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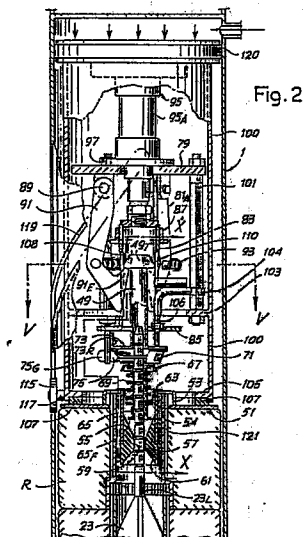
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(54) **Automated apparatus for loading and pressing reels of textile rove in baskets for a dyeing plant.**

(57) An automated apparatus for loading and pressing reels (R) of textile rove in dyeing baskets (20), with rods (23) for the piling up of reels (R) withdrawn from carriages (5), comprises: a tubular member (1) apt to contain at least a pile (P) of reels (R) of carriage (5); means (15) for lowering, lifting and horizontally moving the member (1) as well as means (F) for the alignment thereof with a pile (P) for the withdrawal or with a rod (13) for the loading; at the mouthpiece of member (1), a means (39) to retain or release the pile(s) being withdrawn; for each rod (23) a cap (50) able to transmit the pressing on and to keep pressed the piled reels (R) with their cores (121) slipped on rod (23); inside the member (1), means (85,77,75) to disengage a cap (50) from a rod (23) and means (87,91) for moving it out and retaining it prior to the withdrawal of one or more piles (P) from carriage (5); and a presser (100) that, after the member (1) has slipped one or more piles (P) on a rod (23), presses the reels (R) through the cap (50) which, by engaging the end (23L) of the rod, keeps the reels pressed for the dyeing operation.



Description

AUTOMATED APPARATUS FOR LOADING AND PRESSING REELS OF TEXTILE ROVE IN BASKETS FOR A DYEING PLANT

The invention relates to an apparatus for picking up reels of textile rove from carriage containers in which the reels are stacked in an orderly way, and for loading and pressing the piles of said reels onto rods of dyeing "baskets", on which rods the reels remain under pressing conditions. The apparatus is fully automated and its movements are co-ordinated and controlled by a suitable programming member.

According to the invention, an automated apparatus for loading and pressing reels of textile rove into dyeing baskets - provided with vertical rods in order to fit the tube cores of the reels thereon upon the piling up - by withdrawing the reels from carriage containers in which said reels are piled up in an orderly way, is characterized in that it comprises in combination: a tubular member able to fit on and hold at least a pile of said reels; means for the vertical lowering and lifting of said tubular member and for the horizontal movements thereof; as well as means for positioning said tubular member into allignment with the axis of a reels pipe on the carriage for the withdrawal, or with a basket rod axis for the loading; at the lower end (mouthpiece) of said member, a means to hold or release the pile(s) of reels inside the tubular member; for each rod of the basket, cap means able to receive and transmit the pressing action onto the stacked and transferred reels having the core slipped, onto one of said rods, and keep them pressed down upon the dyeing operation; inside and at the upper part of the tubular member, means to disengage a cap means from a basket rod and means for moving it out and retaining it prior to the withdrawal, by the lowering of the tubular member, of one or several piles of reels from the carriage; and a presser which, after the tubular member has superimposed itself into alignment over a basket rod and, upon its lowering, has put one or several piles of reels thereon, provides for the pressing of said reels by releasing the withdrawn cap and make it press onto the reels pile, the cap engaging the end of the rod and thus keeping the reels under pressing condition for the dyeing operation.

Advantageously, according to the invention, the cap means comprise: a disc-like part capable of placing itself over the leading reel of the pile to be pressed and transmitting the pressing action thereto; a lower tubular portion able to penetrate inside the core of the leading reel and having an invitation, that is flared part for the introduction of the upper extension of a basket rod; clamp means to engage the cap with said extension and disengage it for its removal; and a tubular upper shank, with a head apt to be seized by the cap withdrawal means located inside the tubular member.

The invention will be better understood by following the description and the attached drawing, which shows a practical non limitative exemplification of the same invention. In the drawing:

Fig. 1 shows diagrammatically the automated

apparatus according to the invention, as it is utilized for the transfer and pressing of reels in a dyeing "basket";

Fig. 2 shows an enlarged view of means for the engagement and disengagement of a cap with and from a basket rod, as well as the pressing means;

Fig. 3 shows an enlarged view of the detail III of Fig. 1;

Fig. 4 shows a partial side view taken on line IV-IV of Fig. 1;

Fig. 5 shows a section view taken on line V-V of Fig. 1;

Fig. 6 shows a top view of a possible arrangement of piles of reels inside a basket, for an optimal exploitation of the space;

Figs. 7, 8 and 9 show perspective side, plan and bottom views of a reel of textile material; and

Fig. 10 shows a front elevation view of a cap.

As shown in the attached drawing, the apparatus according to the invention - that may be defined "robotized" - comprises a tubular member 1, whose inner diameter is slightly greater than the outer diameter of the reels of textile material that has to be dyed. The tubular member 1 is upwardly developed and has at the bottom an invitation that is flared mouthpiece 3 so as to be able to fit onto a pile P of reels R which it must withdraw from a carriage 5 on which a number of piles P are located in an orderly way. The reels R of the piles P, whose cores are tubular, are fitted that is inserted onto vertical rods 7 of the carriage 5 so that in each pile the reels result coaxially disposed. In the vicinity of its upper end, the tube 1 is fixed, via transverse brackets 9, to bushes 11 able to slide along rods 13, whose length allows suitable lifting and lowering movements of the tubular member 1. The rods 13 project below from a housing (not shown), on which members are disposed for the lifting and lowering of tube 1 by chains 15 (or equivalent means) anchored to the brackets 9. Said housing, in turn, may be fixed to conventional means, like bridge cranes or similar, in order to move the tubular member 1 either longitudinally or transversally so as to superimpose it, in a centered position, both above a rod 7 of the carriage 5, and above a rod 23 of a basket 20, the latter being of the type apt to be placed into a container of a dyeing plant. The basket 20 comprises a substantially discoid base 19 from which several rods 23 project vertically around a central rod 21 for its lifting, said rods 23 having cross-like section for the insertion of each of them, or on some of them, of a pile P of twelve reels (in the drawing). Each rod 23 has, at its upper end, a thin cylindrical rod-shaped extension 23L having a set of superimposed annular indentations which may also make part of a threading with approximately triangular threads. For the perfect centering of the tubular member 1 with respect to a rod 23, groups of photocells are

provide, in a known manner, solid with the housing from which the rods 13 project downwardly and whose beams must intercept the extension 23L or a cap 50 engaged thereon in order to obtain the centering. The cap 50 is to be described hereinafter. More specifically, two or more blades of lights forming a certain angle, for example of 180°, must be simultaneously intercepted either by said extension or by said cap, and the motion in the two directions of the housing comes to a stop, with the member 1 thus centered only upon the occurrence of this simultaneous interception.

The group of photocells, anyway of known type, which operates upon the lifting of member 1, is generally represented by F in Fig. 1.

The centering of the tubular member 1 on a rod 7 of the carriage 5, may occur automatically, inasmuch as the carriage itself can be placed in a quite determined position relative to the housing which provides for the movements of the member 5, thereby, as for the rods 7 are concerned, the intervention of the set of photocells F may not be necessary; this intervention is necessary instead for rods 23 of the basket since their disposition on the disc 19 may result very complex.

The whole operation for the automatic transfer of the reels R from carriage 5 up to rods 23 of the basket 20 is controlled by a suitable programmer wherein both the positions of the reel piles P on the carriage and the positions of the rods 23 on the basket can be stored. As a consequence, the means through which the housing is moved along with the rods 13 projecting therefrom - automatically move the member 1 up to above a desired pile of reels P of the carriage 5 and thus transfer it, once the reels have been picked up, approximately into alignment with a predetermined rod 23 of the basket, the groups of photocells F thus providing for the exact centering. Onto each rod 23, one or several piles P of reels R may be transferred; if two piles of six reels, as in the drawing example, are to be transferred, the tubular member 1 will perform two subsequent transfer runs. For the withdrawal, the member 1 is lowered down to fit onto a pile P so far as to have also the bottom reel entirely inside it. To keep the pile P inside the member 1 upon the lifting, a device 25 shown in Fig. 3 is provided for the retention of the last reel. The device 25 includes a cylinder-piston system 27 whose rod 27A causes a slider 29 to slide downwards guided by rollers 31 which slide inside slots 33 of said slider. The slider 29 has at its lower end a ramp or inclined plane 35, which is in contact with and acts upon rollers 37 of a shaped shoe 39, which is fixed at the end of a rod 41, having fulcrum at 43 and retained in the rest position illustrated in the drawing by a tension spring 45. When, at the end of the downwards run of member 1, the slider 29 moves, in turn, downwards, the shoe 39 is forced by the inclined plane 35 to press against the yielding outer surface of the reel R which is located at the bottom of the pile. The shoe 39 goes thus through a suitable slot of the tube 1, while the thus pressed reel R is prevented from bending or, however, diverting from the axis of the pile inasmuch as it is held inside the tube. The portion of the shoe 39,

which comes into contact with the outer turns of the reel R, is shaped in a special manner and arc developed in order to give rise to a broad contact with no need for a real penetration thereof between the turns. When the shoe 39 has provided for the anchorage of the last reel of the pile, a limit switch 47 signals to the programmer that the member 1 can be lifted in order to move the withdrawn pile onto a rod 23 and leave it thereon. This withdrawal and transfer operation, in the example of the drawing and also in practice, is provided in two or even more times or stages, to comply the heights of piles of reels which have been disposed on the carriage 5 because of preceding operations and to avoid an excessive length and an excessive lifting travel of the tubular member 1.

To achieve a uniform colouring of reels, upon the dyeing operation, it is necessary that the reels, once transferred onto the rods 23 of the basket 20, be subjected to a certain pressure that must be kept for some time. To such aim, for each rod, special cap members 50 are provided comprising a shank 49 with head 49T and a disc part 51 enable to transmit and maintain the pressure on the underlying reels, as exemplified in Fig. 1. The apparatus according to the invention is therefore provided with means to disengage and withdraw the respective cap 50 from a rod 23 before picking up a first and then a second pile P of reels from the carriage 5 to place then the cap 50 again above the second pile, once having transferred it onto the rod 23, to press the reels through the disc 51 of the cap and to engage again the cap with the rod 23 so as to be able to maintain the pressing condition during the dyeing operation. As it is apparent, a cap 50 is always present on each rod 23 except during the span needful to transfer the reels.

The cap 50 comprises (Figs. 2 and 10), above the disc 51, a hollow hub 53 from which a tubular log (or trunk) 55 develops downwards; under the tubular trunk 55, a bush 57 is fixed and drilled in 59 with a conical invitation 61 for the insertion of the extension 23L of a rod 23. A drilled cup 63 closes the tubular trunk 55 on top, and retains the lower flange 65F of a tubular stem 65. Solid with the upper end of the tubular stem 65, there are also a spring cup 67, turned downwardly, able to take up the reaction of a compression spring 69, and an almost cylindrical casing 71 overhung by a plate 73, having a flap 73R at 90° thereto. From the plate 73, the further tubular stem 49 develops upwards coaxial with the stem 65, which ends, in the drawing example, with a head 49T of truncated cone shape. The lower end of the spring 69 rests on the spring cup 63, and the spring - by reacting on the cup 67 - pushes both the stem 65 and the stem or shank 49, made solid to each other by the casing 71 upwards and keeps them coaxial to each other and orthogonal to disc 51. However, the presence of the spring 69 and flange 65F allows the two coaxial stems 49 and 65 to possibly take up, on use, a modest inclination relative to their normal position which is orthogonal with respect to the disc 51. This according to the fact that, upon the pressing, the disc 51 may find itself not perfectly horizontal, while the two tubular stems 65 and 49,

inside which the extension 23L is brought, must be vertical on use. The casing 71 includes transverse clamp means to engage the cap 50 to the extension 23L of the rod 23 on which it is disposed. The clamp means 75 - of which only the shanks 75G are shown in the drawing, which shanks cause the clamp to open up when they are clenched, that is, moved close to each other - are articulated inside the casing 71 and comprise a pair of jaws (not shown) which, by clamping one against the other, are able to engage an annular transverse groove of a set of grooves arranged on each extension 23L. A spring tends to keep such pair of jaws tightened around said groove while keeping the shanks 75G spaced apart. Accordingly, when an external action is lacking, the clamp means 75 are clenched and the cap 50 is engaged to the extension 23L. To disengage it, angled levers 77 are articulated at the center of the vertical flap 73R of plate 73 and externally thereto, having cusps 77C on top, (Fig. 10), the downward pressing of which cups causes the shanks 75G to be moved close to one another and then the jaw of the clamp means 75 to be opened. Inside the tubular member 1 suitable means are predisposed to release the cap engaged on the extension of a rod 23, in order to withdraw and retain it during the transfer and then to put it in place again into engagement with said extension and in a pressing condition after completion of the transfer. To a plate 79, a flange 97 and a cylinder-piston system 95 are fixed; to the rod 81A of system 95 a tube 83 is fixed having the lower end provided with a flange 85. On the tube 83 a shaped bush 87 is fixed, while to the plate 79, "ear" shaped jaws 91 (three in the example of the drawing) having a hook-like end 91E are articulated at 89. A tern of tension springs 93 connects the jaws 91 between them and tends to keep them close to each other in closing, that is, clamping attitude. At the start of each operation, the rod 81A of system 95 is retracted and thus the shaped bush 87 is lifted, which bush keeps the jaws 91 in spread apart position. When the apparatus fits a rod with no reels thereon in order to draw out a cap 50 and when the head 49T of the cap has gone inside the tube 83 beyond the hook-like ends 91E, the system 95 pushes the rod 81A downwards along with the tube 83 and the shaped bush 87; the latter allows then the jaws 91 to be closed, thus engaging the head 49T. At the same time, the flat edge of the flange 85 presses the cusps 77C of the angled levers 77 downwardly, thereby causing the shanks 75G to move close to each other as well as causing the opening of the jaw of the clamp means 75 which was engaging the cap with the extension 23L. The cap which thus results released and engaged by jaws 91, according to a situation that remains unchanged during the whole period of withdrawal, transfer and pressing operation, is thus withdrawn by the tubular member 1. The achieved pressing is then maintained by the cap 50, which is engaged again with the extension 23L of said rod since, after pressing, the rod 81A resumes its retracted position, the bush 87 causes the opening of jaws 91 - which leave the head 49T - and the flange 85, upon the lifting, allows the jaw of the clamp means 75 to close again thus engaging one of the annular grooves of the

extension 23L.

The pressing of the reel piles, transferred onto each rod 23 by the tubular member 1 through the described procedures, takes place through the action of a cylinder-piston system 120, which acts directly on a tubular pressing member 100 coaxial with the tubular member 1. A tern of studs or pillars 101 connects the plate 79 to appendixes 103 located inside the tubular presser 100 wherein the withdraw cap comes to find itself during the operation. It is useful to point out that rods 104 branch out from the pillars 101, which rods, after a first radial stretch towards the center, bend downwardly at right angle. The vertical stretch of rods 104 extends with stretches 106 of threaded bar, whose projection may thus be adjusted; the end of the stretches 106 is intended to provide a pawl for the plate 73 of the cap in order to limit its penetration inside the presser 100 to such an extent as necessary for its clamping by jaws 91. On the tube 83 longitudinal slits 108 and 110 are formed respectively for the passage and sliding of jaws 91 and rods 104. The lower end of presser 100 has an internal flange 105, on which a ring 107 made of bronze or other suitable material is fixed, with radial slots which engage radial projections 102 located on disc 51 of cap 50. It is thus possible that a limited rotation of the presser 100 be transmitted to the cap 50. Upon the pressing, a first and a second piles of reels result transferred onto a rod 23, and the member 1 is engaged on the second one thereof with the cap 50 overhanging thereto and with the lower face of the disc 51 in contact with the upper face of the leading reel of the pile (Fig. 2). In order not to have the tube 1 retracted by the advancement of the piston 120 which operates the presser 100 upon the pressing operation, a stop member 109 (Fig. 1) is predisposed on top of the tubular member 1, which fits into and is in contrast with a guide 111. The actuation means of member 109 is fixed to a plate solid with the overhanging housing from which rods 13 project. The above mentioned limited rotation of the presser 100 driven by piston 120 is obtained in concomitance with its downwardly advancement by means of a roller 115 predisposed for rotation about a short shaft 117 outwardly projecting from the presser 100, said roller sliding within an almost helical slot 119 formed on the mantle of the member 1 at a suitable height and having a suitable development.

This limited rotation the presser member 100 has to perform during its pressing run, has the following purpose: as can be seen from Figs. 7, 8 and 9, the "cores" 121 of reels R are tubular and exhibit in their lower part an internally splined end 123 with narrow ribs 123R and broad cavities 123C; the upper end 125 of the "cores" - projecting to a limited extent above the reel - is in turn externally splined with narrow ribs 125R and broad cavities 125C. The upper, externally splined end 125 of a core 121 of a given reel is apt to fit - as in case of a splined, that is toothed, joint - inside the lower, internally splined end 123 of the core of another reel superimposed thereto in a pile of reels PT disposed on the rod 23. Anyway, it is possible that upon the prior arrangement of the stacked reels, this mutual insertion of

the upper end of the core of a reel inside the lower end of the overhanging reel in the pile not always occur. Besides, the portion of core which projects above the reel, being at a highest level in the pile, has to partially fit (again as it happens in a splined joint) inside the hub 53 of cap 50, in order that the disc 51 can press directly the textile material of the underlying reel. It should be noted that in correspondence of the hub 53, the disc 51 has a hole 54, coaxial with the tubular trunk 55, and that the periphery of hole 54 has radial indentations whose dimensions, number and equidistance are such that the ribs 125R of the upper end 125 of the leading-reel core can easily enter therethrough, while the tubular trunk 55, along with the bush 57, comes to find itself inside the underlying tubular core 121.

It is apparent that in this manner the limited rotation of the presser 100 concomitantly with the pressing run has the purpose to cause the mutual insertion of the core ends of the reels one inside the other in a superimposed arrangement, and the insertion of the core end of the leading reel into the splined hole 54 of the cap 50. It is clear that, because of the ribs 123R and 125R are narrow and the cavities 123C and 125C are quite broad, it is sufficient a small mutual rotation between the two superimposed cores to cause the engagement, and that the rotation is transmitted by the cap 50 to the leading reel (after the insertion of the core of the latter into the hole 54), and successively by the leading reel to those below.

It is thus assured that the pressing will affect exclusively the superimposed textile material being in mutual contact of all the reels, while the yielding, that is, the relative lowering of the material of each reel in respect to that of an underlying reel due to the pressing, is allowed by the capability of the upper ends of the cores of sliding within the cores of the reels superimposed thereto.

As it is apparent from the foregoing, the apparatus according to the invention, once the described operations have been properly programmed, is able to provide for the withdrawal, transfer and pressing of the piles P of reels R (initially placed on a carriage 5) onto the rods 23 of the basket 20 in a fully automated manner, with no need for manual intervention. The operations may be programmed in view of the filling and subsequent pressing of a certain basket and may be stopped upon completion of such filling, by possibly providing intermediate stoppages for the replacement of an already empty carriage with a filled one.

Claims

1) An automated apparatus for loading and pressing reels (R) of textile rove into baskets (20) of a dyeing plant - provided with vertical rods (23) in order to fit the tube cores (121) of the reels (R) thereon upon the piling up - by withdrawing the reels from carriage containers (5) in which said reels (R) are piled up in an

orderly way, characterized in that it comprises in combination: a tubular member (1) able to fit on and hold at least a pile (P) of said reels (R); means (15) for the vertical lowering and lifting of said tubular member (1) and for the horizontal movements thereof; as well as means (F) for positioning said tubular member (1) into alignment with the axis of a reels pile (P) on the carriage (5) for the withdrawal, or with a basket rod axis for the loading; at the lower end (mouth piece) of said member, a means (39) to hold or release the pile(s) of reels inside the tubular member (1); for each rod (23) of the basket (20), cap means (50) able to receive and transmit the pressing action onto the stacked and transferred reels, with the core (121) slipped onto one of said rods (23) and keep them pressed down upon the dyeing operation; inside and in the upper part of the tubular member, means (85,77,75) to disengage a cap means (50) from a basket rod (23) and means (87,91) for moving it out and retaining it prior to the withdrawal, by the lowering of the tubular member (1), of one or several piles (P) of reels (R) of the carriage (5); and a presser (100) which, after the tubular member (1) has superimposed itself into alignment over a basket rod (23) and, upon its lowering, has slipped one or several piles (P) of reels (R) thereon, provides for the pressing of said reels by releasing the withdrawn cap (50) and make it press onto the reels pile, the cap (50) engaging the end (23L) of the rod and thus keeping the reels under pressing condition for the dyeing operation.

2) Apparatus according to claim 1, characterized in that the cap means (50) comprise: a disc-like part (51) capable of placing itself over the leading reel of the pile to be pressed and transmitting the pressing action thereto; a lower tubular portion (55) able to penetrate inside the core of the leading reel (R) and having an invitation, that is flared, part (61) for the introduction of the upper extension (23L) of a basket rod (23); clamp means (75,75G) (or equivalent) to engage the cap (50) with said extension (23L) and disengage it for the removal of the cap (50); and a tubular upper shank (49), with a head (49T) apt to be seized by the cap withdrawal means (91) located inside the tubular member (1).

3) Apparatus according to claims 1 and 2, characterized in that, in order to engage the cap (50), each rod (23) comprises a cylindrical extension (23L) of small diameter exhibiting a regular succession of annular indentations (or an equivalent threading) to have the clamp means (75,75G) of the cap (50) engaged therewith in order to block it in position.

4) Apparatus according to claims 1 to 3, characterized in that inside and in the vicinity of the head of the tubular member (1), jaws means (91,91E) are provided able to engage the head (49T) of the cap stem (49) in order to lift it, and means (81,85) for simultaneously driving the opening of the clamp means (75,75G) engaged

in one of the indentations of the basket rod extension (23L), thus allowing the removal of the cap (50), said means being driven to perform the inverse operation to put the cap (50) again into place and causing the blocking thereof after the transfer and the pressing of piles (P) onto the basket rod (23).

5) Apparatus according to claims 1 to 3, characterized in that the means for retaining inside respectively releasing from the inside of the tubular member (1) one or more piles (1) of reels (R) is a tooth shaped member (39), which is able to go through a slotting at the lower end of the tubular member (1), by pressing the textile material of the last reel (R) so as to retain it, and able to be retracted to permit the going out of the pile.

6) Apparatus according to claim 5, characterized in that the movement in centripetal direction of said tooth-shaped member (39) is driven by a slider (29) with an inclined plane (35) which moves a roller fixed on the back of the tooth (39), the return movement of the tooth being operated by a spring (45).

7) Apparatus according at least to claims 1 and 2, characterized in that the presser (100) is tubular and slides at the inside of the tubular member (1) fitted onto the reel piles (P) transferred onto a basket rod (23); that it operates the pressing by means of an edge of its lower mouthpiece which presses onto the disc (51) of the cap (50) and that on said mouthpiece and/or above the disc, friction means (107,102) are provided to transmit a limited presser (100) rotation to the disc (51).

8) Apparatus according to claim 7, characterized in that it comprises a roller 115, or other member, which projects laterally of the presser and is engaged for sliding within an approximately helical slit (119) formed in the mantle of the tubular member, in order to obtain said limited rotation of the tubular presser, having the purpose of determining the mutual insertion of the upper outwardly splined end (125) of the core (121) of one reel (R), into the lower inwardly splined end (123) of the overhanging reel (R) and the insertion within a splined hole (54) of the cap (50) disc of the upper end (125) of the core of the pile leading reel.

9) Apparatus according to claims 1 and 2, characterized in that the means for the withdrawal of the cap (50) are "ear", that is, jaw means (91,91E) whose hook-like end (91E), when in clamping position, engage the head (49T) of the upper shank (49) of the cap (50), said means (91,91E) being forced into clamping position by tension springs (93) and spread apart by a shaped ferrule (87) which slides axially inside said means.

10) Apparatus according to claims 1 to 4, characterized in that the clamp means (75) for engaging the cap (50) to an annular indentation of an extension (23L) of a basket rod (23), have a central jaw urged into closing attitude by a spring, and in that the opening of the jaw takes

place by the approaching of the shanks (75G) of the two parts of the jaw projecting outwardly of a casing (71) enclosing such jaw, to each other.

11) Apparatus according to claim 10, characterized in that the approaching of said shanks (75G) of the two parts of the clamp-means jaw to each other is obtained, for the disengagement of the cap (50), by means of the lower finger-like ends of a pair of angled levers (77) articulated to a side bracket (73) of the cap, on the upper cusps (77C) of which the edge of a flange (85) presses, this flange axially sliding around the upper shank (49) of the cap (50).

12) Apparatus according to claims 10 and 11, characterized in that a cylinder-piston system (81,81A) provides for the simultaneous opening of the clamp means (75G) of the cap and for the closing of the ear that is jaw means (91,91E) in order to engage the head (49T) of the cap stem (49) for the withdrawal thereof, by simultaneously moving said shaped ferrule (87) and said flange (85) downwards, said cylinder-piston system (81,81A) being housed inside the rod (95A) of the presser-operating cylinder-piston system (95-95A).

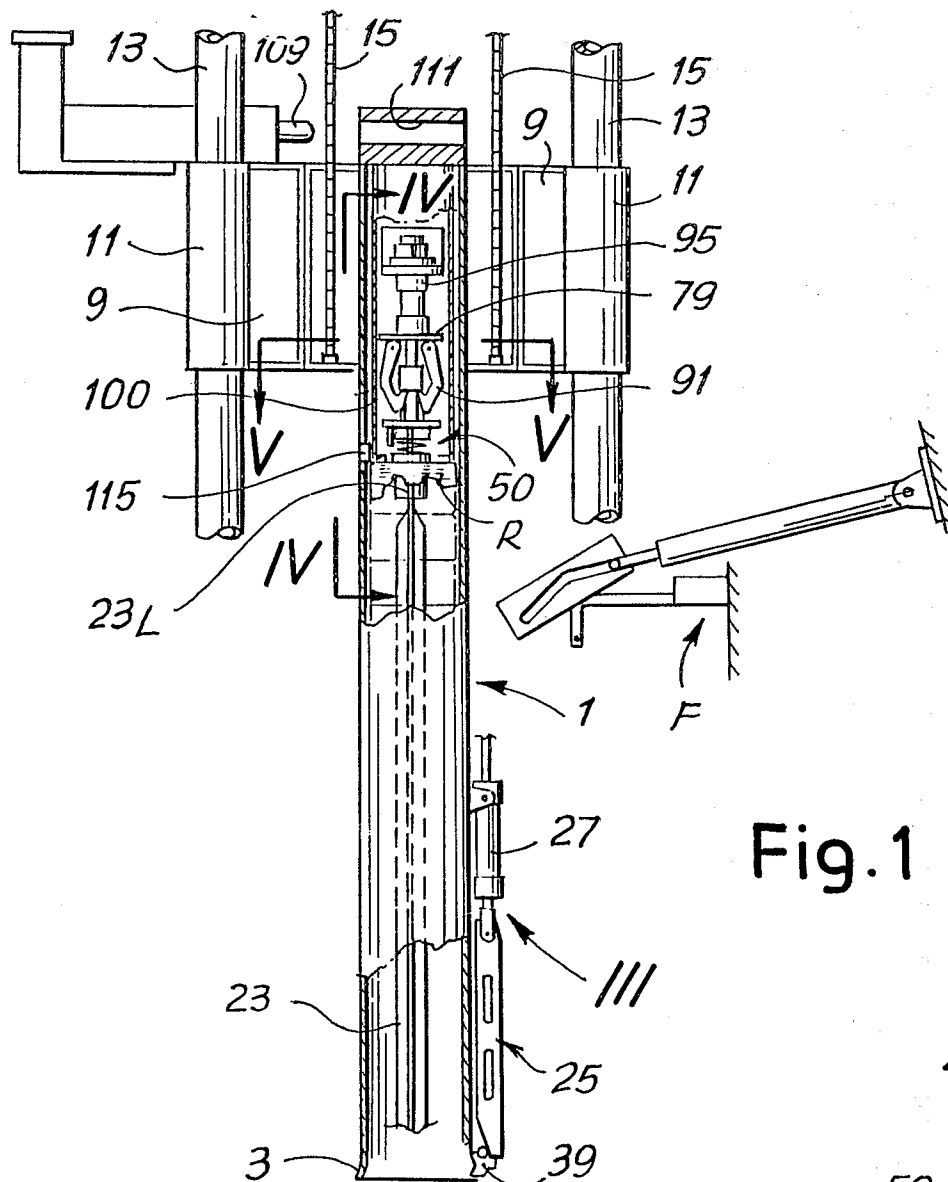
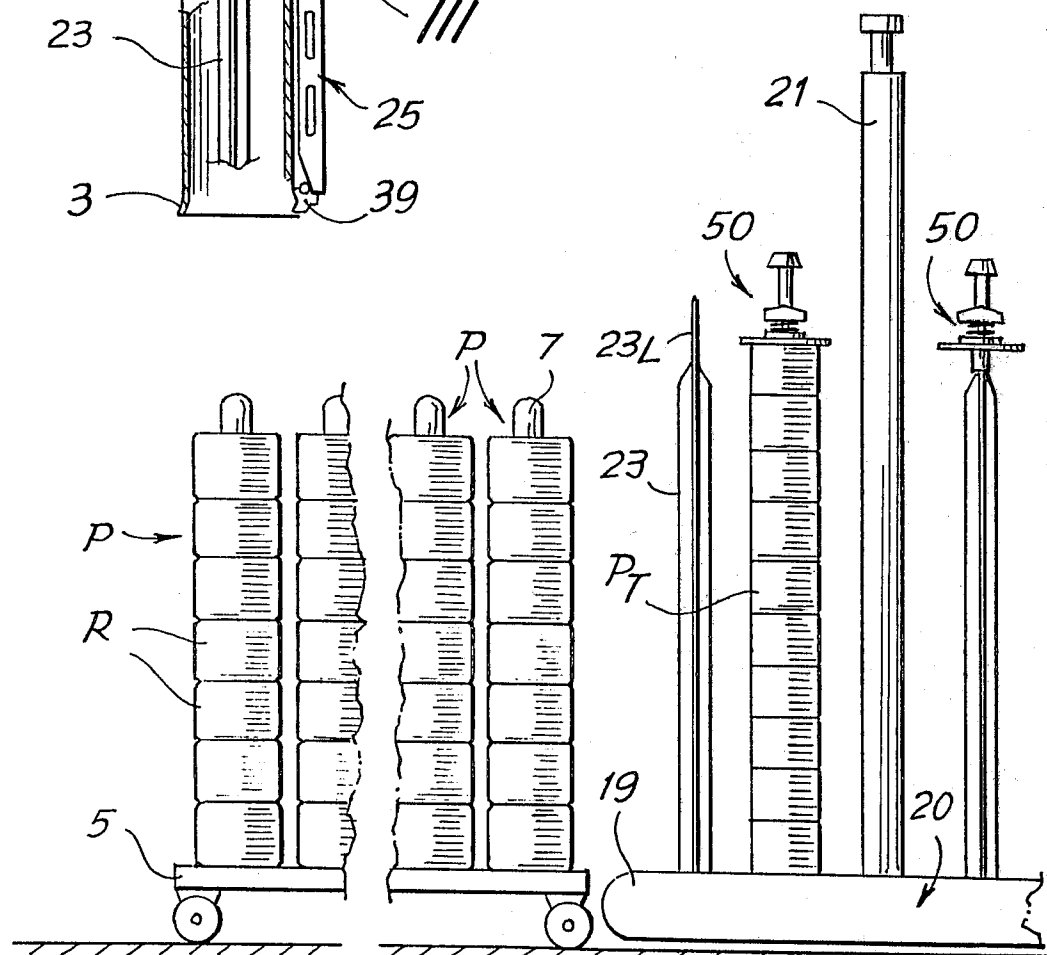


Fig. 1



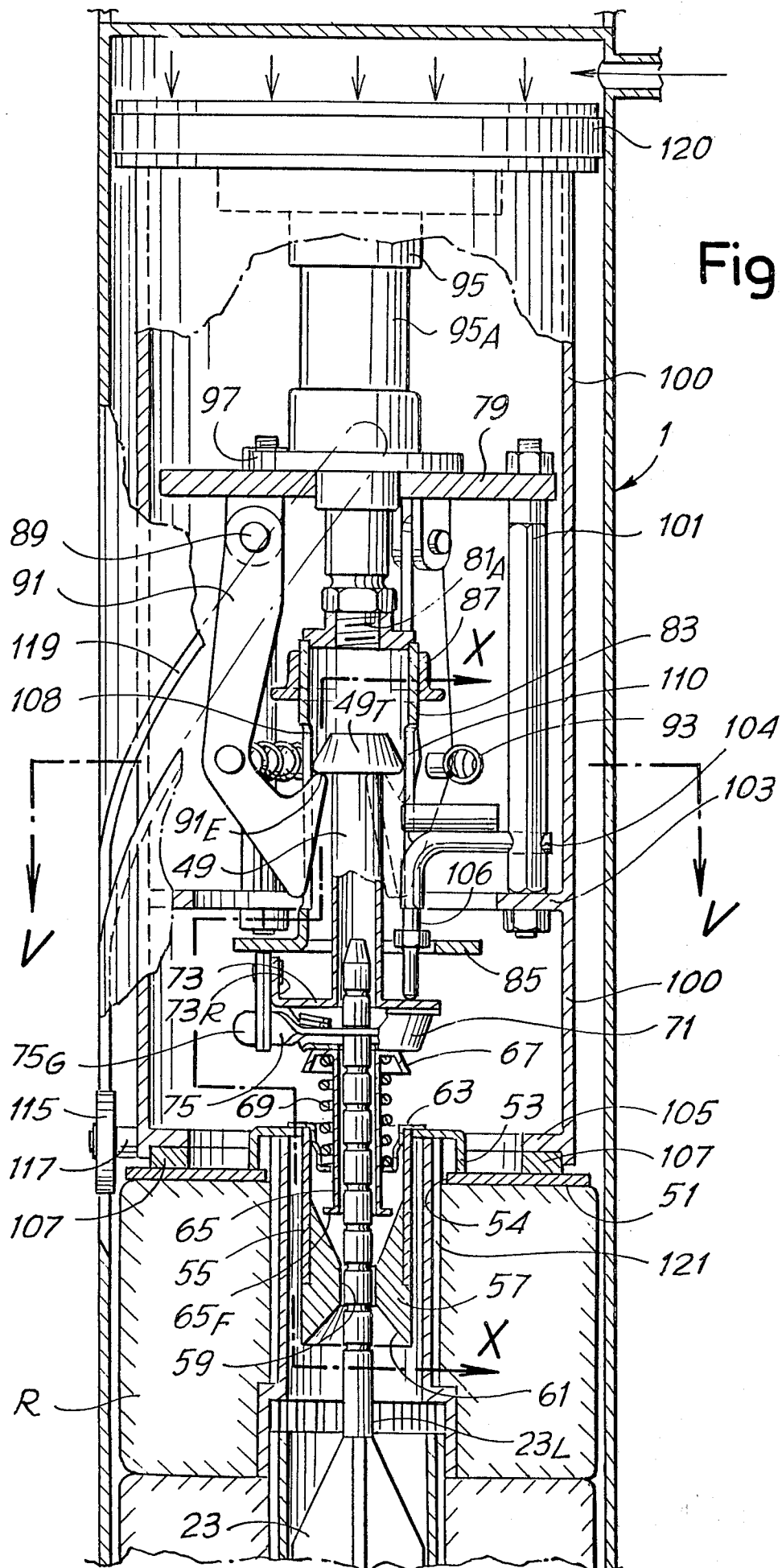


Fig. 3

Fig. 4

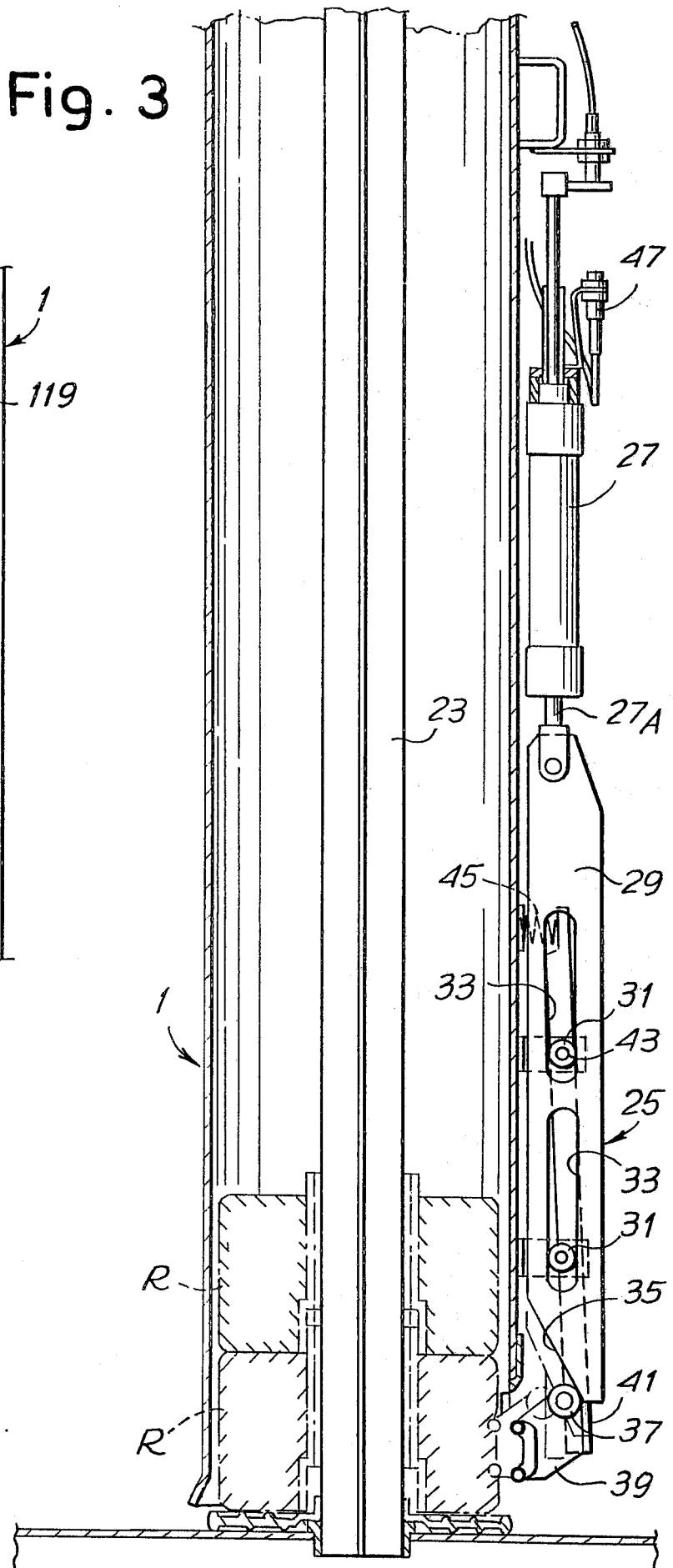
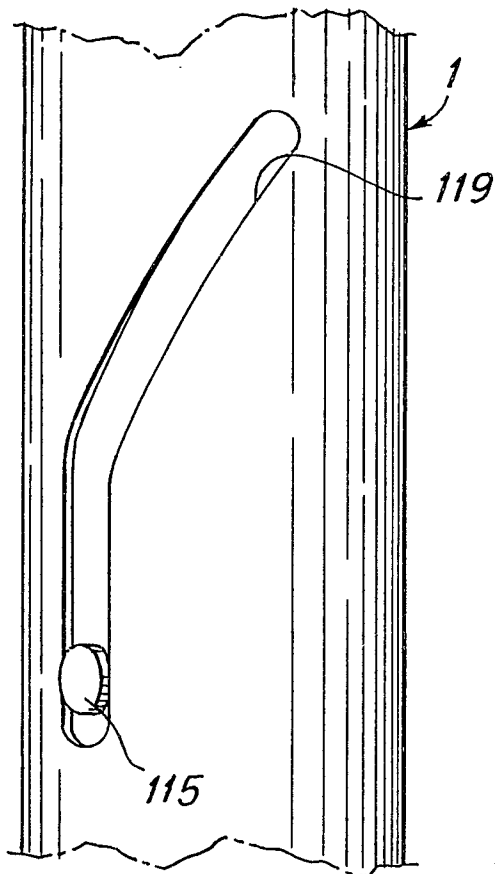


Fig. 5

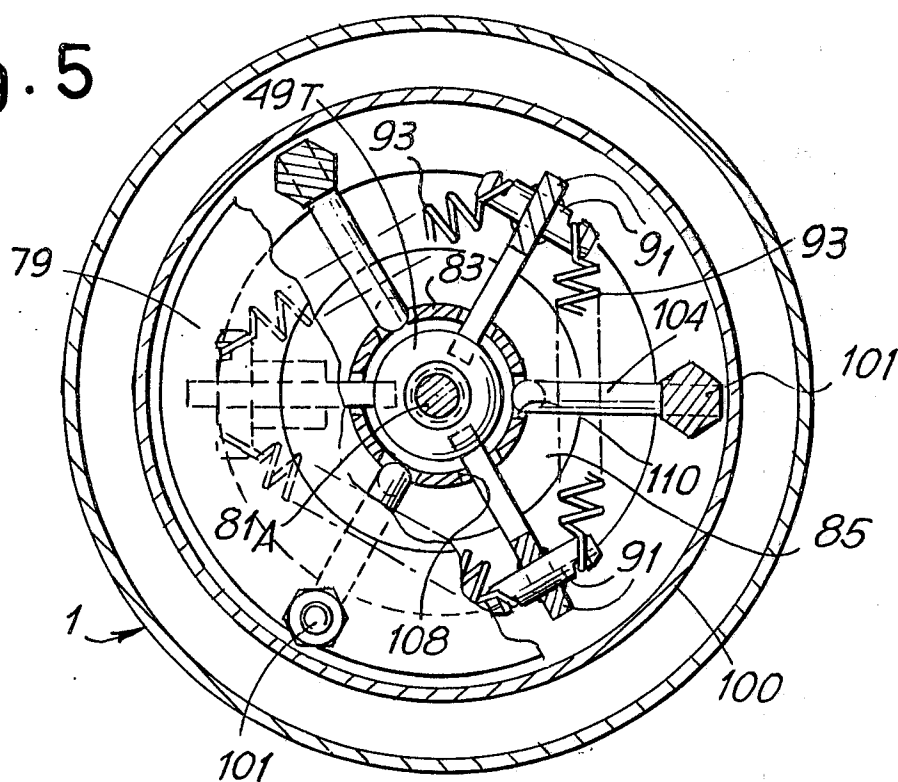


Fig. 6

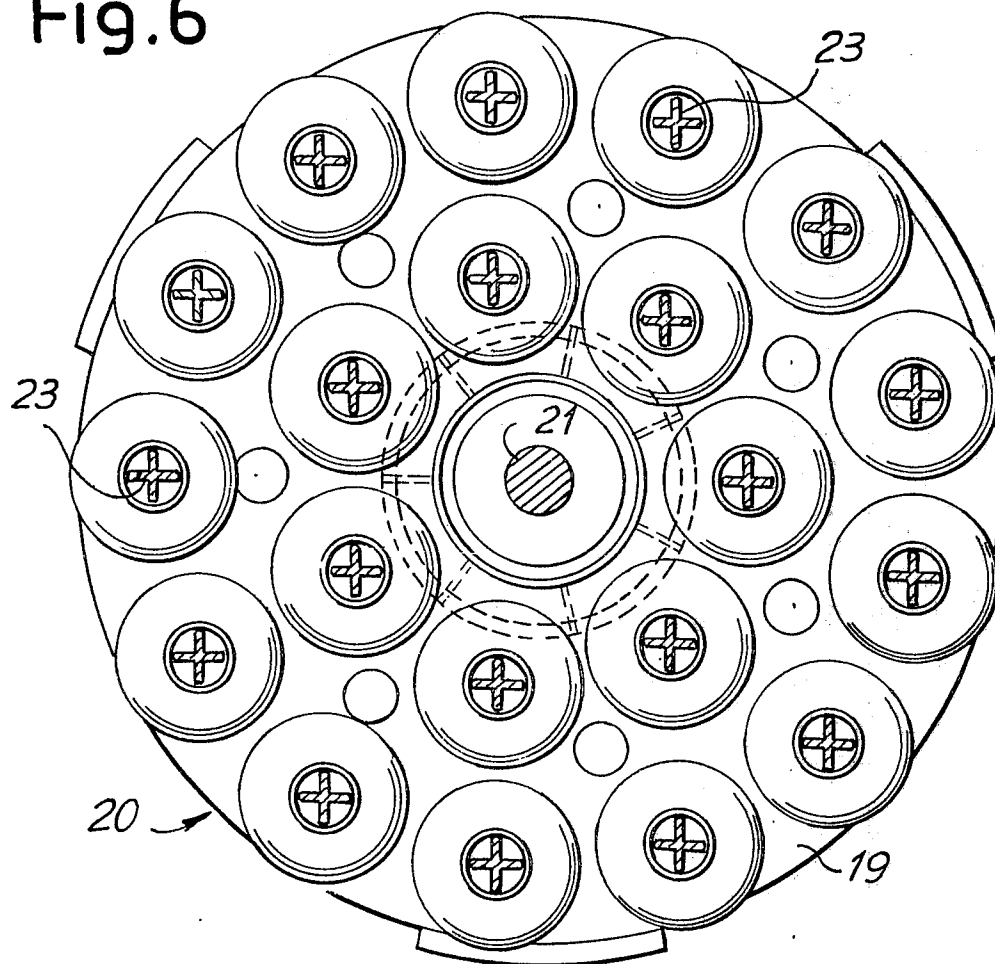


Fig. 10

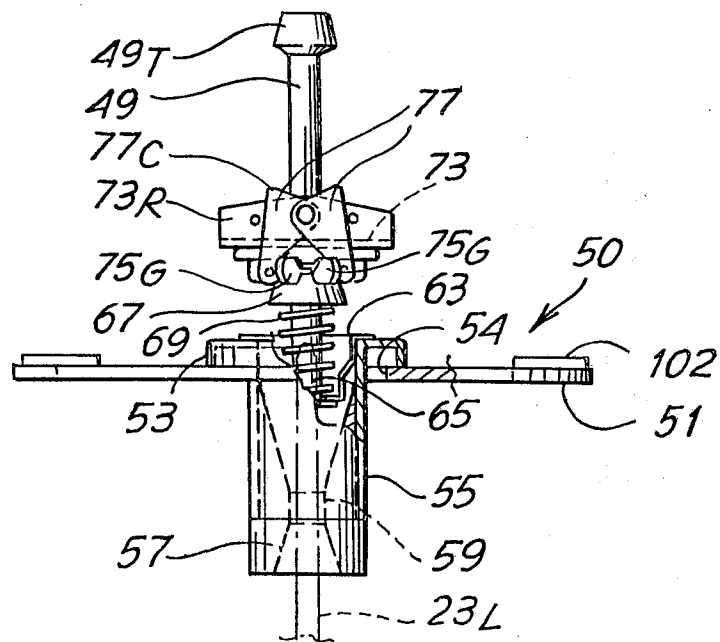


Fig. 9

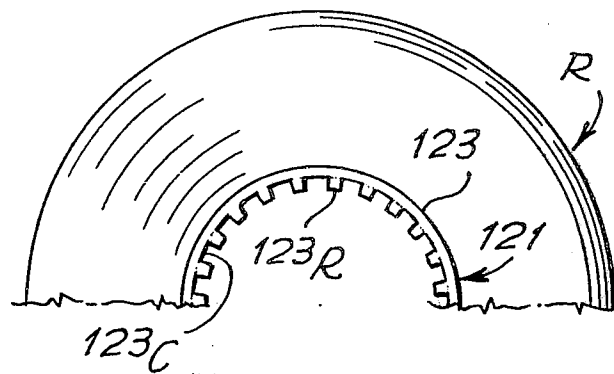


Fig. 7

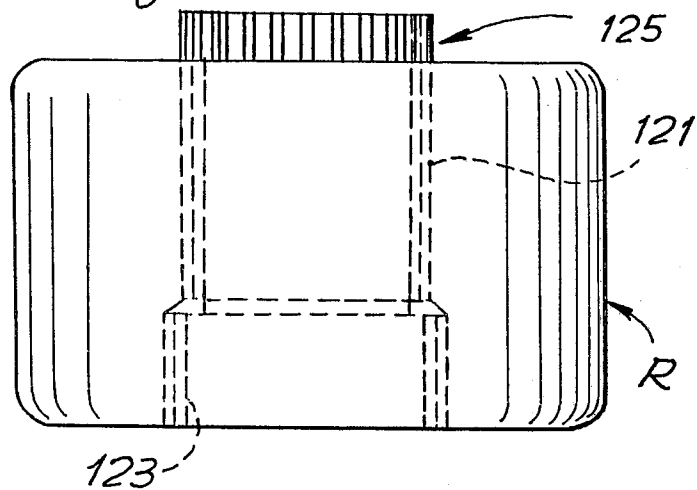
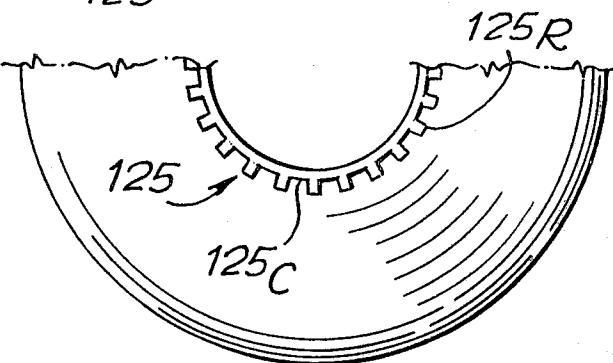


Fig. 8





European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 87 83 0256

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-A-2 300 838 (BECKER) * Whole document *	1	D 06 B 5/16
X	EP-A-0 130 092 (BARRIQUAND) * Whole document *	1	
A	EP-A-0 151 680 (OFFICINE MINNETTI)		
A	EP-A-0 209 652 (OFFICINE MINNETTI)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			D 06 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 13-10-1987	Examiner PETIT J.P.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	