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R. K. BEATON

MEANS FOR VARYING THE DELIVERY OF PUMPS

Filed Jan. 29, 1923

Fig. 1. Fig. 2. Fig. 3.

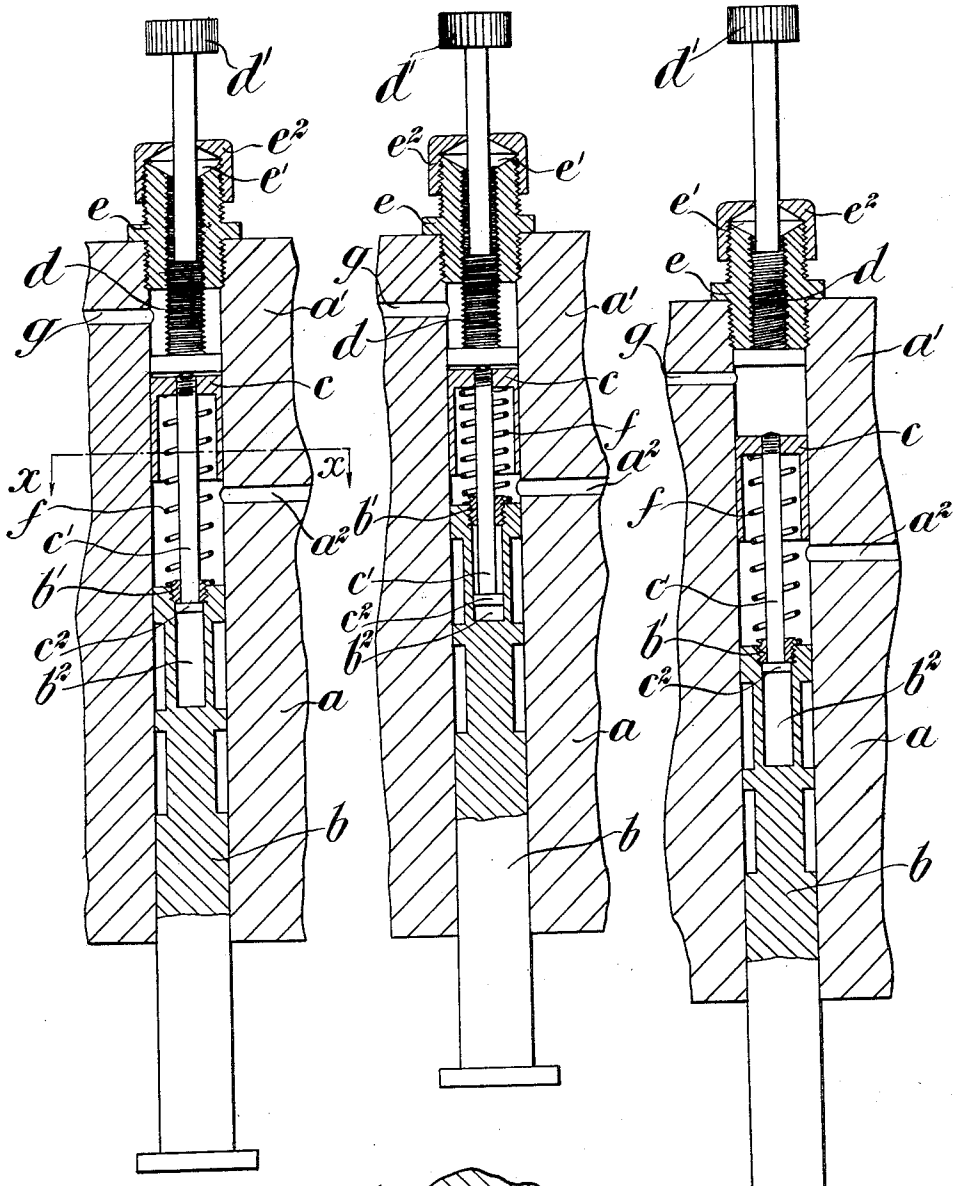
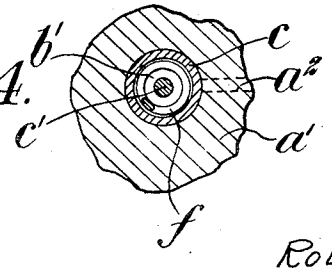


Fig. 4.



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ROBERT KENNETH BEATON, OF GREENOCK, SCOTLAND.

MEANS FOR VARYING THE DELIVERY OF PUMPS.

Application filed January 29, 1923. Serial No. 615,740.

To all whom it may concern:

Be it known that I, ROBERT KENNETH BEATON, a subject of the King of Great Britain and Ireland, and a resident of Greenock, county of Renfrew, Scotland, have invented a certain new and useful Improvement in Means for Varying the Delivery of Pumps, of which the following is a specification.

This invention relates to means for varying or regulating the amount of fluid, which may be water, oil or air, delivered by a pump of the reciprocating kind, and it consists of a loose piston or bucket attached to the inner end of each pump plunger by a piston rod which is free to reciprocate or slide coaxially with the plunger in a passage bored or otherwise formed within the inner end of the plunger.

An embodiment of this invention is illustrated in the accompanying drawings, which show only sufficient of the pump mechanism to make the invention readily understood, and in which:—

Figure 1 is a longitudinal section through a pump cylinder, showing the means for varying the amount of fluid regulated for maximum delivery, and the plunger at the end of the outward stroke.

Figure 2 is a similar view with the plunger at the end of the inward stroke.

Figure 3 shows the plunger at the end of the outward stroke and the regulating means adjusted for minimum delivery of fluid.

Figure 4 is a cross-section of Figure 1 on the line X, X.

Referring to the drawings, the cylinder a has an extension a' beyond the end of the plunger b, to accommodate the loose piston c, and regulating screw stop d and cover e which is screwed into the end of the extension a'. The loose piston c and the extension a' are shown of the same diameter as the plunger b and cylinder a, but it will be readily understood that they may be of larger or smaller diameter and that the difference in the amount of fluid delivered will be varied accordingly.

A plug or brush b' is screwed but may be bolted to the end of the plunger through which passes the piston rod c', the end of which is fitted with a collar c^2 of lesser diameter than the rod and loosely fitting the bore of the longitudinal passage b^2 in the plunger b. When the plunger is at the end of its outward stroke, as shown in Figure 1, the collar c^2 on the rod c' abuts on the plug b' and is thereby prevented, together with the loose piston c, from becoming detached from the plunger. A helical or other suitable spring f is placed between the plunger and piston to keep them as far apart as the length of the rod and the collar c^2 thereon will allow when the plunger is at the end of the outward stroke.

The suction and delivery opening or openings into each of the pump cylinders is or are located between the plunger and piston which do not at any part of the stroke cover said opening or openings. In the drawings only one opening a^2 is shown which serves for both suction and delivery.

The regulating screw stop d which has an extended stem with a milled head d' is inserted through the end cover e of each cylinder extension and projects more or less into the extension according to the adjustment of the screw portion in the end cover. A recess e' for packing is provided between the end of the cover e and a screwed cap e^2. When projecting furthest into the extension a' and abutting against the piston c, as shown in Figures 1 and 2, the piston cannot move and the pump will give the maximum amount of delivery as the plunger b during the inward stroke, Figure 2, will overrun the piston rod c' and compress the spring f, and while reducing to the minimum its distance from the piston, will drive the fluid through the delivery opening a^2. During the outward stroke the plunger will recede from the immovable piston c, the rod of which will slide through the plug b' and the increasing space between plunger and piston will be filled from the suction a^2 of the pump.

When the projection of the regulating stop d into the extension a' is reduced, the space between plunger and piston, when the former is at the end of its inward stroke, will be increased and its effective stroke will be reduced, and when the projection of the stop d into the extension a' is least, as shown in Figure 3, the piston c will reciprocate with the plunger b, preserving always the same maximum space between them, and the amount of delivery will be at its minimum.

The amount of fluid delivered by the pump is therefore proportional to the projection of the regulating stop d into the extension a', and inversely proportional to the travel of the loose piston c which re-

mains stationary when the fluid delivered is to be a maximum, and travels with the plunger, preserving the maximum space between piston and plunger when the fluid delivered is to be a minimum.

A relief passage g is provided near the end cover e of the extension a' and leads to the suction of the pump to prevent any accumulation of pressure between the cover a and piston c due to leakage past the latter.

The drawings show one cylinder and plunger fitted with the regulating means, but it is obvious that any number of cylinders and plungers may be similarly fitted, and that other methods of obtaining the loose sliding attachment between the piston and plunger may be used, e. g. the piston rod may have a cross-head with its pins slidable in slots formed in the sides of the passage in the plunger.

I claim:—

1. Means for varying or regulating the amount of fluid delivered by reciprocating pumps, comprising an extension of each pump cylinder, a piston located in said extension, a rod fixed at one end to the piston and having at the other end a loose sliding attachment to the pump plunger and a regulating screw stop in the end of said extension.

2. Means for varying or regulating the amount of fluid delivered by reciprocating pumps, comprising an extension of each pump cylinder of different diameter than the diameter of said cylinder, a piston of corresponding diameter located in said extension, a rod fixed at one end to the piston and having at the other end a loose sliding attachment to the pump plunger, a helical spring on said rod between and pressing against the piston and plunger, a cover fitted on the end of the said extension and a regulating screw stop inserted through said end cover.

3. Means for regulating or varying the amount of fluid delivered by reciprocating pumps, comprising an extension of each pump cylinder, a piston located in said extension, a rod fixed at one end to the piston and fitted at the other end with a collar and slidable in a longitudinal passage formed in the pump plunger, a plug fitted in the end of said plunger and surrounding the piston rod, a helical spring on said rod between and pressing against the piston and plunger, a cover fitted on the end of said extension, a regulating screw stop inserted through the said cover, a stem with a milled head extending from the screw stop through a packing recess in said cover, and a relief passage from the end of said extension to the suction of the pump.

In testimony whereof I have affixed my signature hereto this 9th day of January, 1923.

ROBERT KENNETH BEATON.