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(11) Publication number:

0 405 644 B1

(12)

EUROPEAN PATENT SPECIFICATION

- (49) Date of publication of patent specification: **24.05.95** (51) Int. Cl.⁶: **B41F 15/08**, B41F 15/30
(21) Application number: **90201561.9**
(22) Date of filing: **18.06.90**

(54) **Centre unit for machines for the multi-colour silk-screen printing of cylindrical containers in general.**

(30) Priority: **29.06.89 IT 3485889 U**

(43) Date of publication of application:
02.01.91 Bulletin 91/01

(45) Publication of the grant of the patent:
24.05.95 Bulletin 95/21

(84) Designated Contracting States:
AT BE CH DE DK ES FR GB GR IT LI LU NL SE

(56) References cited:
EP-A- 0 265 982
US-A- 3 190 463
US-A- 3 338 574

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Description

This invention relates to a centre unit for printing machines for multi-colour silk-screen printing on cylindrical containers in general.

Machines for the multi-colour silk-screen printing of such containers have been known for some time, comprising a horizontal platform with which a container loading station, at least two printing stations and a container discharge station are associated, these stations being arranged angularly equidistant along the circular path followed by the mandrels which support the containers to be printed.

The mandrels are provided in a number equal to the number of said stations and are arranged radially to said circular path, respective screens being associated with said at least two printing stations to slide tangentially to said circular path.

In such known machines, the mandrels consist of a plug over which the containers are tightly forced so that they are juttingly supported by the respective mandrel.

The known machines of the aforesaid type, to which the invention relates, are of little sophistication and have a relatively low productivity and cost.

Machines are also known, such as disclosed in EP-A-0265982, in which the containers are supported between a plug and a rotatable support element, coaxial with the plug, which may reciprocate, under command of a cam operated unit, between a position coincident with the end side of the container, and a position a little distant therefrom, in order to grip and release the container.

The known machines above referred to have however operational limits in the sense that when the bodies to be printed are juttingly supported they must necessarily be of small axial dimensions.

The object of the present invention is to associate with each individual mandrel, without creating constructional complications in the other parts of the machine, a rear support arranged to cooperate with the mandrel in supporting the containers being processed, in order to allow even relatively lengthy and/or heavy containers to be printed without their undergoing undesirable movement relative to the mandrels and consequently relative to the screens.

Said object is attained by the invention as characterised in the accompanying claim.

The characteristics and constructional merits of the invention will be apparent from the detailed description given hereinafter with reference to the accompanying figures in which:

Figure 1 is a plan view of the invention associated with a mandrel of a multi-colour silk-screen printing machine;

Figure 2 is a view in the direction II of Figure 1;

Figure 3 is a partial plan view of a printing machine equipped with the invention.

Said figures, and in particular Figures 1 and 3, show a circular ring structure 1 of vertical axis rotated with stepwise movement in the direction A by a convenient intermittent drive unit, not shown because of usual type.

With reference to Figure 3, in the illustrated case the printing machine is provided with six printing stations indicated overall by 2, a loading station 20 for the containers 3 and a container discharge station 21, said two loading and discharge stations being provided with convenient means for gripping the containers, such as gripper members swinging in vertical planes radial to said ring structure 1.

Essentially, said stations are spaced angularly apart by 45° and the ring structure 1 is rotated through equal steps, a container being loaded for printing and a printed container being simultaneously discharged during the halt periods of the ring structure.

As can be seen, within the ring structure 1 there is a fixed ring gear 4, with eight identical radial mandrels being arranged circumferentially equidistant along the outer circumferential edge of the ring structure.

Each mandrel comprises a tube 5 which is fixed onto said ring structure 1, and in which a shaft 55 is rotatably mounted to project beyond the two ends of the tube 5.

On the rear end of the shaft 55 there is fixed a gear wheel 44 which engages with the ring gear 4 (see Figures 1, 3), and on the front of the shaft 55 there are fixed an interchangeable gear wheel 50 and an interchangeable plug 51. This latter can be tightly forced into the mouth of the container 3, the front end part of the shaft 55 comprising a coaxial hole (not shown) to be connected to a convenient pneumatic circuit. This latter, which is not shown because of known type, can apply vacuum to the container 3 to pull it against the plug 51 and hence support it, and can then break the vacuum in the container 3 to allow it to be discharged.

It should also be noted that the interchangeable gear wheel 50 has a pitch circle diameter equal to the outer diameter of the containers 3, and the gear wheel 44 has a pitch circle diameter equal to 1/8 of the pitch circle diameter of the ring gear 4, for obvious reasons.

According to the invention, with each plug 51 there is associated an interchangeable coaxial front support 151 or centre unit, which keeps the container 3 elastically thrust against the plug 51 to thus ensure perfect horizontal positioning of the container during printing.

Said interchangeable support 151, which comprises a recess for receiving the base of the con-

tainer 3 (see Figure 1), is mounted rotatable at the centre of a slider 6 consisting of a fork-shaped body with its concavity facing the plug 51.

As can be seen in Figure 1, the ends of the arms of said fork-shaped body 6 are provided with respective sleeves 60 slidably mounted on two cylindrical bars 61 which are parallel to each other and to the common axis of said plug 51 and support 151.

Each pair of bars 61 is arranged symmetrically about the corresponding tube 5, with the two bars 61 fixed to the ring structure 1 by convenient fixing devices 11. Finally, between one of said fixing devices 11 and the corresponding sleeve 60 there is interposed a double-acting pneumatic cylinder-piston unit 7, the outward and return strokes of which are governed by an underlying pneumatic valve 70 (see Figure 2). This latter is controlled by a circular cam 77 supported by a fixed element 10 of the machine (Figure 2), the point 71 at which the cylinder-piston unit 7 is connected to the slider 6 comprising a screw clamp (see Figures 1, 2) which enables said connection point to be adjusted. Finally, it should be noted that all the bars 61 are connected together by a stiffening polygonal frame 66.

With reference to Figure 3 a description will now be given in summary terms, as they are well known to the expert of the art, of the elements associated with each printing station 2 of the machine equipped with the invention. Each station 2 comprises a usual screen 22 above which there is a usual spatula 23, these being supported by respective overlying radial levers 24. These latter have their inner ends connected to respective raising/lowering devices and to respective exclusion devices (not visible), their outer ends being hinged to the top of a common column 25. In addition, the inner edge of each screen 22 is slidably supported by one of said radial levers 24, and the outer edge of the same screen 22 is hinged to a slide 26, this being slidably mounted on a corresponding pair of superposed cylindrical bars 27.

Finally, as can be best seen in Figure 2, a rack 28 arranged to engage with the gear wheels 50 is associated with the inner edge of each screen 22, the screen support slides 26 being connected together by a lever system indicated overall by 29.

The operation of the machine is not described as this is well known to the expert of the art.

Claims

1. A centre unit for silk-screen printing machines for cylindrical containers comprising on a circular ring structure (1) a loading station (20) for the containers (3) to be printed, at least two printing stations (2), and a discharge station

(21) for the printed containers, said at least four stations being angularly equidistant along the circular ring structure, tangential to which the printing station screens (22) slide and along which, with stepwise movements of an angular width equal to the width by which said stations are distributed, there rotate an equal number of radial mandrels (5, 51) which support the containers by virtue of a vacuum created within them, comprising a pair of identical parallel guides (61) to be arranged symmetrical about and parallel to the longitudinal axis of a mandrel (5, 51) and projecting beyond the front end (51) of this latter where they support a slider (6) provided centrally with an interchangeable rotatable support (151) aligned with the respective mandrel and caused to slide with forward and backward movement by a cam operated lever characterized in that the slider (6) comprises a fork shaped body having its concavity facing the circular ring structure and is connected to the circular ring structure by a double acting pneumatic cylinder - piston unit (7), of which at least one of the fixing points is connected to the slider (6) by an adjustable device (71).

Patentansprüche

1. Zentrale Einheit für Druckmaschinen zum Siebdruck auf zylindrischen Behältern, welche auf einer kreisförmigen Ringstruktur (1) eine Ladestation (20) für die zu bedruckenden Behälter (3), wenigstens zwei Druckstationen (2) und eine Entladestation (21) für die bedruckten Behälter aufweist, wobei wenigstens die vier Stationen im gleichen Winkelabstand angeordnet sind, entlang der kreisförmigen Ringstruktur, zu der die Siebe (22) der Druckstation tangential gleiten, und entlang der mit stufenweisen Bewegungen von einer Winkelweite gleich der Weite, in welcher besagte Stationen verteilt sind, eine äquivalente Anzahl von radialen Spindeln (5,51) rotiert, welche die Behälter aufgrund des darin gebildeten Vakuums halten, ein Paar von identischen parallelen Stäben (61) aufweisend, die symmetrisch um und parallel zur Längsachse der Spindel (5,51) angeordnet sind und über das Vorderende (51) letzterer hinausragen, wo sie eine Gleiteinrichtung (6) halten, welche mittig ausgerichtet, mit einer austauschbaren, drehbaren Halteeinrichtung (151) versehen ist, die axial zur jeweiligen Spindel ausgerichtet ist und von einem Nockenbetriebenen Hebel zum Vor- und Rückwärtsgleiten gebracht wird, **dadurch gekennzeichnet**, daß die Gleiteinrichtung (6) ein gabelförmiges Bau-

teil aufweist, mit seiner Konkavität zur kreisförmigen Ringstruktur, und an dieser kreisförmigen Ringstruktur durch eine doppelt wirksame pneumatische Zylinderkolbeneinheit (7), von der wenigstens einer der Befestigungspunkte mit der Gleiteinrichtung (6) durch eine einstellbare Einheit (71) verbunden ist, befestigt ist.

Revendications

1. Unité centrale pour machines d'impression par sérigraphie pour des récipients cylindriques comprenant sur une structure annulaire circulaire (1) un poste de chargement (20) pour les récipients (3) qui recevront l'impression, au moins deux postes d'impression (2), et un poste de déchargement (21) pour les récipients imprimés, lesdits au moins quatre postes étant angulairement espacés de façon équidistante le long de la structure annulaire circulaire, tangentielllement à laquelle les écrans sérigraphiques (22) des postes d'impression coulisent et le long de laquelle, par mouvement pas à pas d'une largeur angulaire égale à la largeur selon laquelle lesdits postes sont distribués, tournent un nombre égal de mandrins radiaux (5, 51) qui supportent les récipients sous l'effet d'un vide qui y est créé, comprenant une paire de guides parallèles identiques (61) destinés à être disposés symétriquement autour et parallèlement à l'axe longitudinal d'un mandrin (5, 51) et faisant saillie au-delà de l'extrémité avant (51) de ce dernier, où ils supportent un chariot (6) comportant en son centre un support rotatif interchangeable (151) aligné avec le mandrin respectif et qui est commandé de façon à se déplacer en coulissement dans un mouvement d'avance et de recul au moyen d'un levier actionné par une came, ladite unité étant caractérisée en ce que le chariot (6) comprend un corps en forme de fourche présentant sa concavité qui fait face à la structure annulaire circulaire et qui est relié à la structure annulaire circulaire au moyen d'une unité pneumatique à double action cylindre-piston (7), dont l'un au moins des points de fixation est relié au chariot (6) par un dispositif réglable (71).

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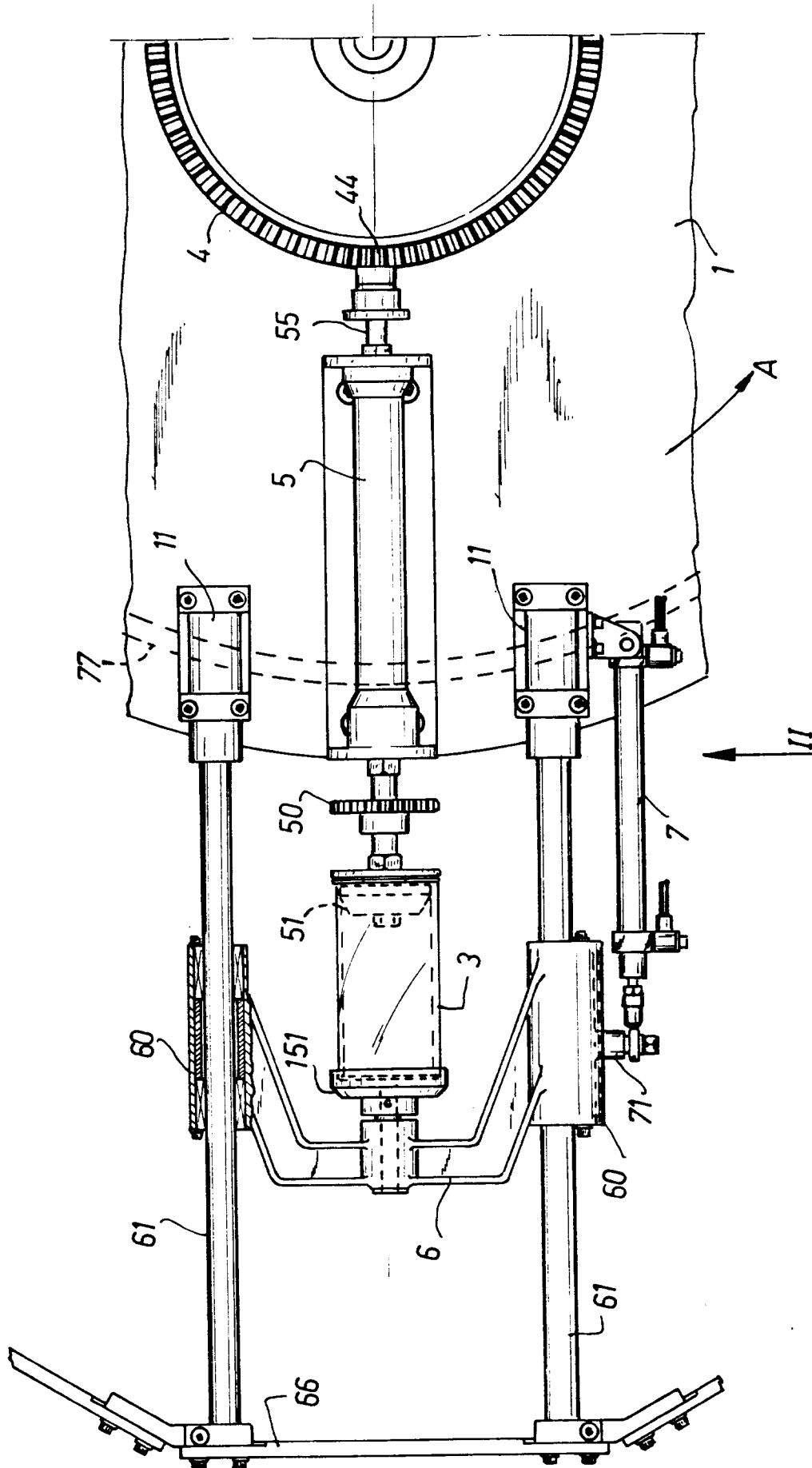


FIG. 1

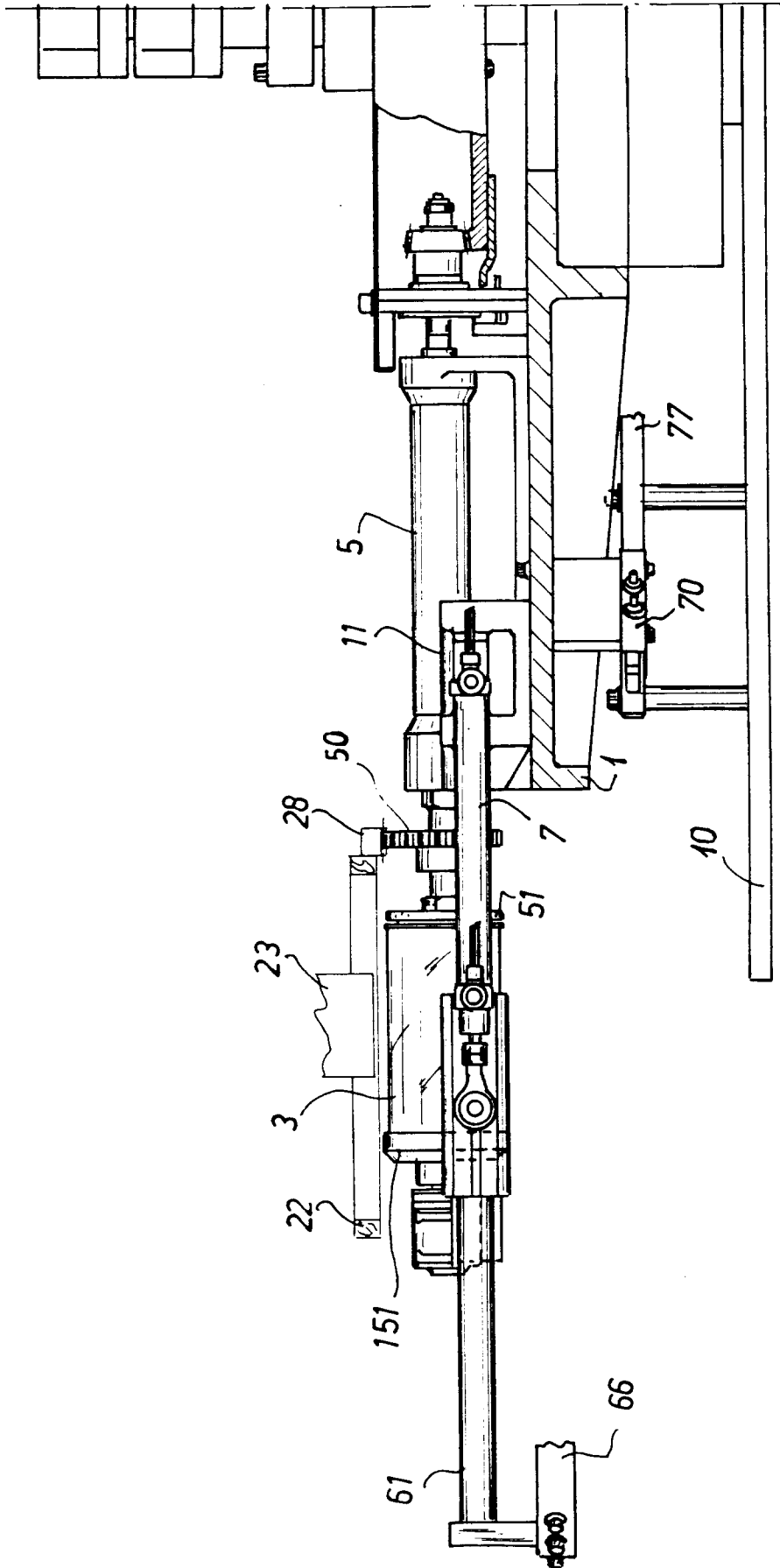


FIG. 2

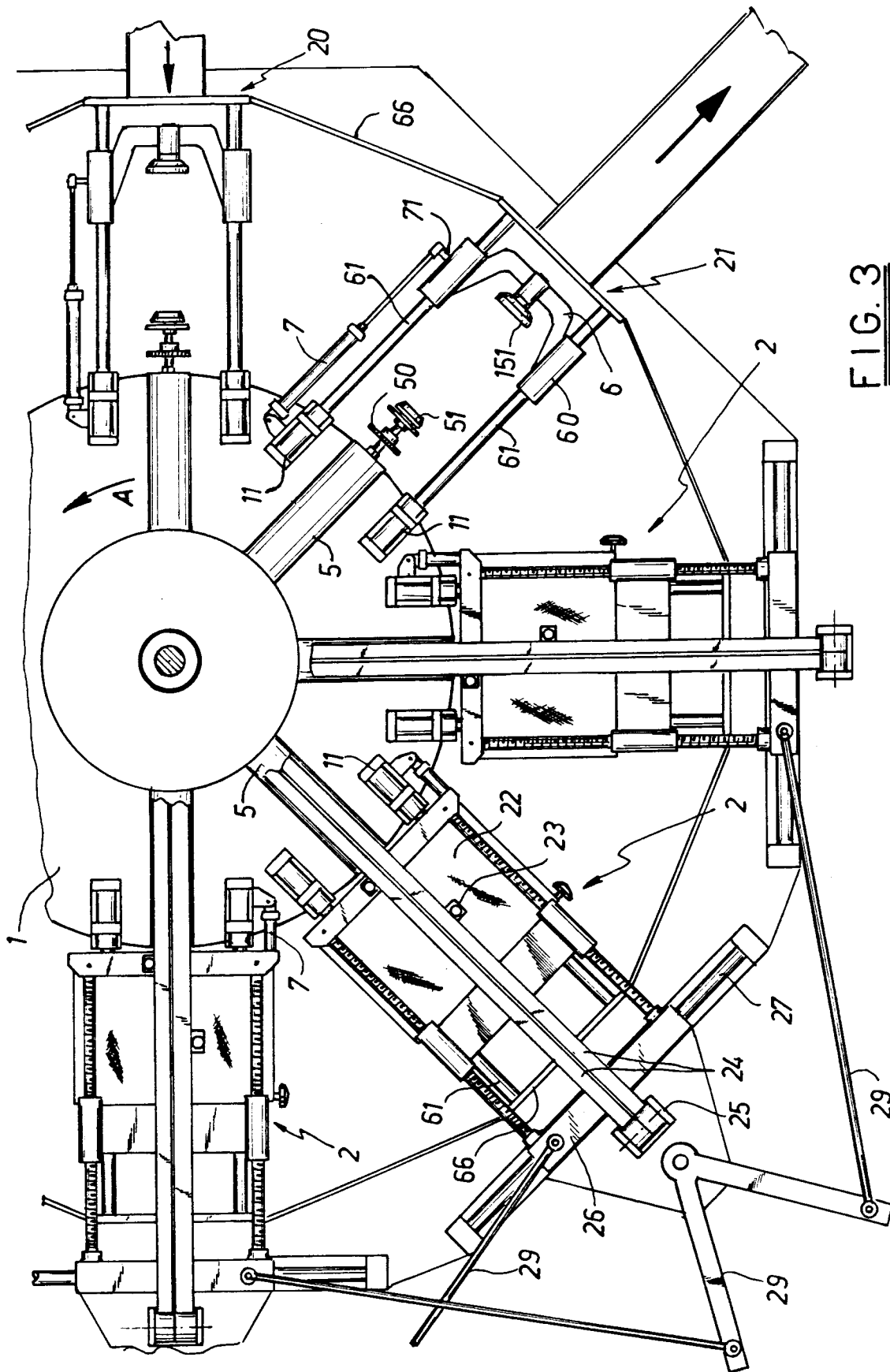


FIG. 3