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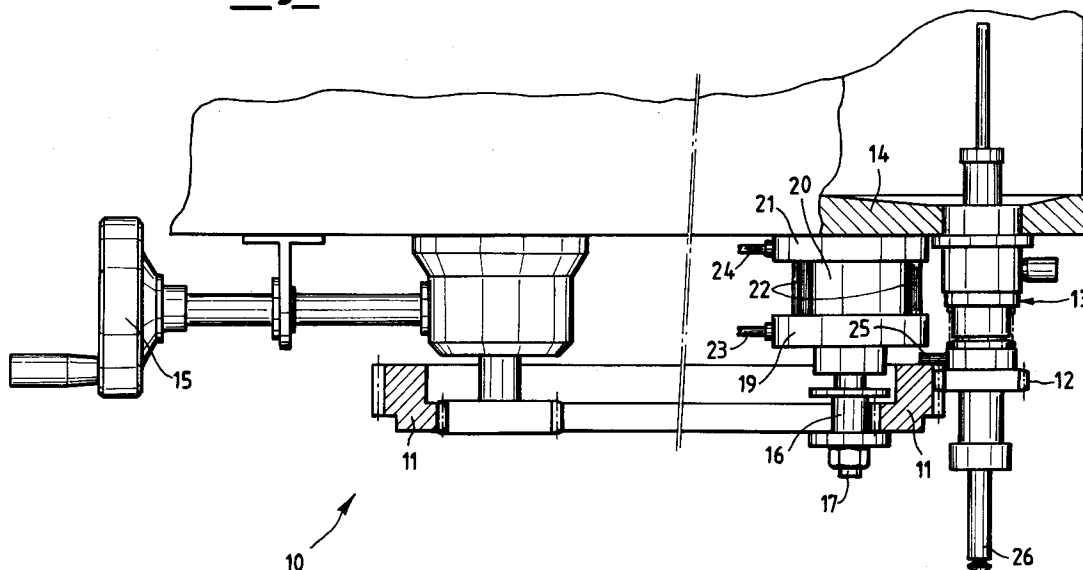
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I-37040 Zimella Verona(IT)**ING. BARZANO' & ZANARDO MILANO S.p.A.****Via Borgonuovo, 10****I-20121 Milano (IT)**(54) **Filling machine with device for stopcock emptying and sterilizing.**

(57) A filling machine equipped with a device for stopcock emptying and sterilizing, in particular in the field of liquid-state alimentary products filling, in which, inside the framework, beside the usual devices for filling the containers and moving them, a device is provided which, automatically and simultaneously, opens the stopcock ducts in order to allow steam, or another sterilizer agent, to flow through.

Such a device is essentially constituted by a crown gear (11) used in order to automatically regulate the liquid level inside the containers to be filled, which crown gear is suitably shifted in the vertical direction in such a way that it gets engaged with studs (25) integral with each stopcock, thus causing the ducts of said stopcocks to open.

Fig.1**EP 0 532 123 A1**

The present invention relates to a filling machine equipped with a device for stopcock emptying and sterilizing, for use in particular in the field of liquid-state alimentary products filling.

In the sector of this kind of filling machines, one of the most serious problems certainly is the problem of sterilization of all ducts guiding the liquid to the interior of the containers, which may be bottles or other kinds of containers.

The sterilization operation requires the opening of the filling stopcocks, which is carried out at present in manual way, by individually operating on each stopcock through purposely provided devices for keeping said stopcocks open. Such devices are essentially constituted by a hook, installed on each stopcock, which gets engaged by a stud: in that way, the nozzle of the stopcock is raised with an opening being left free, from which the sterilizer agent fed to the stopcock can be drained, thus circulating through all of the portions of the filling machine through which the liquid alimentary product flows.

Such devices display the drawback that they require a considerable time waste, because the operator must act on each individual stopcock during both the steps of stopcock opening and subsequent closing --which time waste proportionally increases with increasing sizes of the machine on which said stopcocks are installed: filling machines exist, which are even equipped with more than 100 stopcocks each; the burdensomeness of such a manual operation of this extent is hence evident.

A purpose of the present invention is of obviating the disadvantages of the known art as cited hereinabove, by providing a filling machine equipped with a device for automatically and simultaneously opening all the stopcocks, so that they can be totally emptied and through them a sterilizer agent, usually steam, can be circulated.

Another purpose of the invention disclosed in the present application is of providing a machine equipped with a simply made device which can be easily installed independently from the number of stopcocks the filling machine is equipped with.

In order to achieve such purposes, a filling machine was provided which is equipped with a stopcock emptying and sterilizing device, for use, in particular, in the field of liquid-state alimentary products filling, which machine comprises a framework with an opening for feeding the containers to be filled, a conveyor means for conveying said containers into said opening, an opening for evacuating the filled containers, a tank connected with at least one filling stopcock, and a crown gear interacting with a pinion gear integral with said stopcock, which filling machine is characterized in that said crown gear is kept hanging by at least three actuator elements which cause said crown gear to

reciprocate in the vertical direction, said crown gear coming into contact, during the upwards stroke of said vertical reciprocating motion, with a stud installed integral with said stopcock of said filling machine.

Notwithstanding its vertical shifts, said crown gear remains always into engagement with said pinion gears integral with said filling stopcocks.

The structural and functional features and the advantages of a device according to the present invention will be better understood from the following disclosure made by referring to the accompanying schematic drawings in which:

Figure 1 shows an exemplary form of practical embodiment of a machine according to the present invention;

Figure 2 shows in particular a coupling between the inner crown gear and the stud of a stopcock when the latter is in its open position; and

Figure 3 shows the same detail of Figure 2, when said stopcock is closed.

Referring to Figure 1, with 10 an exemplary form of practical embodiment is generally indicated, of a filling machine equipped with a device according to the present invention, which device is applied to the well-known devices for the simultaneous regulation of the stopcocks used in order to obtain the desired filling level. A crown gear 11 positively acts on a pinion gear 12 stably installed on each stopcock 13, installed on the bottom of a tank 14 from which said stopcock enables the liquid alimentary product, or the sterilizer product, to be drawn. Such a crown gear, by being manually actuated, for instance by means of a perpendicular control handle 15, or another purposely provided device, causes the pinion gear 12 integral with the filling stopcock 13 to revolve, causing the tightly sealing gasket sliding along the liquid inlet nozzle to be lifted or lowered, thus automatically, and simultaneously, regulating the level of the liquid inside all of the containers which are being filled by all of the stopcocks of the filling machine in question.

Now, when the filled container gets disengaged, the stopcock is automatically closed and therefore, for the sterilization operation, the stopcocks have to be opened in order to make it possible the sterilizer agent to flow through them.

In order to attain such a result, the crown gear 11, referring to Figure 2, is supported by at least three actuator means suitable for transmitting to it a vertical translational movement -- with said actuators being, for example, hydraulic or pneumatic cylinders. The crown gear 11 is caused to shift upwards by means of a thrust element 16 integral with a rod 17 which, in its turn, receives a vertical thrust by being integral with a piston 18. Such a piston can slide inside a cylindrical seat constituted

by the assembly of a base element 19, a cylindrical element 20 and a top sealing element 21.

Such elements are stably constrained to each other by means of suitable screws 22. The elements 19 and 21 are provided with connection fittings 23 and 24 respectively, for a hydraulic or pneumatic actuator means. As it can be clearly seen, the crown gear remains always immeshed with each pinion gear 12. In the example depicted in Figure 1, the crown gear 11 is internal, but examples of practical embodiments of these filling machines exist, in which such a crown gear is external to an ideal circumference along which the stopcocks are arranged.

When a sterilization operation becomes necessary, for example immediately before a filling cycle is started, these cylinders are actuated and lift the crown gear 11. During its upwards stroke, said crown gear 11 comes into contact with a stud 25 each stopcock is provided with, and which is stably constrained to said stopcock, by being situated above the stud 12. Upon said contact, said stud is lifted and causes the opening of the nozzle 26 of the relevant stopcock, thus enabling the sterilizer product to escape.

When the actuator means are de-energized, the crown gear returns back to its resting position, the contact between the crown gear and the studs gets lost, the stopcocks are closed again, and a filling cycle can be started.

The considerable saving in time is evident, which can be attained by adopting such a device, which shows the advantage that the crown gear and the pinions which regulate the container filling level, are kept always immeshed with each other, with no changes consequently occurring in said filling level during the whole sterilization operation.

Another advantage is that the crown gear may be both internal and external to the filling stopcocks. This feature gives the designer more freedom in the arrangement of the components which characterize such a kind of filling machine, in view of the optimization of the encumbrances. In that case, as regards the stopcocks, the only envisaged change concerns the radial position of the stud on each stopcock -- no other changes are contemplated.

The present invention was disclosed for merely illustrative, non-limitative purposes, and it must be understood that modifications and variants supplied by those skilled in the art may in any case be encompassed by the scope of protection of the same finding.

Claims

1. Filling machine equipped with a stopcock emptying and sterilizing device, for use, in particu-

lar, in the field of liquid-state alimentary products filling, which filling machine comprises a framework with an opening for feeding the containers to be filled, a conveyor means for conveying said containers into said opening, an opening for evacuating the filled containers, a tank connected with at least one filling stopcock, and a crown gear interacting with a pinion gear integral with said stopcock, which filling machine is characterized in that said crown gear is kept hanging by at least three actuator elements which cause said crown gear to reciprocate in the vertical direction, said crown gear coming into contact, during the upwards strokes of said vertical reciprocating motions, with a stud installed integral with said stopcock of said filling machine.

2. Filling machine according to claim 1, characterized in that said actuator elements are pneumatic cylinders.
3. Filling machine according to claim 1, characterized in that said actuator elements are hydraulic cylinders.
4. Filling machine according to claim 1, characterized in that said crown gear is always into engagement with said pinion gear integral with said filling stopcock.
5. Filling machine according to claim 1, characterized in that said stud installed integral with said filling stopcock is situated above said pinion gear interacting with said crown gear.
6. Filling machine according to claim 1, characterized in that said crown gear is internal to said filling stopcocks.
7. Filling machine according to claim 1, characterized in that said crown gear is external to said filling stopcocks.

Fig.1

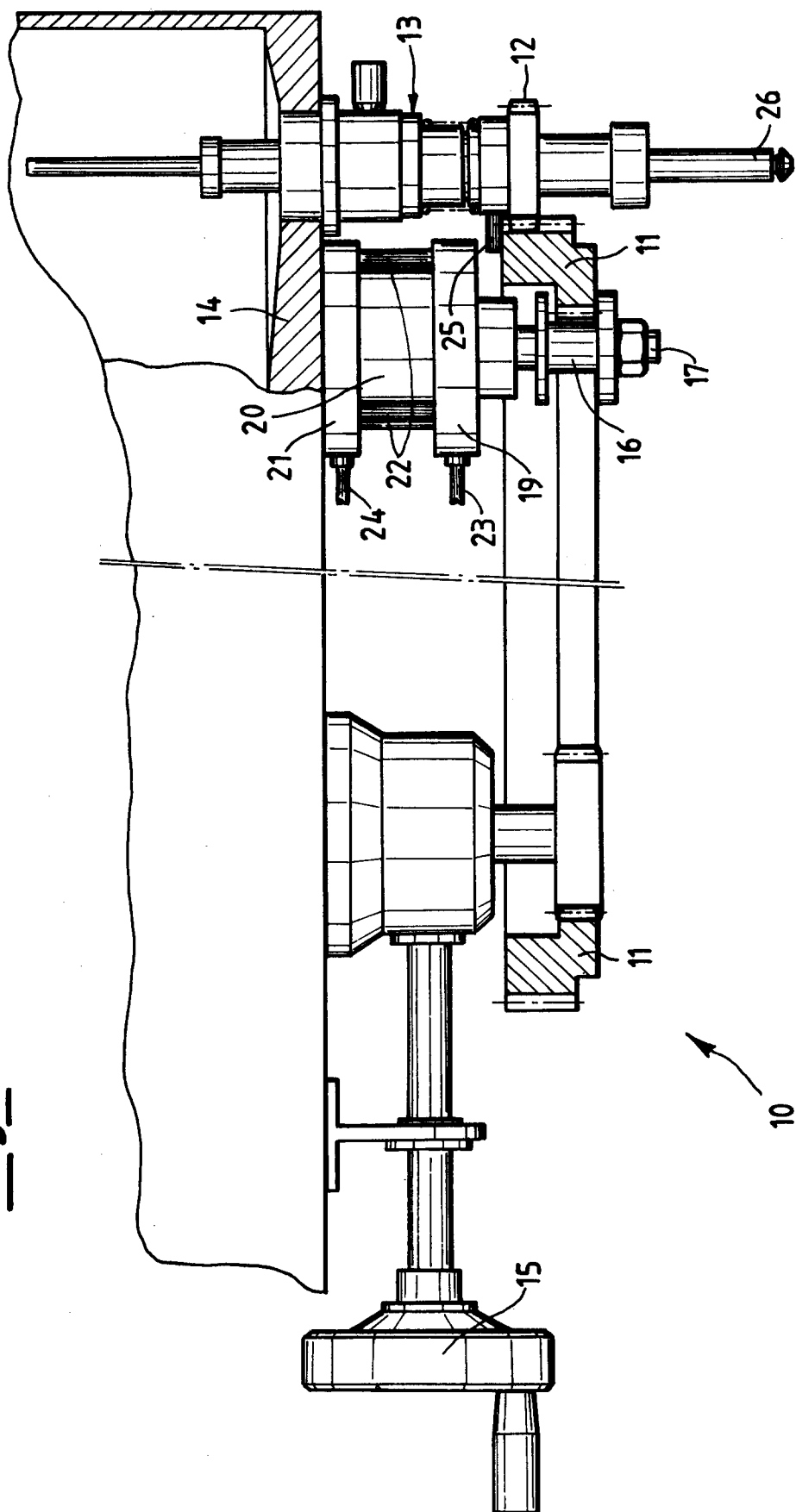


Fig.2

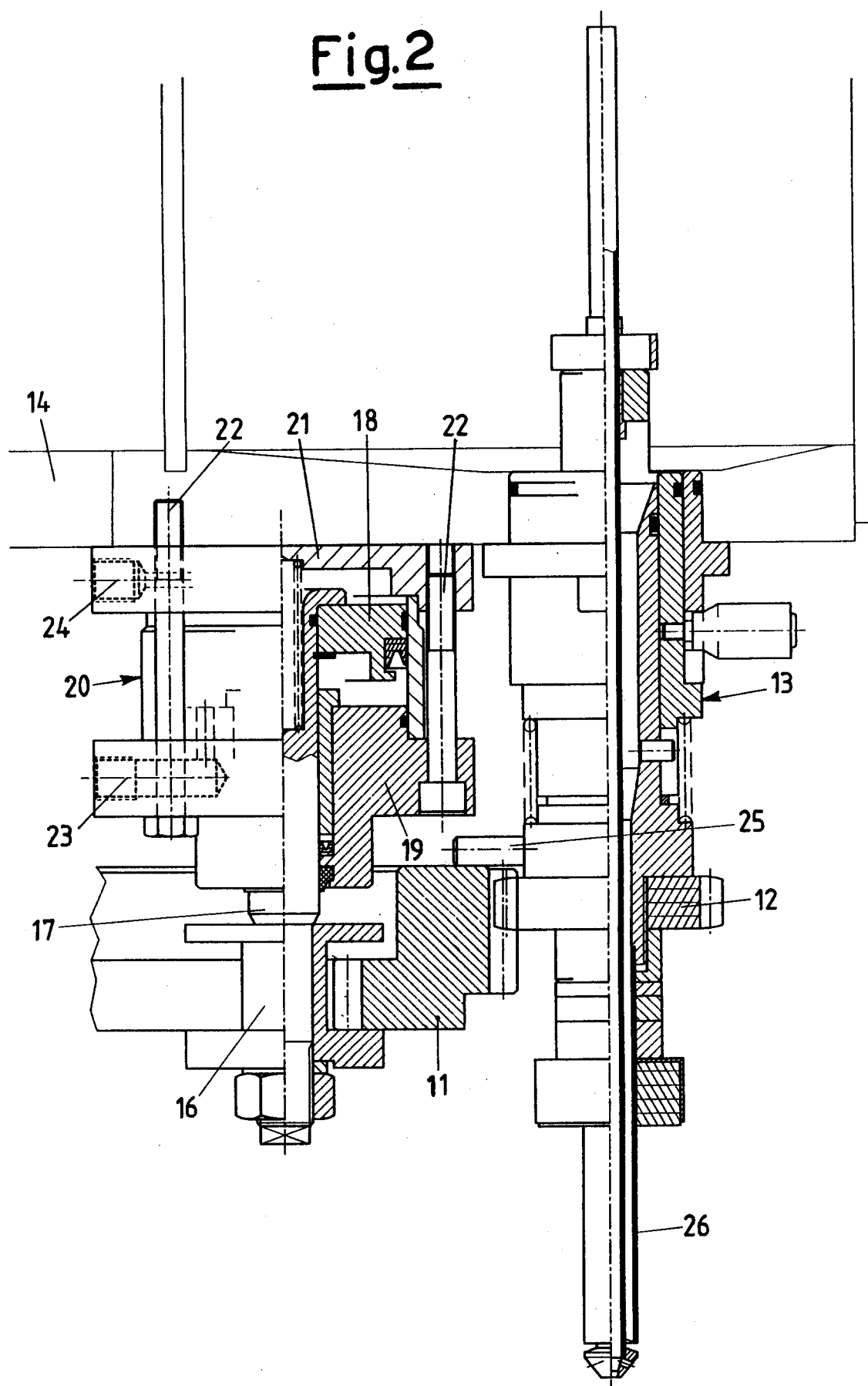
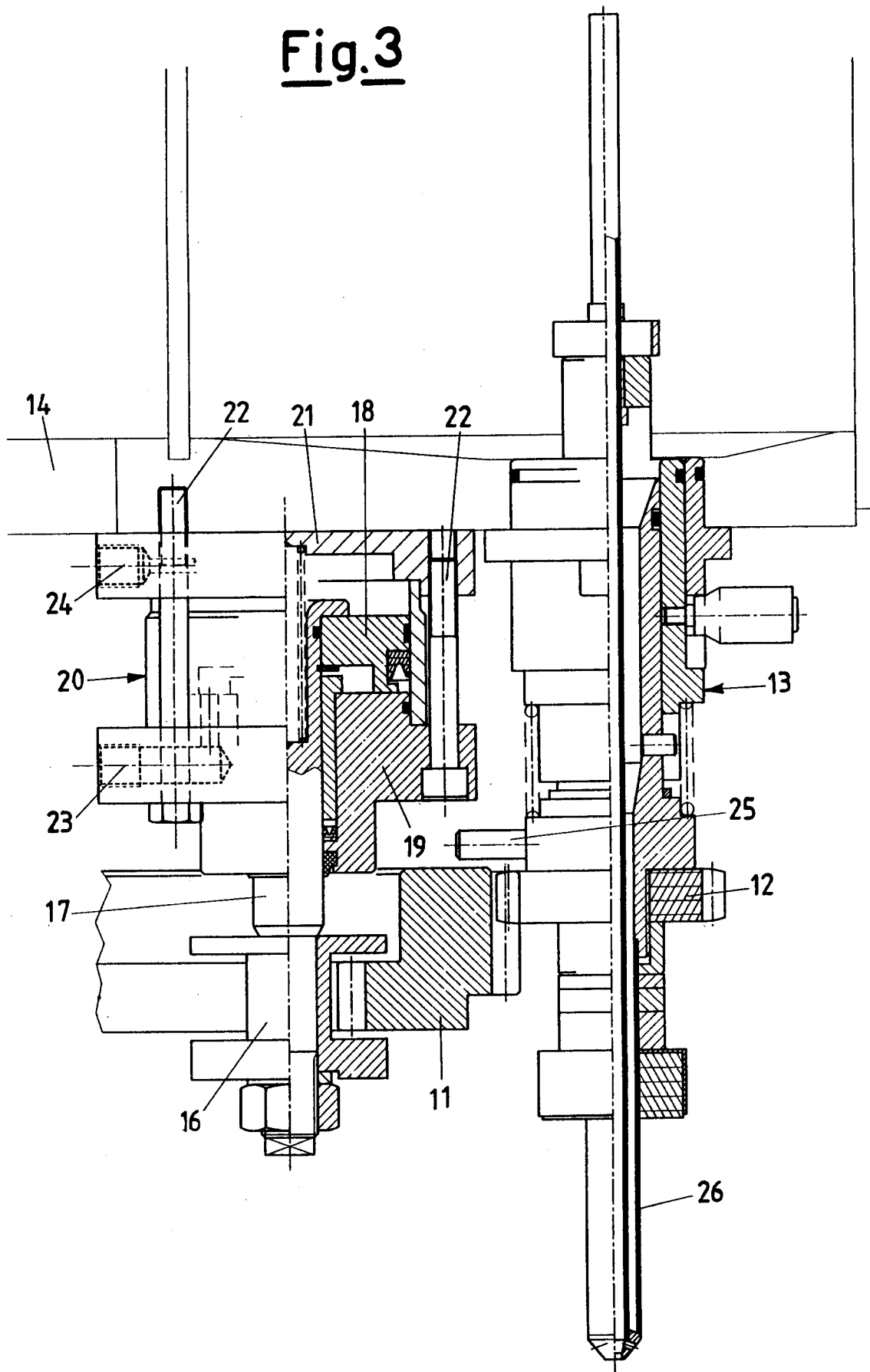


Fig.3





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EUROPEAN SEARCH REPORT

Application Number

EP 92 20 2761

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.5)
A	EP-A-0 042 896 (FELIKS) * page 4, line 22 - page 5, line 21 * * page 13, line 7 - page 14, line 16; figures 1,4 * ---	1	B65B55/02 B65B39/00
A	EP-A-0 072 354 (CATELLI) * abstract; figure 3 * -----	1	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B65B B67C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 06 JANUARY 1993	Examiner CLAEYS H.C.M.
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 I : document cited for other reasons ----- & : member of the same patent family, corresponding document	