion has been inserted the feeder assembly stops and the motor, motor-reducer 23 is actuated and causes the movement of the sliding plate 15 with the consequent cutting of the tape; as soon as the sliding plate returns to its resting position, a subsequent tape portion is inserted, and so forth.

If the execution of hot-cutting is instead required, after selecting the cutting inclination by acting on the rack which causes the rotation of the supporting shaft of the cutting bar, the automatic operating cycle is started, and it is repeated similarly to the one described above, with the only difference that the cutting is performed by means

of the localized melting of the material constituting the tape, performed by means of the hot bar. It should be noted that during the hot-cutting step the tape is kept motionless in position by the mutual action of the elastic presser and of the abutment plate.

From the above it is apparent that the invention achieves the intended aim and objects; in particular the fact is stressed that the use of eccentric means, which perform the alternated translatory motion both of the blade cutting assembly and of the hot-cutting assembly, allows to considerably simplify the structure of the machine and to have, at the same time, greater reliability in operation and greater cutting precision.

Furthermore, the provision of the motor, motor-reducer 23 which performs a pushing action on the plate 15, on one side, and of the front motor, motor-reducer assembly 37 which in practice exerts a traction on the sliding frame 31, on the other side, allows to significantly reduce the overall dimensions of the machine without compromising its functionality in any way.

Another important aspect of the invention furthermore resides in the fact that all the actuations and the succession of actuations performed by the machine are servo-controlled by an electronic control assembly which allows to reduce manufacturing costs, though functionality is significantly increased.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

Furthermore, all the details may be replaced with other technically equivalent elements.

In practice, the materials employed, so long as compatible with the specific use, as well as the contingent shapes and dimensions, may be any according to the requirements.

Where technical features mentioned in any claim are followed by reference numerals and/or signs, those reference numerals and/or signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference numerals and/or signs do not have any limiting effect on the scope of each element identified by way of example by such reference signs.

Claims

1. Automatic machine for cutting to size, particularly for tapes and the like, comprising an assembly (2) feeding portions of tape (5) to at least one cutting assembly (10) constituted by a fixed blade (11) operatively engageable by a movable blade (12), characterized in that it comprises eccentric means (20) interacting with said movable blade (12) for its translatory motion with respect to said fixed blade (11) from a rest position, whereat said movable blade (12) is spaced from said fixed blade (11) for the insertion of the portion to tape (5) to be cut, to a cutting position, whereat said movable blade (12) interacts with said fixed blade (11) to perform the cutting of the tape (5) and/or vice versa.

2. Automatic machine, according to claim 1, characterized in that said movable blade (12) is supported at the end of a sliding plate (15) movable in a substantially horizontal plane and actuated by said eccentric means (20).

3. Automatic machine, according to the preceding claims, characterized in that said eccentric means (20) are constituted by at least one disk (21) eccentrically keyed to a vertical shaft (22) connected to a motor, motor-reducer assembly (23).

4. Automatic machine, according to one or more of the preceding claims, characterized in that said disk (21) acts between the edges (26) arranged opposite along the direction of motion, of an opening (27) defined by said sliding plate (15).

5. Automatic machine, according to one or more of the preceding claims, characterized in that it comprises a ring of bearings (25) interposed between said disk (21) and the active edges (26) of said opening (27).

6. Automatic machine, according to one or more of the preceding claims, characterized in that it comprises a hot-cutting assembly (30) arranged below said cutting assembly (10) in the direction of insertion of the tape (5).

7. Automatic machine, according to one or more of the preceding claims, characterized in that said hot-cutting assembly (30) has a sliding frame (31) slideable on horizontal rods (32) and having a pair of front crosspieces (39) defining a front opening (38) on which there act front eccentric means (35) actuated by a front motor, motor-reducer assembly (36).

8. Automatic machine, according to one or more of the preceding claims, characterized in that said hot-cutting assembly (30) comprises a hot-cutting bar (41) operatively connected to an electric heating resistor (42) and supported by a central shaft (43), extending substantially parallel to said horizontal bars (32), which is rotatably connected between a pair of rear crosspieces (40) of said sliding frame (31).

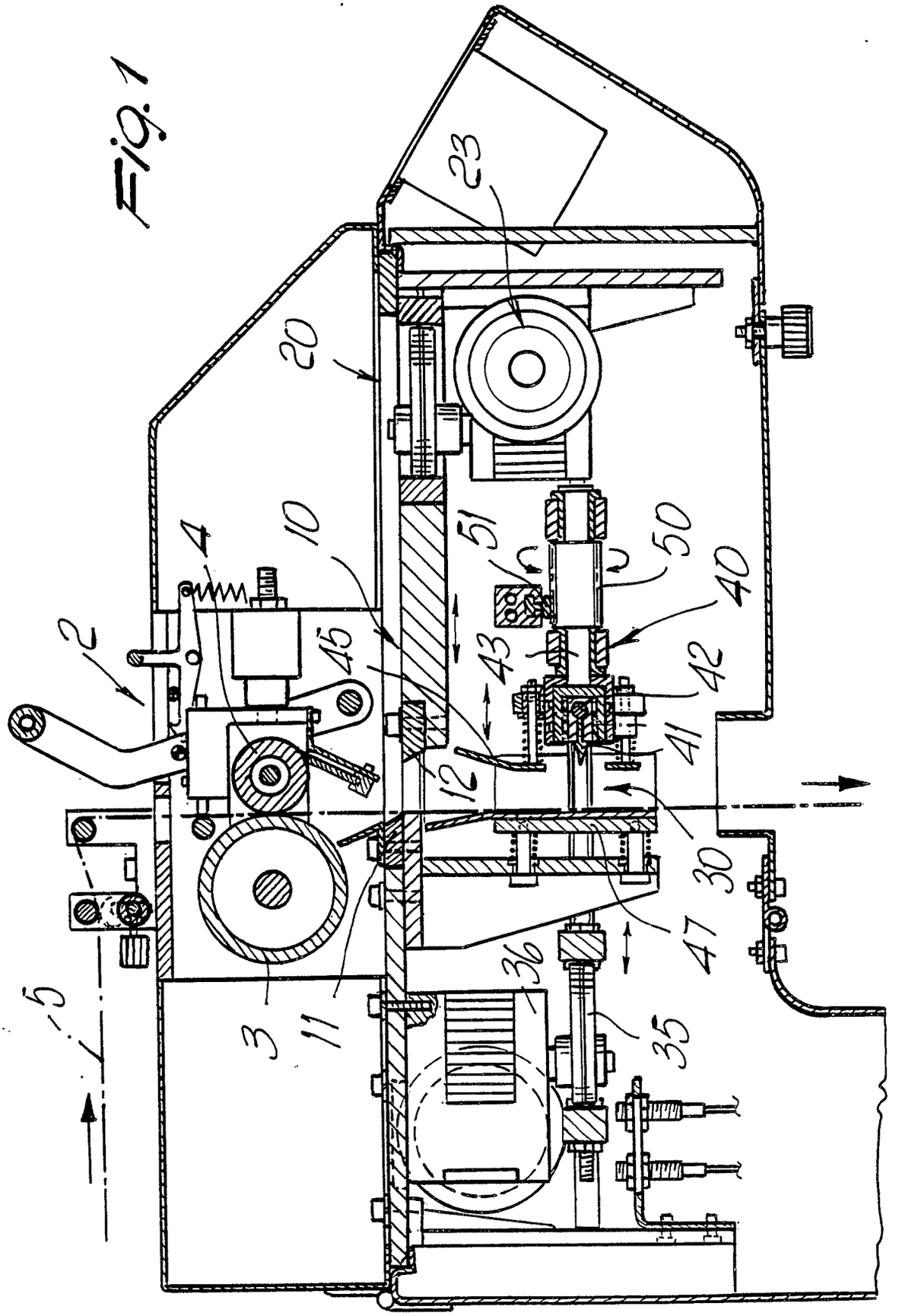
9. Automatic machine, according to one or more of the preceding claims, characterized in that it comprises, laterally to said hot-cutting bar (41), a pair of elastically yielding pressers (45) operatively engageable with an elastically yielding abutment plate (47) for the removable retention of said tape (5) during the hot-cutting step.

10. Automatic machine, according to one or more of the preceding claims, characterized in that it comprises, on a middle portion of said central shaft (43), a toothed region (50) engageable with a rack (51) movable perpendicular to said central shaft (43) for the rotation of said central shaft (43) about is own axis with inclination of said hot-cutting bar (41) with respect to the direction of advancement of said tape (5) for the execution of inclined cuts.

11. Automatic machine, according to one or more of the preceding claims, characterized in that said sliding plate (15) is slideable between a pair of guiding bars (16) provided with a groove (17) in which a complementarily shaped guiding profile engages.

12. Automatic machine, according to one or more of the preceding claims, characterized in that said motor, motor-reducer assembly (23) is arranged on the opposite side with respect to said front motor, motor-reducer (36) to reduce the overall dimensions of said automatic machine.

Fig. 1



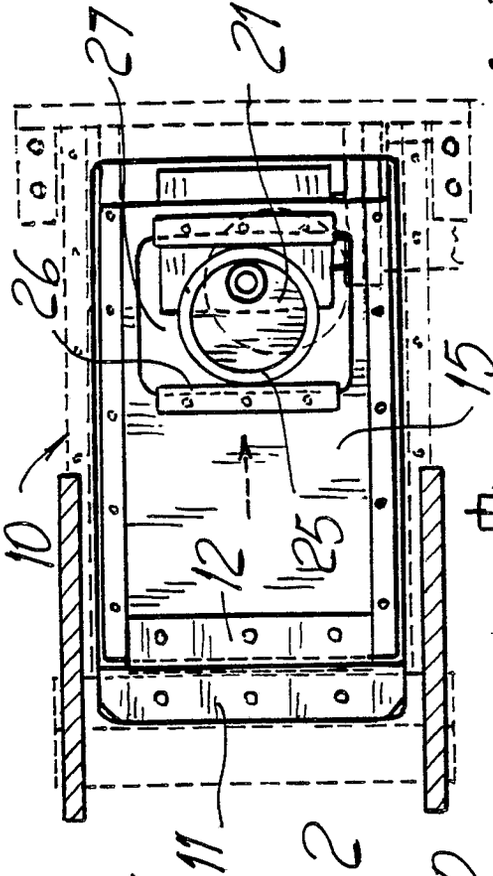


Fig. 3

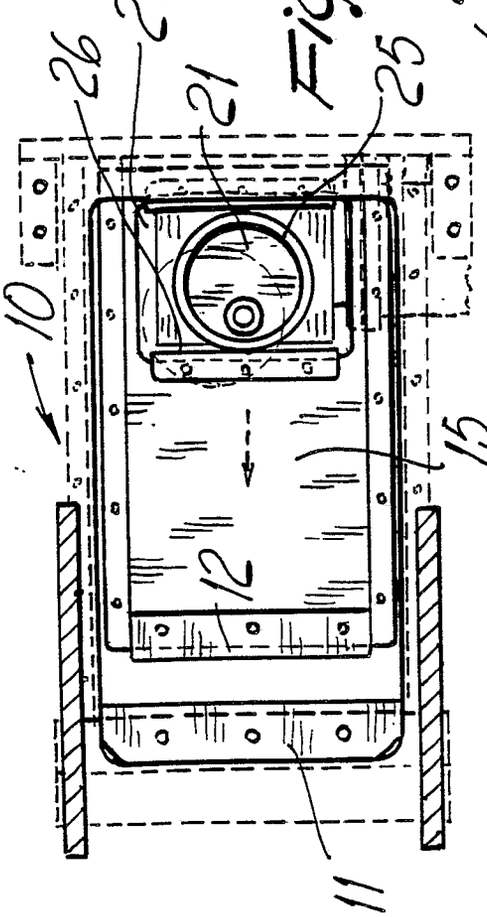


Fig. 2

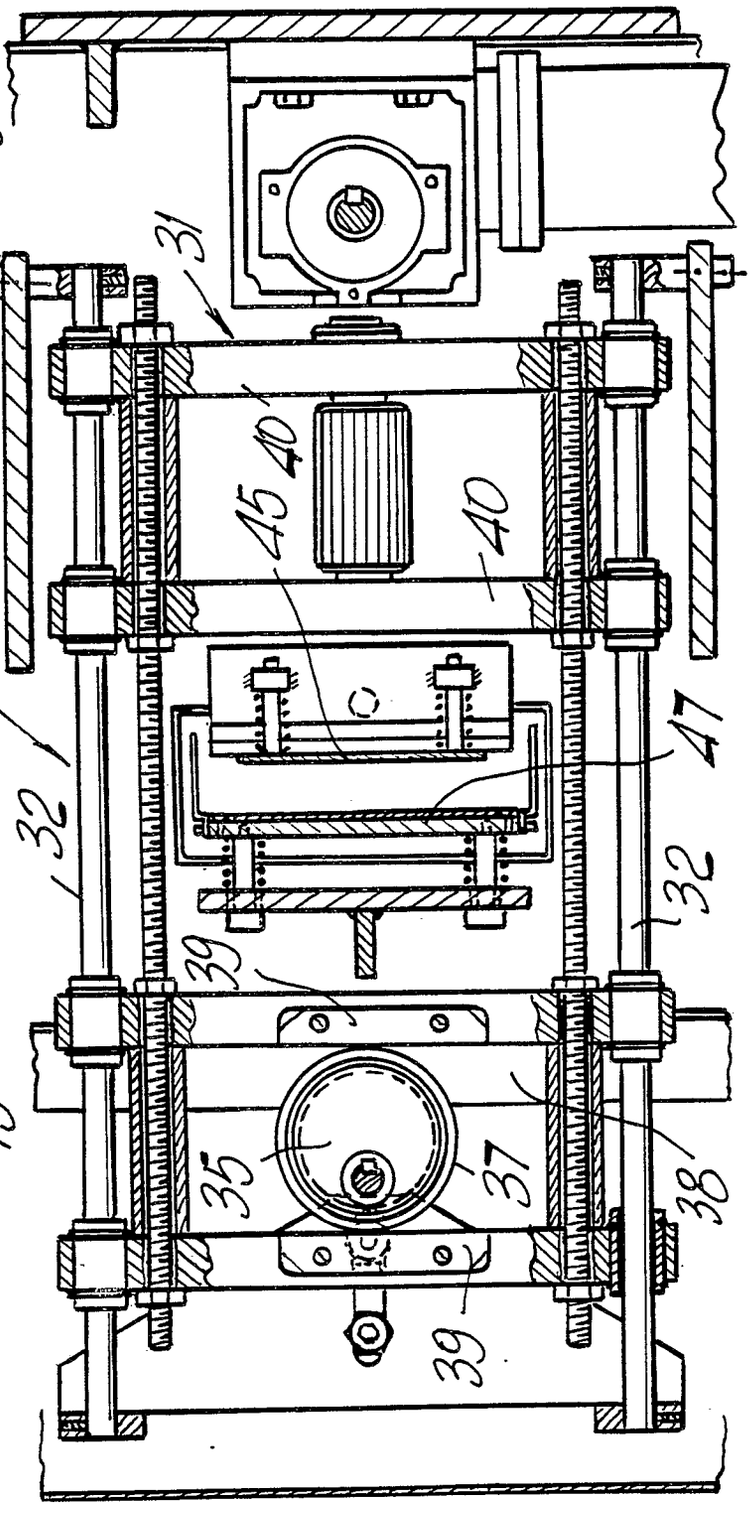


Fig. 5

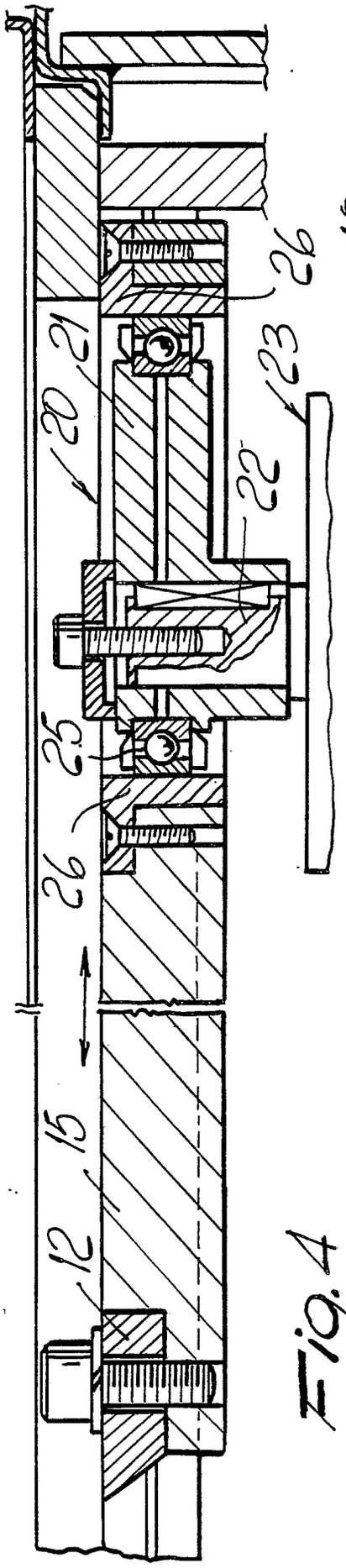


Fig. 4

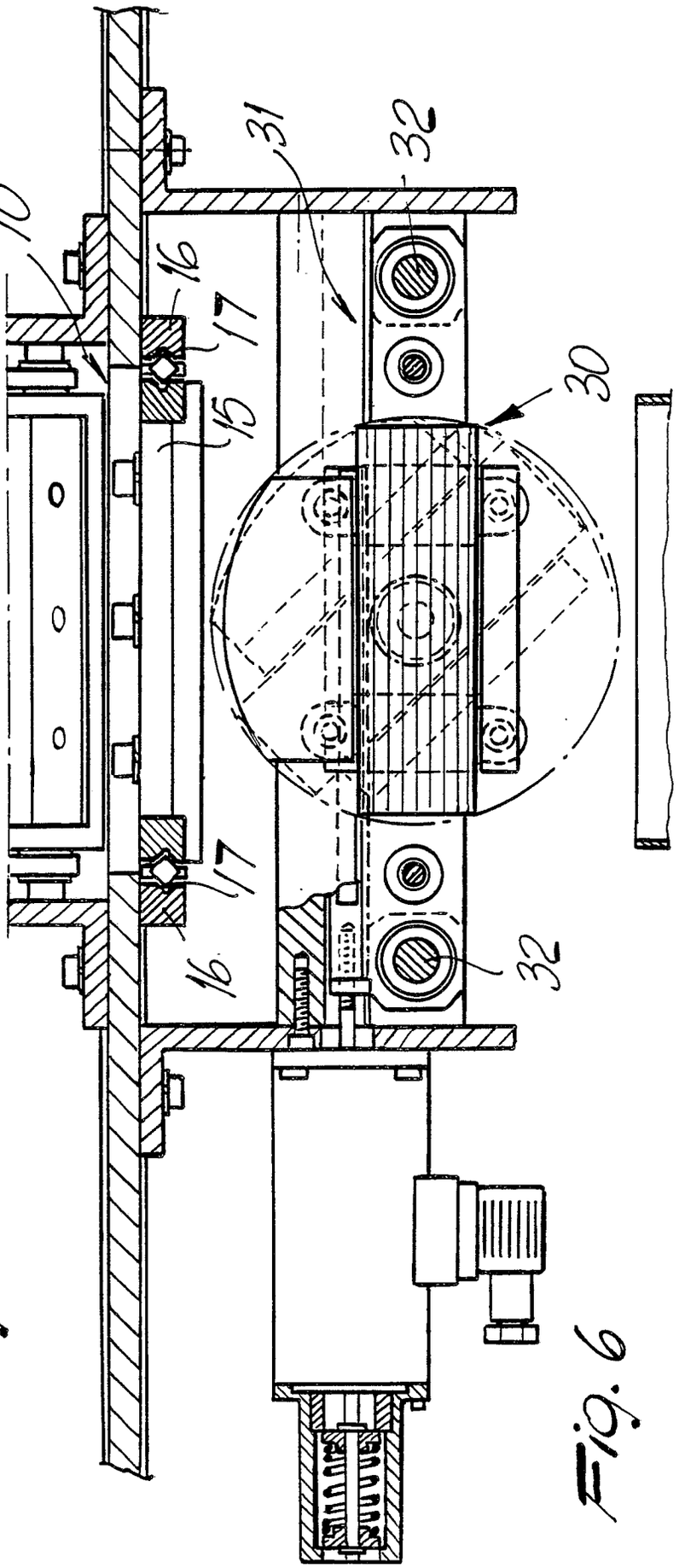


Fig. 6