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

(11) Publication number: **0 090 631**
**A2**

# (12) EUROPEAN PATENT APPLICATION

(21) Application number: **83301730.4**

(22) Date of filing: **28.03.83**

(51) Int. Cl.³: **B 65 C 9/36**, B 65 C 9/46, B 65 C 9/18

(30) Priority: **26.03.82 GB 8208882**

(43) Date of publication of application: **05.10.83 Bulletin 83/40**

(84) Designated Contracting States: **DE FR GB IT NL SE**

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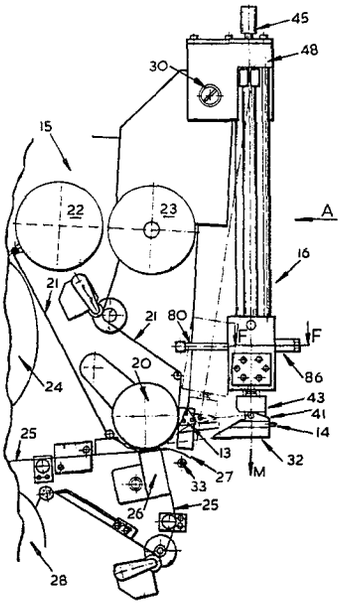
## (54) Label applicator device.

(57) A labelling machine comprises a label printer (15) associated with a label applicator device (16) incorporating a telescopic arrangement (48, 44, 43, 46) which is pivotally mounted at one end (30) on a fixed support (63) and at its other end carries a label transporter (32). Pivotal drive means (72, 73, 74, 77) is provided to move the telescopic arrangement (48, 44, 43, 46) between a label-receiving position (20, 26, 33, 13) where the transporter (32) collects a label from the printer (15) and a label delivery position. In the label delivery position drive means (45) is effective to cause the arrangement (48, 44, 46, 43) to extend and retract telescopically in order to deliver a label to a package at an applicator station (29). Control means (65, 66) is provided for measuring the extent of telescopic extension on each occurrance and for consequentially controlling the telescopic drive means (45) during retractive motion.

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# LABEL APPLICATOR DEVICE

This invention relates to a label applicator device.

Various forms of labelling devices are known in the packaging industry, these devices comprising a ticket or label issuing unit and a label applicator device comprising a label transporter which collects the label from the issuing unit and transports the label to an application station at which the label is applied to a package. In the known devices the movement of the transporter is governed by a preset control system which undergoes a preset and invariable routine. This routine is normally designed to handle the worst circumstance envisaged by the designer and accordingly does not provide efficient operation for other more common circumstances.

It is an object of the present invention to provide an improved form of label applicator device which, at least in part, is self-adaptive to provide substantially constant efficiency of operation under various different circumstances of use.

According to the present invention a label applicator device comprises a telescopic arrangement pivotally mounted at one end on a fixed support and carrying a label transporter at its other end, pivotal drive means connected to the telescopic arrangement and drive means for effecting extension and retraction of the telescopic arrangement wherein control means are provided for measuring the extent of telescopic extension and controlling the telescopic drive means during retractive motion.

An embodiment of the present invention will now be described by way of example with reference to the accompanying drawings, in which:

Fig. 1 illustrates a labelling device incorporating a label applicator device in accordance with the present invention;

Fig. 2 is a detailed sectional view of the label

applicator device shown in Fig. 1;

Fig. 3 is a scrap sectional view of a detail in Fig. 2;

Fig. 4 is a view of the label applicator device of Fig. 1 taken in the direction of arrow A in Fig. 1;

Fig. 5 is illustrative of a further detail of Fig. 2; and

Fig. 6 is a scrap sectional view of a still further detail of Fig. 2.

In the drawings Fig. 1 illustrates a label printer 15 associated with a label applicator device 16 which is arranged to collect printed labels from the printing station of the printer 15 and deliver these to a package to be labelled at an applicator station 29.

Printer 15 comprises a print drum 20 to which is fed a carbon film 21 from a feed spool 22, the used film 21 being collected by a takeup spool 23. Adhesively backed labels are mounted on a label supply ribbon 25 fed from a label supply spool 24 and ribbon 25 is fed to the printing station adjoining drum 20, passes round anvil 26 at which the printed label 27 is released from the ribbon and the used ribbon, freed of its labels is collected by takeup spool 28. Ribbon 25 and film 21 pass over various guide rollers, at least one of which acts as a tension roller in each case.

Applicator device 16 comprises a telescopic arm which at its upper end is pivotally mounted at 30 and at its lower end is provided with a label transporter 32 and device 16 is pivotally driven in a controlled manner so that transporter 32 can be presented to the printing station to collect the printed label 27 following its partial release from the label carrier ribbon 25 caused by anvil 26. For this purpose transporter 32 is suction operated. Also, an air nozzle 33 is provided in device 15 adjacent anvil 26 and arranged to blow the printed ticket towards the transporter 32 to facilitate

collection thereby of the label 27. Following label collection the device 16 is pivotally moved into its vertical position where the transporter 32 is spaced from the printing station and the device 16 is then telescopically extended to move the transporter 32 in the direction M towards the applicator station 29 where the label carried by transporter 32 is affixed to a package. In this connection it will be understood that the package receives a label containing weight-related data and the printer 15 is accordingly controlled by a weighing device (not shown) prior to the package being delivered to the applicator station. When the package is in the applicator station 29 the magnitude of telescopic extension of the device 16 is determined by the physical size of the package which is an unknown quantity and which may vary from package to package. Accordingly in order to maximise efficiency of the device 16 the present invention provides for measuring the extent of telescopic extension of the device 16 prior to the label being planted upon the package, this measure being used to control the telescopic drive system which in reverse operation effects telescopic retraction of the device 16. With this arrangement the time interval required for operation of the device 16 is minimised.

As is more clearly shown in Fig. 2 which is a sectional view through device 16, transporter 32 comprises a sponge rubber pad 40 secured to a rigid carrier member 41 which in turn is pivotally mounted by means of shaft 42 on a block 43. Block 43 comprises a spigot 43A which extends along a glass cylinder 44 and is connected to a graphite piston located therein and which is pneumatically driven by an air supply fed to the interior of tube 44 by way of a coupling 45 at the top end of tube 44. Tube 44 is located at its lower end by a guide block 46 which is united by means of a pair of tie bars 47 (see Fig. 4) with an upper block 48, block 48 being pivotally mounted

at 30 as previously described. It will be appreciated that coupling 45, block 48 and the top end of tube 44 are arranged to provide a pneumatic seal so that the chamber formed within tube 44 above the piston is leak-free and telescopic extension of the device 16 is effected either by pressurising this chamber or simply by releasing the vacuum pressure therein. Because the piston is made of graphite and the tube 44 is made of glass a good quality seal is achieved between the piston and the glass which permits the piston to be held at the upper end of the tube 44 by means of suction only.

In order to guide the movement of transporter 32 during telescopic extension block 43 is provided with a pair of guide rods 50,51, located within respective guide tubes 52,53 the upper ends of rods 50,51 being provided with bearing washers 54,55 respectively which slide over the interior surface of the respective tubes 52,53. Rubber buffers 56 are provided at each end of rods 50,51 to eliminate shock loading at each end of the travel.

Rod 50 is provided at its upper end with a latching arrangement 60 formed by nuts 61 secured to the rod 50 and a generally U-shaped plate 62 mounted for pivotal action and torsionally loaded in a clockwise direction by a spring (not shown), the plate 62 being mechanically interlocked by means of an adjoining support panel 63 having an aperture 64 through which plate 62 is movable when the device 16 is in its vertical position. Accordingly latch 60 provides that the device 16 is in its telescopically retracted condition when the device 16 is pivotally moved out of its vertical position towards the printing station.

In order to measure the magnitude of telescopic extension of device 16 when in its vertical position guide rod 51 is shaped along its length to provide a series of teeth 65 and guide block 46 is provided with a photocell arrangement 66 which counts the passage of

teeth 65 during each movement of the transporter 32 in the direction M. The photocell arrangement 66 is more clearly illustrated in Fig. 3 which is a scrap sectional view on D-D of Fig. 2. The arrangement 66 comprises a vertically spaced pair of identical devices 67 each guarded by a wear plate 68 from possible damage by movement of the guide rod 51. The two photocell devices 67 are depitched with respect to teeth 65 so that in addition to effecting a count of the passing teeth 65 the direction of movement is also ascertained.

At its upper end guide rod 51 carries a magnet 69 which activates a Hall effect switch 70 mounted on block 48 and acting as a condition sensor determining whether or not device 16 is in its telescopically extended or telescopically retracted condition.

Pivotal movement of device 16 is effected by the drive arrangement shown in Figs. 4 and 5 which comprises electric motor 72 with clutch and brake unit 73 secured by means of block 74 to support panel 63. The output driven element of this arrangement is a circular disc 75 (Fig. 5) which projects through a slightly elongated aperture 76 in panel 63 and pivotally mounted on disc 75 is a link arm 77, the pivotal mounting being at 78 which is eccentric with respect to disc 75. In Fig. 5 link arm 77 is illustrated in a horizontal position but by virtue of the pivotal mounting at 78 if device 16 were absent this arm 77 would in fact pivot to a vertical position under the influence of gravity. The end of arm 77 remote from 78 carries a spigot 79 which engages a socket (not shown) in block 46 and because block 46 is effectively pivotally mounted at 30 when disc 75 is rotated in the direction of the arrow thereon spigot 79 moves with a substantially horizontal reciprocal action. A transverse guide bar 80 extends through block 46 and is secured at its ends to posts mounted on panel 63 so that pivotal movement of device 16

is constrained to be substantially planar. Control of clutch and brake unit 73 is effected by means of a pair of magnets 82, 83 mounted on disc 75 and alternately influencing Hall effect switch 84 housed within block 74 so that rotational motion of disc 75 is effected in intermittent sequences each of 180°. This enables device 16 to dwell in each of its extreme pivotal positions. Fine adjustment of this reciprocal drive arrangement is provided on the one hand by horizontal movement of block 74 and it is for this reason that slot 76 is non-circular and by vertical movement of the socket which receives spigot 79 and which is mounted on block 46.

As is shown in Figs. 1, 4 and 6 block 46 supports a spring loaded ball catch arrangement 86 the spring loaded ball of which engages a spherical depression in spigot 43A.

Angular position sensing of device 16 is effected by a Hall effect switch 90 mounted on panel 63 and actuated by a magnet carried by block 48.

Operation of the described arrangement is as follows. A package to which a label is to be attached is delivered by means (not shown) to the weighing device which in turn activates the printer 15 to print the weight related data on the label 27. At this point the transporter 32 is in abutment with a cam 13 at the printing station which not only protects the print drum 20 from damage but also pivots transporter 32 about pin 42, this pivotal action being limited by the chamfered portion of carrier member 41 which abuts block 43, the spring loading on shaft 42 being in the clockwise direction in Fig. 1. The package is forwarded by means (not shown) to the label applicator station 29 and immediately following completion of label motion within printer 15 a control signal is issued to the electrical control circuitry (not shown) which causes suction to be applied to transporter 32 via feed pipe 14

and an air blast to be delivered by nozzle 33 so that transporter 32 collects the printed label. After a preset time interval an electrical signal is issued to clutch/brake unit 73 which rotates disc 75 through 180°, completion of this activity being sensed by Hall effect switches 84 and 90 which together inhibit further rotation of disc 75 and simultaneously after a preset time interval cause pressurised air to be applied through coupling 45 to the chamber within tube 44 which causes spigot 43A to be released from the ball catch arrangement 86 and this pressure is maintained for a preset duration so that transporter 32 is accelerated downwardly in the direction M. At the end of this preset duration which can be made adjustable if so desired pressure is released from coupling 45 which is effectively opened to atmosphére so that continued downward movement of transporter 32 occurs under the influence of gravity. Simultaneously with this release of pressure the suction applied to feed pipe 14 may also be released to permit the printed label simply to be pushed by transporter 32 towards the awaiting package. On abutment with the package the transporter 32 rebounds at least to a limited extent and this is sensed by photocell arrangement 66 which then ceases counting of the downward movement of guide bar 51 and immediately issues a control signal so that suction is applied through coupling 45 to the chamber within tube 44. This results in the device 16 being telescopically retracted and this suction is maintained until switch 70 produces a signal caused by the returned presence of magnet 69. Additionally to obtain a shock free landing of the device 16 in its retracted position the suction drive through coupling 45 is controlled in duration by the count signal previously obtained from the photocell arrangement 66 during the extension movement of the device 16. At the end of the retraction movement the nuts 61 on guide rod 50 abut plate 62 of latch 60 causing the plate to be retracted from

aperture 64 in panel 63. The signal issued by switch 70 is provided as an override to remove suction from coupling 45 and provides a drive signal to clutch/brake unit 73 to cause disc 75 to be again rotated through 180° causing return of transporter 32 to the printing station there to await receipt of the next printed label.

CLAIMS

1. A label applicator device characterised by the combination of a telescopic arrangement (48,44,46,43) pivotally mounted at one end (30) on a fixed support (63) and carrying a label trasporter (32) at its other end, pivotal drive means (72,73,74,77) connected to the telescope arrangement (48,44,46,43) and effective to move said arrangement (48,44,46,43) pivotally between a label-receiving position (20,26,33,13) and a label-delivery position (vertical), drive means (45) for effecting extension and retraction of the telescopic arrangement (48,44,46,43) when said arrangement is in said label-delivery position, and control means (65,66) for monitoring telescopic extensive movement of said arrangement (48,44,46,43) and for controlling the telescopic drive means (45) to effect retractive motion immediately on cessation of said extensive movement.

2. A label applicator device as claimed in claim 1, characterized in that said telescopic arrangement (48,44,46,43) comprises a glass tube (44) containing a graphite piston, the label transporter (32) being attached to the piston rod (43A) and said drive means (45) comprises means for controlling the pneumatic pressure within said tube (44).

3. A label applicator device as claimed in claim 2, characterised in that the label transporter (32) carries a guide rod (51) having teeth (65) and a photocell arrangement (66) attached to said glass tube (44) is arranged to co-operate with said guide rod (51) to count the passage of said teeth (65) during each said telescopic extension and to issue a control signal to said telescopic drive means (45) to effect retractive motion of the telescopic arrangement (48,44,46,43) for a duration determined by said count.

4. A label applicator device as claimed in claim 3, characterised in that said photocell arrangement (66) comprises a pair of spaced photocells (67) which are depitched with respect to said teeth (65) in order to monitor the direction of movement of said guide rod (51).

5. A label applicator device as claimed in any preceding claim, characterised by interlock means (60) effective to prevent pivotal movement of said arrangement (48,44,46,43) away from said label-delivery position when said arrangement (48,44,46,43) is at least in a partially extended condition.

6. A label applicator device as claimed in any preceding claim, characterised in that said label transporter (32) comprises means (14) for applying suction to a label to be transported.

7. A label applicator device as claimed in any preceding claim, characterised in that said pivotal drive means (72,73,74,77) comprises a rotatable driven member 75 which is interconnected with said telescopic arrangement (48,44,46,43) by crank means (77) remote from said one end (30).

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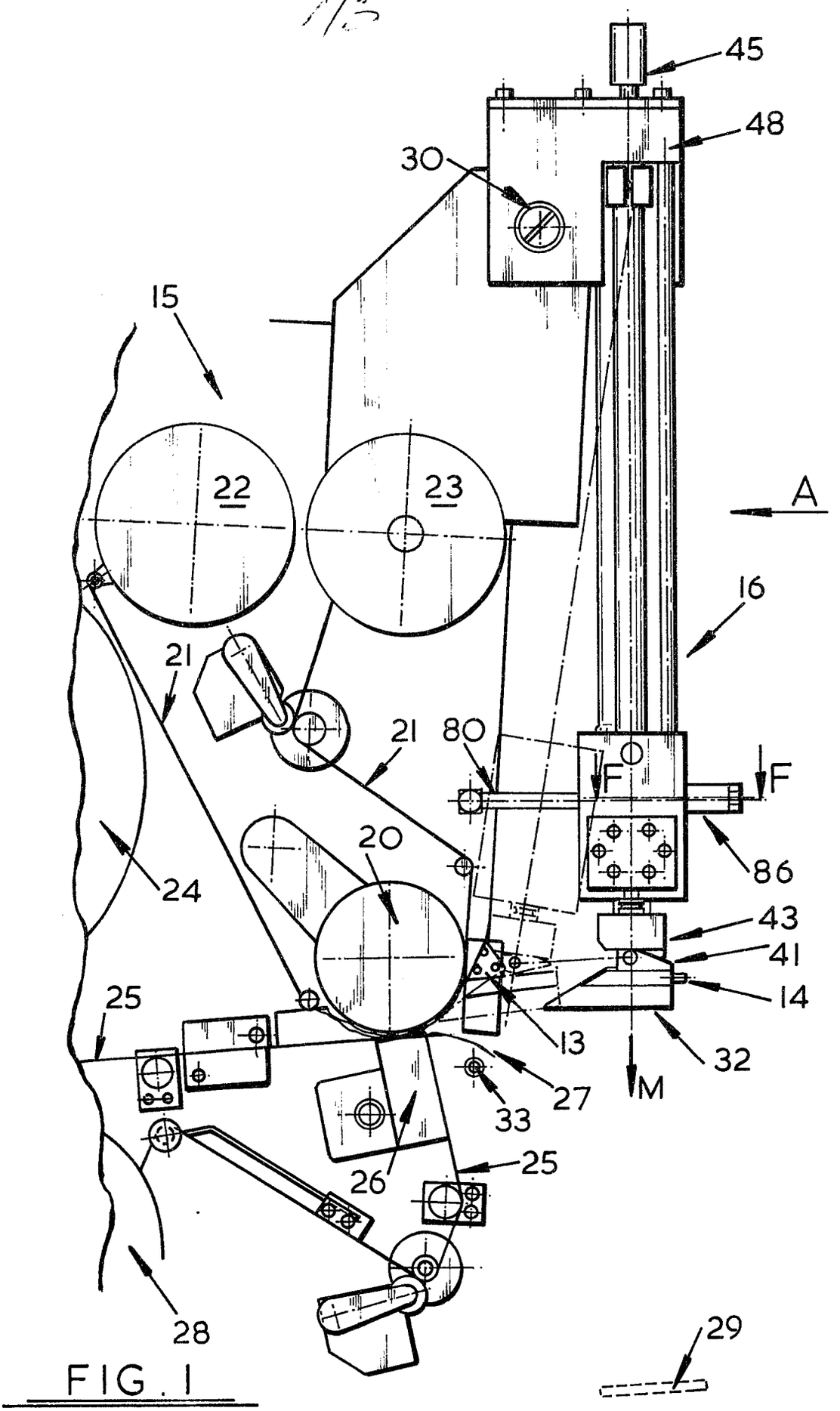
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FIG. 1

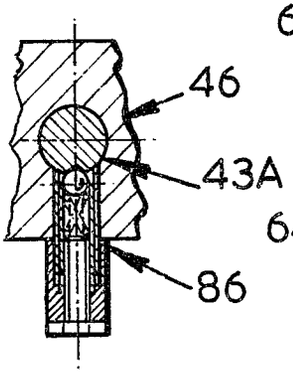


FIG. 6

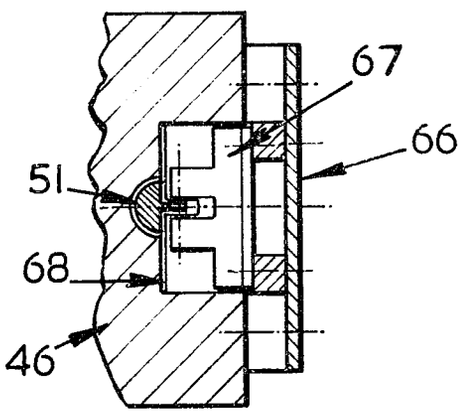


FIG. 3

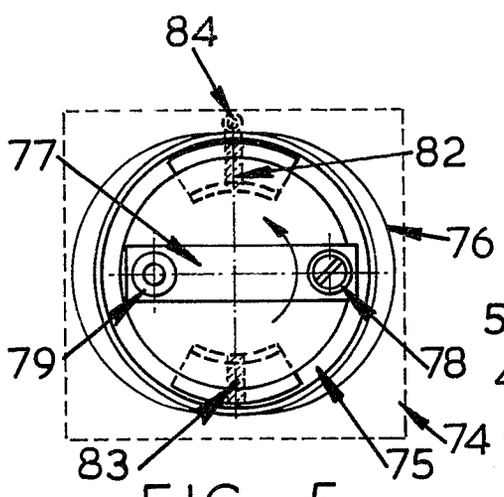


FIG. 5

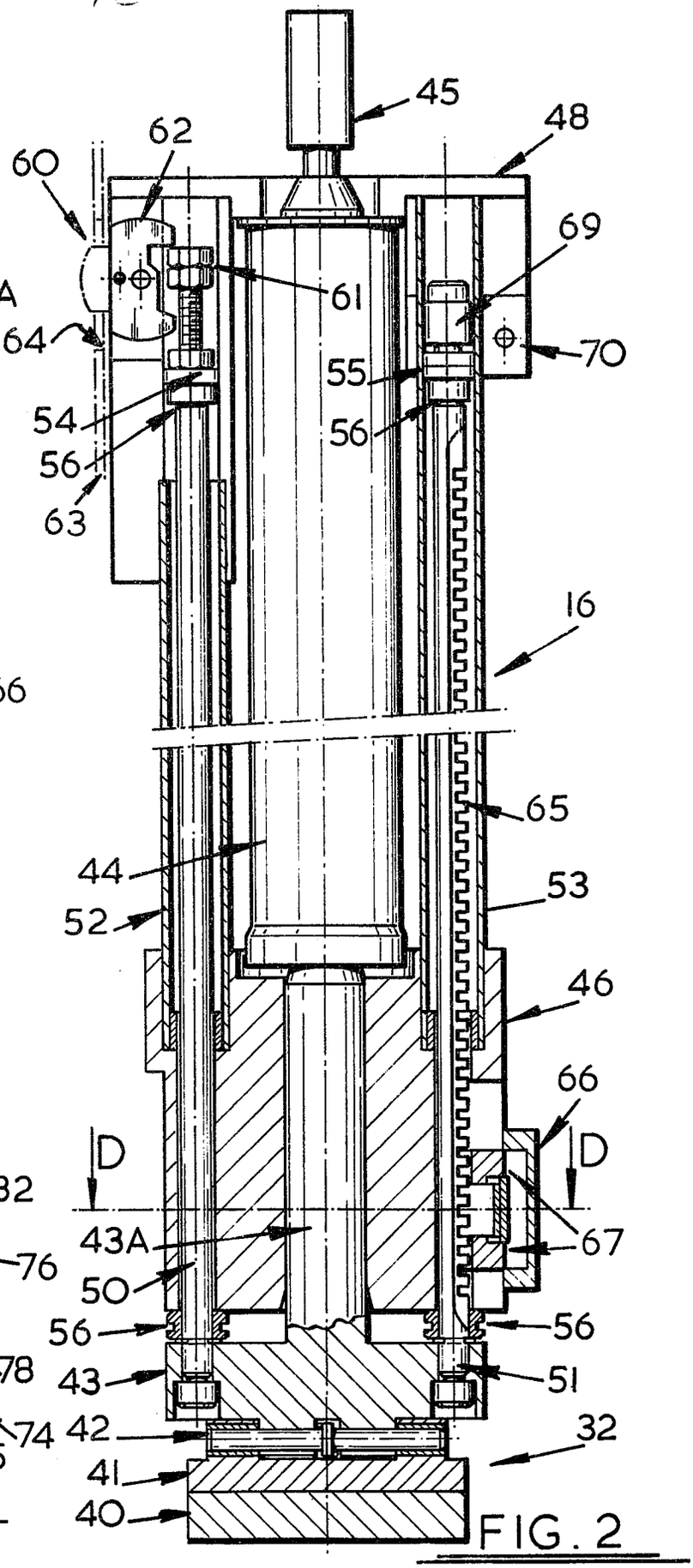


FIG. 2

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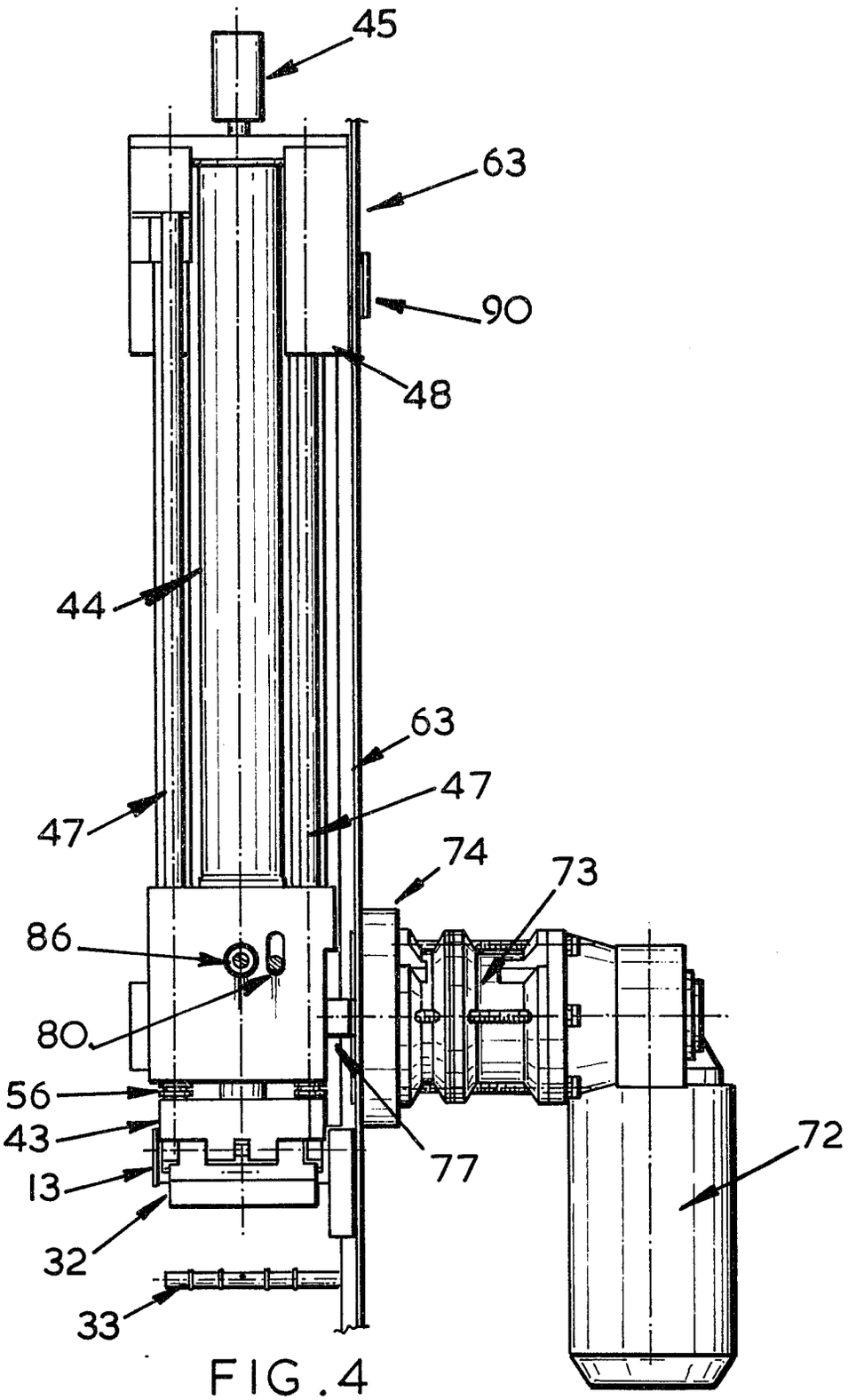


FIG.4