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Description

The invention relates to a machine in accordance with the preamble of claim 1.

A machine of this kind is disclosed in US—A—3 601 288.

It is the object of the present invention to design an extremely sanitary machine which can be readily cleaned and readily reassembled.

An embodiment of the invention is shown in the enclosed drawing, in which

Fig. 1 is a fragmentary, sectional, side elevational view of the filling machine;

Fig. 2 is an enlarged, fragmentary, sectional, elevational view more particularly illustrating the valve assembly and associated parts;

Fig. 3 is a fragmentary top plan view illustrating the manner in which the valve and pump assemblies are mounted for ready disassembly;

Fig. 4 is a front elevational view of one of the pump assemblies;

Fig. 5 is a front elevational view of one of the valve assemblies.

Referring now more particularly to the accompanying drawings, the machine is shown as having a frame F supporting an upstanding sleeve 10 which has a flange 10a bolted to the frame at 11. Bearings 12 and 13 mounted by sleeve 10 journal a central shaft 14 which is adapted to be driven by a spur gear 15 connected with any suitable source of rotary power.

A tank mounting orbiting assembly, to be later described, supports a liquid-filled tank 16 for rotation with the shaft 14. Also mounted for rotation with the assembly are a plurality of pump assemblies A, pins 17 being provided to secure the pump assemblies A in place surrounding the outlet portion 16a as shown. It is to be understood that the outlet portion 16a has an outlet passage 18 and that the number of pump assemblies A depend on how many containers are to be supported on the machine and filled during the revolution of shaft 14. The passages 18 are in radial alignment with passages 18a provided in the pump assemblies A, which, as Figure 2 indicates, are sandwiched between a tank housing 16b and a plurality of valve assemblies 19 which are mounted radially outboard of each pump assembly A. As Figure 2 indicates, seal rings 20 are provided around outlet passage 18 in slots 21 provided in each pump assembly A to seal passages 18 and 18a at the juncture of pump assemblies A and housings 16b, and circular seal rings 22 are provided in slots 23 in the valve assemblies 19 to seal the passages 18a and passages 19a provided in the valve assemblies 19 at the juncture of the valve assemblies 19 and pump assemblies A.

Each pump assembly A includes a cylinder 24 with a piston 25. The piston head 25a is slotted to receive a sealing O-ring 26. Each valve assembly 19 is provided with a frustoconically shaped recess R communicating with an associated passage 19a to receive a rotary frustoconical valve 27 which later will be more particularly

described, and it will be seen that a pump cylinder 24 is positioned opposite each recess R and valve 27. Springs 27b retained by removable retainers 27a secured in the outer ends of the recesses R urge valves 27 inwardly and a sealing ring 27d is provided as shown. Openings 29 are provided in the radial outer wall of each pump cylinder 24, so that when a valve 27, with its port system 30, is in the position shown in Figure 2, it communicates the passage 19a with the filling passage 31 above piston head 25a via opening 29. Each port system 30 includes ports 30a and 30b, and a port 30e perpendicular to port 30b, and in the Figure 2 position, ports 30a and 30b communicate passage 19a with cylinder 24. Each pump assembly A comprises a container supporting carrier 32 having a partly enclosing side wall 32a for supporting an open-topped yogurt container y which is in the position to be filled through a dispensing opening 33 provided above each carrier 32 in communication with each valve recess R. It is to be understood that, when the valve 27 is rotated approximately 90° from the suction position in which it is shown in Figure 2, port 30e of angle shaped port system 30 will communicate with the dispensing opening 33 and deliver material ejected by the pump piston 25 through opening 29 and port 30b to dispensing opening 33 via port 30e. Mounted below valve assemblies 19 are a pair of semicircular, detachable, orbiting, condensate collecting and spill trays 34, each having passages 34a beneath each opening 33 formed by riser walls 35 which are of greater height than the tray outer lips 36.

It will be seen that each piston 25 includes an upper stem part 25b and a lower stem part 25c, joined by a coupling 37.

The rotatable tank-supporting annulus cage C, which is journaled by a bearing 39, includes a top plate 41 to which an under plate 42 is bolted as at 43. Under plate 42 is bolted to the annular cage C as at 44. Depending from plate 42 is the flange 40 which is welded to shaft 14 and may be bolted to plate 42 as at 45. A pin 46 centrally disposed in openings 47, 48 and 49 in underplates 42, top plate 41 and in tank housing 16b, respectively, is provided as shown to aid in locating the parts for assembly.

As Figure 1 indicates, a guide ring 50, bolted to the cage C intermediate its length as at 51, mounts slide bearings 52 over the lower stem parts 25c of pistons 25 and a further guide ring 53 with slide bearings 54 for the lower stem parts 25c is also provided.

Figure 1 shows a pump piston 25 in both an upper and lower position. Provided to guide each piston in its vertical travel relative to cage C, is a follower roller 55 received within a recessed guideway 56 formed in cage C. Each roller 55 is mounted on a threaded stem 55a received in a threaded opening 57 provided in a block 58 fixed to the lower stem part 25c of each piston 25.

The vertical position of each piston 25 at any time is determined by the vertical position of a follower 59 which is mounted in a block 60

dependent from each block 58. The vertical position of each roller 59 is influenced by either an upper arcuate cam part 61 or a lower annular cam part 62.

Certain critical parts are fabricated and assembled in a particular manner to permit their ready dis-assembly for periodic cleaning purposes. In addition a "clean-in-place" system is provided which is used to clean the parts on a daily basis. Figures 3 through 5 particularly indicate the manner in which the assemblies 19 and A are supported by the tank housing 16b in the manner which permits them to be easily dis-assembled. It will be observed that the outer perimeter of housing 16b is a fourteen-sided polygon and it will further be observed that threaded openings 83 are provided in the housing 16b to accommodate mounting stud members 84.

As Figure 4 particularly indicates, the pump assemblies A in front elevation are substantially T-shaped and include converging recesses 85 with which the pump assemblies A are suspended on stud members 84. Likewise (see Fig. 5) the valve assemblies 19, which are also generally T-shaped in front elevation, have converging recesses 86 to similarly suspend the valve assemblies 19 on the stud members 84. Clamp washers 87 provided on the stud members 84 may be secured by nuts 88 within recesses formed by shoulders 19c of the valve assemblies 19. Clamp washers 87 have wedge walls 87a which engage with similarly inclined walls 89 of the valve assemblies 19 to clamp the valve assemblies 19 and the pump assemblies A securely in position.

To disassemble valve assemblies 19 and pump assemblies A for cleaning and to obtain access to outlet passage 18 of tank 16, it is merely necessary to back off the nuts 88 and lift valve assemblies 19 and pump assemblies A vertically from the stud members 84. It is extremely easy likewise then to simply replace them in position again and tighten nuts 88 when reassembly is to be effected.

When it is desired to clean the critical parts of the assembly "in place", the semi-circular trays 34 are removed and plugs 90 (Figure 5) are pushed up into position in the recessed openings 91 in valve assemblies 19 surrounding dispensing opening 33. Each plug 90 includes a shoulder portion 90a snugly fitting into opening 91 and has an O-ring or other suitable seal 92, as shown. To secure the plugs 90 in position, outboard walls 93 thereon have bayonet slots 94 for receiving pins 95 provided on the valve assemblies 19 and the plugs 90 are twisted to engage the pins 95 in the slots as the plugs 90 are moved into position. Leading upwardly from each valve assembly 19 from plug receiving opening 91, is a passage 96 leading to a tube 97. Tube 97, as indicated in Figure 1 leads back into tank 16.

In order to clean the assembly in place, each of the openings 91 in each valve assembly 19 is fitted with a plug 90 and water introduced through the tube 98 into the interior of tank 16 is then re-circulated through the pump assemblies A and valve assemblies 19 back to the tank 16 via

passages 96 and tubes 97. Only one tube 97 has been shown in Figure 1 but it is to be understood that each of the valve assemblies 19 may have a tube 97 or that a manifold (not shown) can be provided to which passages 96 lead and that a single tube may then lead from it back into tank 16. When a water flush has been accomplished, one of the valves 27 can be removed to drain the water from the system. Thereafter the process can be repeated with a sanitized cleaning solution, and suitable water and cleaning solution flushes can be alternated until the desired sanitary cleaning has been accomplished.

Claims

1. Machine for dispensing liquid and semi-liquid material and the like in measured amounts to containers (y), comprising

a) a supply tank (16) with a plurality of circumferentially spaced radial tank outlet passages (18) provided in a housing (16b) of said tank, the tank (16) being mounted for rotation on a stationary frame (F);

b) a carrier (32) for supporting a multiplicity of containers (y) to orbit with said tank (16);

c) a plurality of pump assemblies (A) mounted to orbit with the tank (16), each pump assembly (A) including a cylinder (24) and a piston (25) mounted for reciprocating movement in a suction and ejection stroke;

d) a plurality of valve assemblies (19) mounted to orbit with the tank (16), each valve assembly (19) including a valve (27) feeding material in one position from a tank outlet passage (18) to the cylinder (24) of a pump assembly (A) and in another position from the cylinder (24) to a dispensing opening (33) above a container (y);

e) stationary arcuate cam parts (61, 62) for moving followers (59) connected with the pistons (25);

f) radially extending stud members (84) and clamping means (87, 88) for releasably mounting said pump assemblies (A) and said valve assemblies (19),

characterised by the following features:

g) said pump assemblies (A) are sandwiched between said tank housing (16b) and said valve assemblies (19) which are mounted radially outboard of each pump assembly (A), each pump assembly (A) comprising a passage (18a) being in radial alignment with a tank outlet passage (18) and with a passage (19a) of the associated valve assembly (19),

h) common stud members (84) and clamping means (87, 88) are provided for each pump assembly (A) and the associated valve assembly (19);

i) said pump assemblies (A) and said valve assemblies (19) are suspended from a pair of said stud members (84) in a manner to be liftable vertically off said stud members (84) after releasing the associated clamping means (87, 88).

2. Machine according claim 1, characterised in that said pump assembly (A) and said valve

assemblies (19) are T-shaped in front elevation and have converging recesses (85, 86) at their sides lying upon said stud members (84).

3. Machine according to claim 1, characterised in that said frame (F) comprises a sleeve (10), internally journaling a central shaft (14) and externally journaling a cage (C) hung from the upper part of said central shaft (14) and supporting said tank (16).

Patentansprüche

1. Vorrichtung zur Abfüllung von flüssigem und halbflüssigem Material und dergleichen in abgemessenen Mengen in Behälter (y), enthaltend,

a) einen Vorratsbehälter (16) mit einer Anzahl von in Umfangsrichtung mit Abstand voneinander angeordneten radialen Behälterauslaßöffnungen (18), die in einem Gehäuse (16b) des Vorratsbehälters angeordnet sind, wobei der Vorratsbehälter (16) drehbeweglich auf einem ortsfesten Rahmen (F) vorgesehen ist;

b) einen mit dem Vorratsbehälter (16) drehbeweglichen Träger (32) zur Aufnahme einer Anzahl von Behältern (y);

c) eine Anzahl von mit dem Vorratsbehälter (16) drehbeweglichen Pumpenanordnungen (A), von denen jede einen Zylinder (24) und einen in einem Ansaug- und Ausstoßhub hin- und herbeweglichen Kolben (25) enthält,

d) eine Anzahl von mit dem Vorratsbehälter (16) drehbeweglichen Ventilanordnungen (19), von denen jede ein Ventil (27) enthält, das in einer Position Material von einer Auslaßöffnung (18) des Vorratsbehälters zum Zylinder (24) einer Pumpenanordnung (A) und in einer anderen Position vom Zylinder (24) zu einer Abfüllöffnung (33) oberhalb eines Behälters (y) führt;

e) stationär angeordnete, gekrümmte Steuerflächenteile (61, 62) zur Betätigung von Folgeelementen (59), die mit den Kolben (25) verbunden sind;

f) in radialer Richtung verlaufende Bolzen (84) und Klemmelemente (87, 88) zur lösbaren Halterung der Pumpenanordnungen (A) und der Ventilanordnungen (19), gekennzeichnet durch folgende Merkmale,

g) die Pumpenanordnungen (A) sind sandwichartig zwischen dem Gehäuse (16b) des Vorratsbehälters und den Ventilanordnungen (19) angeordnet, die ihrerseits in radialer Richtung außerhalb der einzelnen Pumpenanordnungen (A) vorgesehen sind, wobei jede Pumpenanordnung (A) einen Kanal (18a) enthält, der auf eine Auslaßöffnung (18) des Vorratsbehälters und einen Kanal (19a) der zugehörigen Ventilanordnung (19) in radialer Richtung ausgerichtet ist;

h) für jede Pumpenanordnung (A) und die zugehörige Ventilanordnung (19) sind gemeinsame Bolzen (84) und Klemmelemente (87, 88) vorgesehen,

i) die Pumpenanordnungen (A) und die Ventilanordnungen (19) sind derart an je zwei Bolzen (84) ausgehängt, daß sie nach Lösen der zugehörigen Klemmelemente (87, 88) in vertikaler

Richtung von den Bolzen (84) abgenommen werden können.

2. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Pumpenanordnungen (A) und die Ventilanordnungen (19) in Stirnansicht T-förmig ausgebildet sind, wobei die auf den Bolzen (84) liegenden Seiten konvergierende Ausnehmungen (85, 86) ausweisen.

3. Vorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß der Rahmen (F) eine Hülse (10) enthält, die im Innern eine zentrale Welle (14) drehbar aufnimmt und die außen einen Käfig (C) lagert, der vom oberen Teil der zentralen Welle (14) herabhängt und den Vorratsbehälter (16) trägt.

Revendications

1. Distributeur de matériau liquide, semi-liquide et analogue en quantités mesurées dans des récipients (y), comprenant

a) un réservoir d'alimentation (16) avec plusieurs orifices de sortie (18) radiaux, espacés sur le pourtour, prévus dans une enveloppe (16b) de ce réservoir, ledit réservoir étant monté rotativement sur un châssis fixe (F);

b) un support (32) de plusieurs récipients (y) pour décrire une orbite avec le réservoir (16);

c) plusieurs assemblages de pompes (A) montés pour décrire une orbite avec le réservoir (16), chaque assemblage de pompe (A) comprenant un cylindre (24) et un piston (25) décrivant un mouvement alternatif avec un temps d'aspiration et un temps d'expulsion;

d) plusieurs assemblages de vannes (19) montés pour décrire une orbite avec le réservoir (16), chaque assemblage de vanne (19) comprenant une vanne (27) délivrant du matériau, dans une position à partir d'un passage de sortie (18) du réservoir vers le cylindre (24) d'un assemblage de pompe (A), et dans une autre position depuis le cylindre (24) jusque'à un orifice de distribution (33) au-dessus d'un récipient (y);

e) des parties arquées stationnaires de came (61, 62) pour déplacer les rouleaux (59) reliés aux pistons;

f) des goujons (84) disposés radialement et des moyens de fixation (87, 88) pour monter de manière détachable ces assemblages de pompes (A) et ces assemblages de vannes (19),

caractérise en ce que

g) ces assemblages de pompes (A) sont placés entre cette enveloppe (16b) réservoir et ces assemblages de vannes (19) qui sont montés radialement vers l'extérieur de chaque assemblage de pompe (A), chacun de ces assemblages de pompes (A) comprenant un passage (18a) aligné radialement avec un passage de sortie (18) du réservoir et un passage (19a) de l'assemblage de vanne (19) associée,

h) des goujons (84) et des moyens de fixation (87, 88) communs sont prévus pour chaque assemblage de pompe (A) et pour l'assemblage de vanne (19) associé;

i) ces assemblages de pompes (A) et ces assem-

blages de vannes (19) sont suspendus à deux de ces goujons (84) de manière à pouvoir être soulevés verticalement de ces goujons (84) après avoir relâché les moyens de fixation (87, 88) associés.

2. Distributeur selon la revendication 1, caractérisé en ce que ces assemblages de pompes (A) et ces assemblages de vannes (19) présentent en élévation la forme d'un T et ont des recoins con-

vergents (85, 86) de leurs côtés reposant sur ces goujons (84).

3. Distributeur selon la revendication 1, caractérisé en ce que ce châssis (F) comprend un manchon (10), portant à l'intérieur un axe central (14) et à l'extérieur une cage (C) suspendue à la partie supérieure de cet axe central (14) et portant ce réservoir (14).

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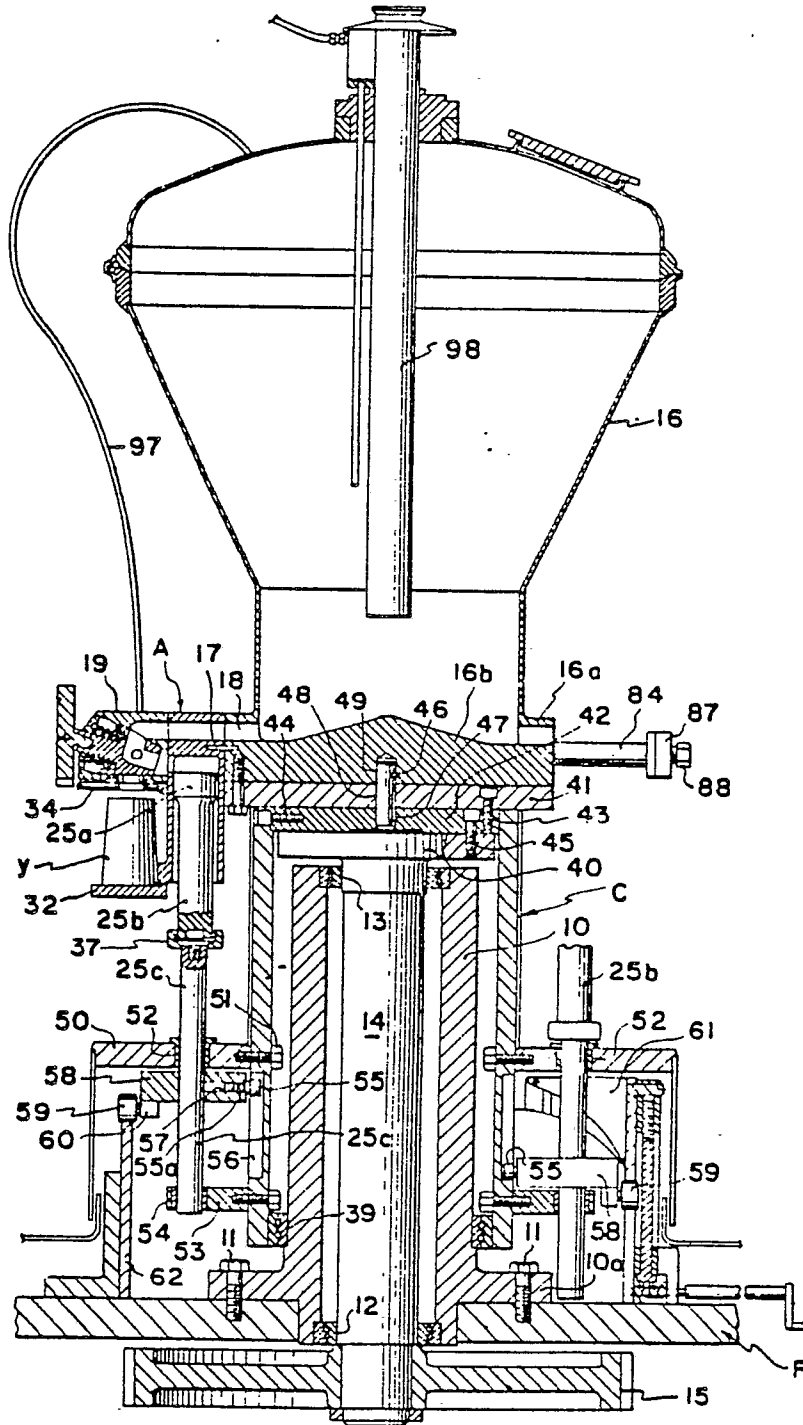
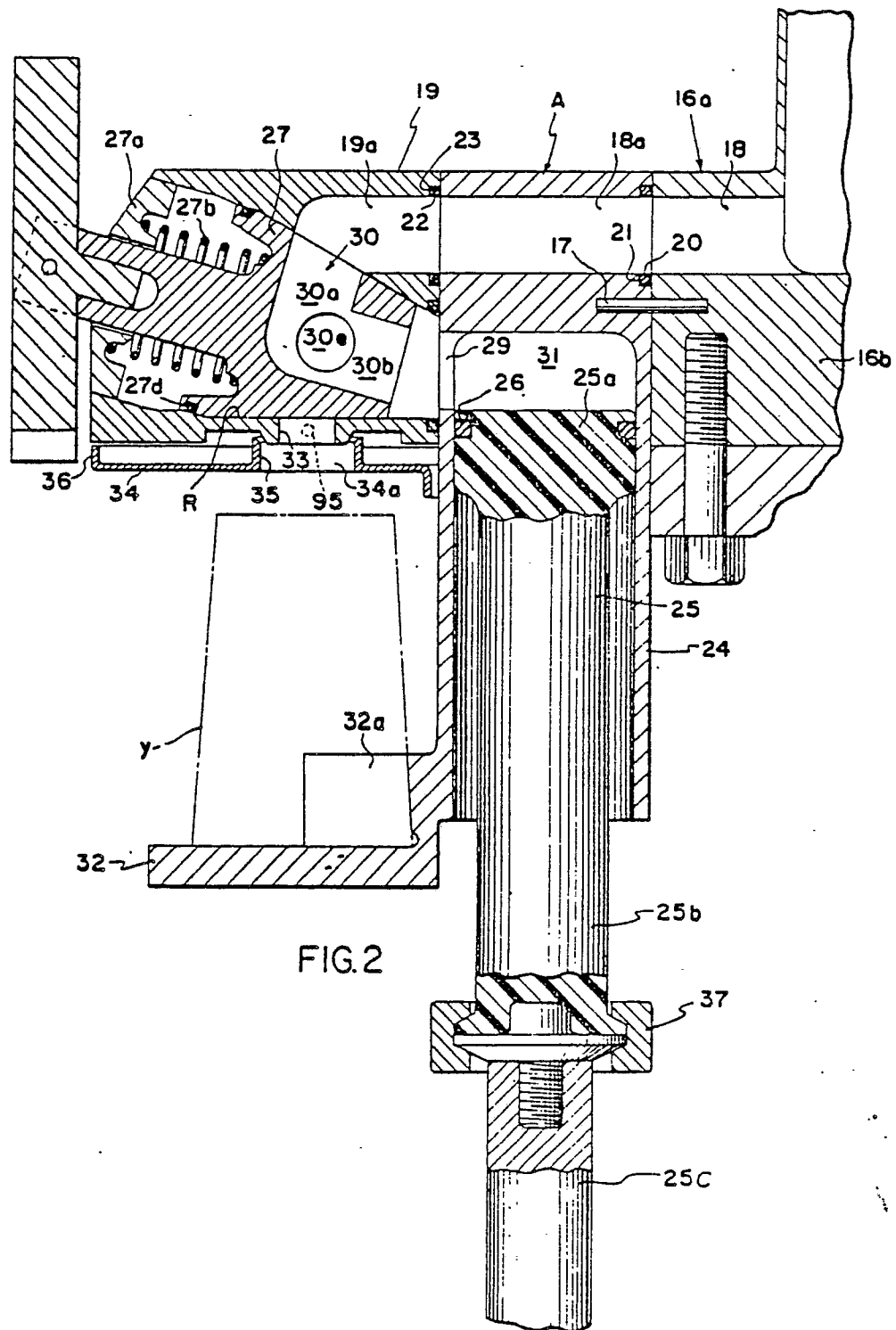


FIG 1



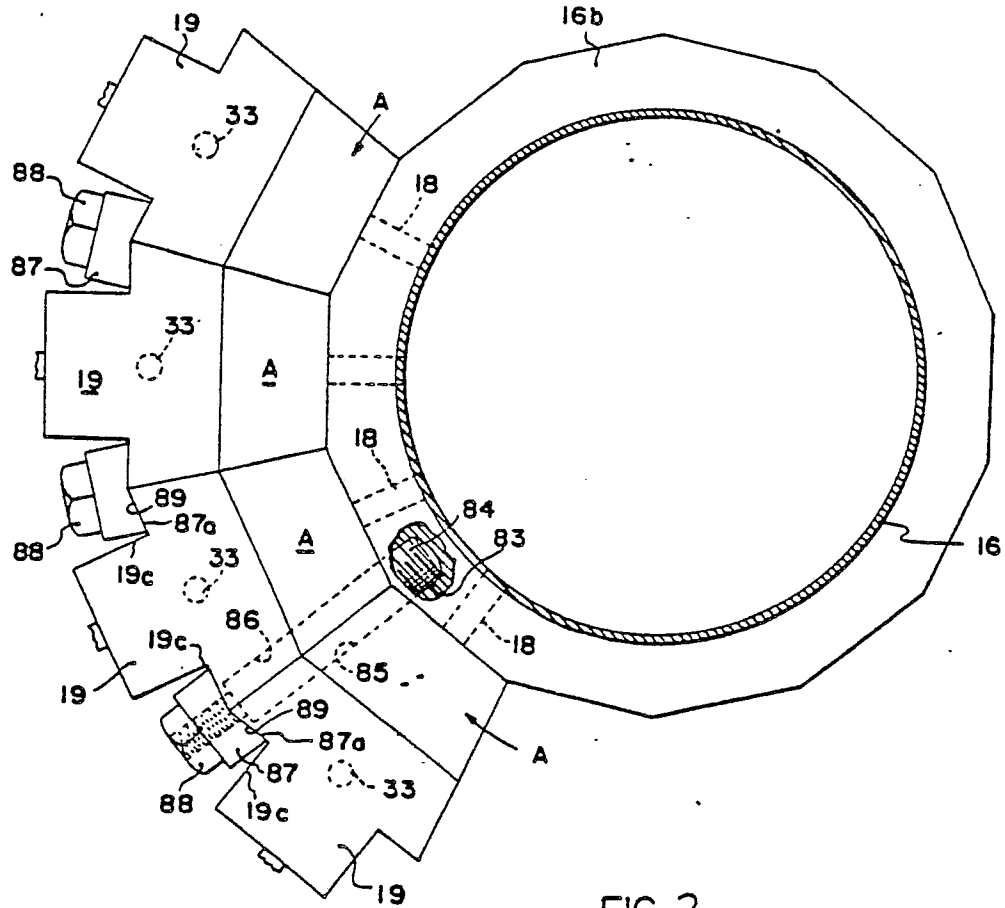


FIG. 3

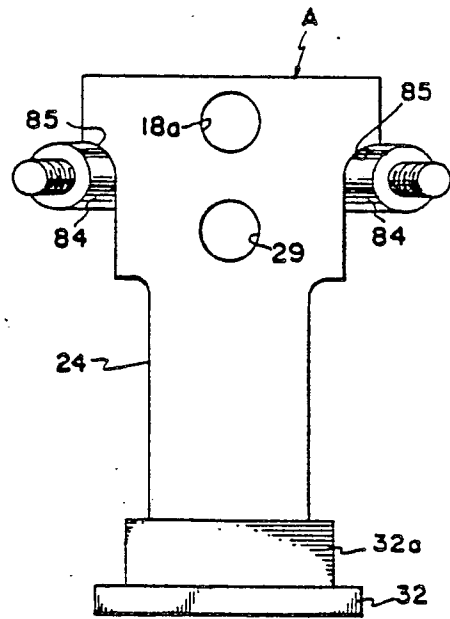


FIG. 4

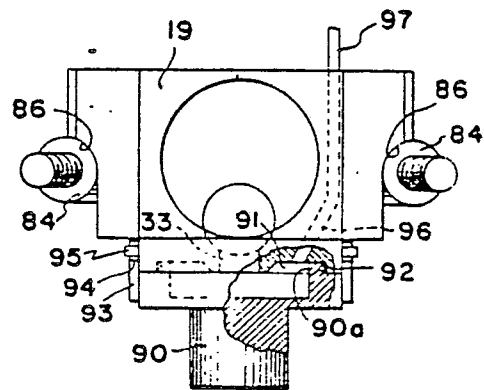


FIG. 5