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LIQUID PUMP.

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Fig. 1.

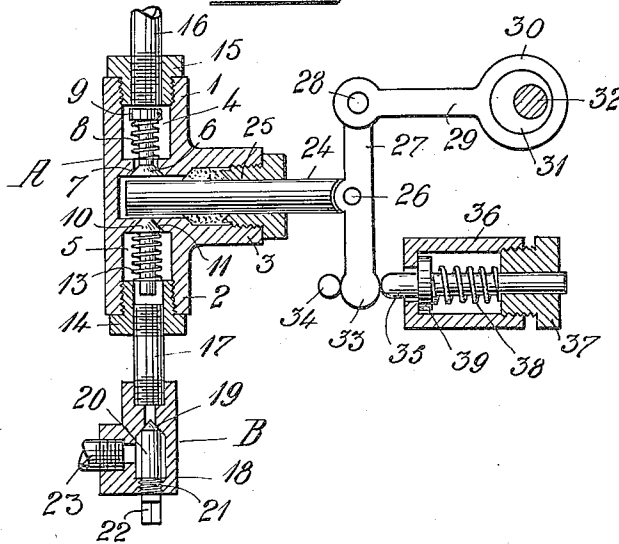
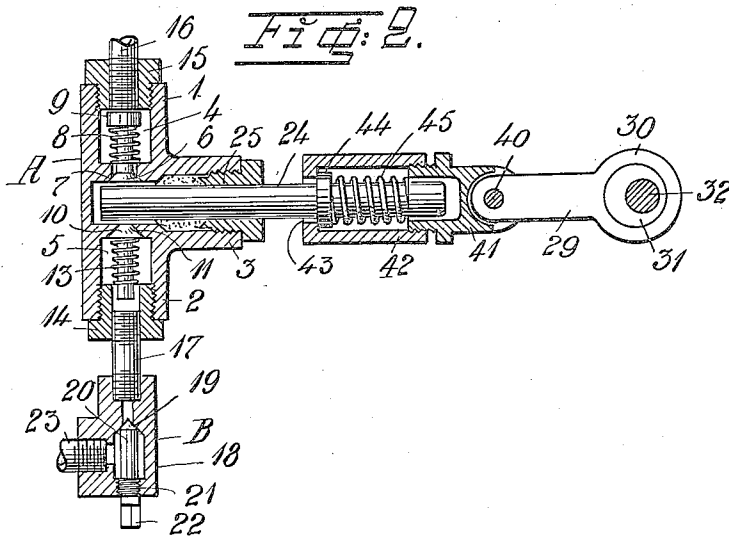


Fig. 2.



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LIQUID-PUMP.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, KARL DELLGREN, a citizen of the Kingdom of Sweden, residing at Västervik, Sweden, have invented new and useful Improvements in Liquid-Pumps, of which the following is a specification.

This invention relates to liquid pumps, and more particularly to feed pumps for hydraulic machines, fuel pumps for internal combustion engines and the like, the object in view being to produce a compensating pump of the class referred to or, in other words, a pump in which the working stroke thereof will be automatically regulated in accordance with the speed of the machine or engine, the latter in turn being controlled by means of a regulating valve, a distinct relationship being thus established between the plunger of the pump and the regulating valve so that the adjustment of the valve has an important and definite effect on the operation of the pump plunger.

A further object of the invention is to provide for the easy and accurate regulation of the amount of liquid fed to the machine or engine in accordance with the speed and power desired; also to produce a pump particularly required for great variation in speed and power while in operation.

With the above and other objects in view, the invention consists in the novel construction, combination and arrangement of parts, as herein described, illustrated and claimed.

In the accompanying drawings:

Figure 1 is a view partly in elevation and partly in section of the pump mechanism of this invention.

Fig. 2 is a similar view showing the same principle but involving a modified arrangement of some of the parts.

Referring to the drawings, A generally designates the body of the pump which comprises a barrel shaped or cylindrical extension 1, a similar extension 2 arranged in opposition to and extending in the reverse direction from the extension or cylinder 1 and a cylindrical extension 3 shown as arranged perpendicularly to the extensions or cylinders 1 and 2. The cylindrical extension 1 forms an inlet valve chamber 4 while the extension 2 forms an outlet valve chamber 5. 6 designates the inlet valve which coöperates

with a seat 7 and is normally held against its seat by means of a spring 8 engaging a shoulder 9 on the stem of said inlet valve 6.

The outlet valve shown at 10 is normally held against its seat 11 by means of a spring 13 which bears against a plug 14 threaded into the open end of the valve chamber 5. 15 designates a similar plug threaded into the end of the inlet valve chamber 4. 16 represents the inlet pipe leading from a suitable reservoir and 17 a pipe leading from the pump body to a regulating valve designated generally at B, the same comprising a valve body or casing 18 provided with an internal valve seat 19 with which coöperates a valve 20 having a threaded and adjustable connection at 21 with the valve casing and having a projecting end portion 22 adapted to be turned by any suitable means for adjusting the valve 20 in relation to its seat 19, thereby regulating the amount of liquid which passes by the valve and reaches the service pipe 23 leading to the machine or engine.

The pump piston or plunger 24 reciprocates through the gland 25 of a stuffing box formed by the tubular extension 3 above referred to and said plunger is shown in Fig. 1 as pivotally connected at 26 to one element of the pump driving mechanism, said element being shown in the form of a lever 27 which is pivotally connected at 28 to the rod 29 of an eccentric connection embodying a strap 30 which encircles an eccentric 31 on a driving shaft 32 which of course may consist of any desired shaft which revolves with and is driven by or forms a part of the machine or engine in question. The lever 27 opposite the pivoted end 28 thereof is enlarged and rounded as shown at 33 and is confined between a stationary projection 34 preferably round in cross section and a yielding compensating pin 35 forming part of a compensator which in addition to the pin 35 embodies a cylindrical housing or casing 36, a plug 37 detachably threaded into one end thereof and a compensating spring 38 which is interposed between the plug 37 and a shoulder 39 on the compensating pin 35, the spring 38 being adapted to be compressed more or less by adjusting the threaded plug 37.

In the operation of the pump above described, the liquid is drawn in through the inlet valve and is discharged through the outlet valve by the action of the plunger.

5 The plunger being operated by means of the shaft 32 and the rod 29 and lever 27, the other end of the lever is maintained in place between the stop 34 and the compensating pin or plunger 35. The pin 35 is resisted
10 by the action of the spring 38 which in turn is controlled as to its degree of compression by the threaded plug 37 so that the initial pressure on the end 33 of the lever may be regulated. The amount of liquid passing to
15 the machine or engine is controlled by the regulating valve 20 which may be opened more or less or entirely closed by any suitable means as by hand or governor mechanism. When only a small opening is provided by the regulating valve 20 the pressure in the pump increases to such an extent that the pressure on the inner end of the plunger 24 is greater than the pressure from the compensating spring 38. This makes the
20 compensating spring contract under the action of the plunger, thus preventing the full working stroke of said plunger and thereby decreasing the amount of liquid supply to the machine or engine, resulting in a reduction of the speed of the said machine
25 or engine. If the regulating valve 20 is entirely closed, the lever 27 will work on the pivot 26 as a fixed point and the compensating spring 38 will contract and expand equally with the stroke of the eccentric 31.

Under the arrangement illustrated in Fig. 2, the lever 27 is dispensed with and the eccentric rod 29 is pivotally connected at 40 to one section 41 of a compensator housing the main section of which is indicated at 42. The pump plunger 24 is extended into the housing 42 through an opening 43 in the end thereof and is provided with a fixed collar or flange 44 against which bears one end of the compensating spring 45, the opposite end of which may be seated against the inner extremity of the section 41 of the casing or housing 42. The principle involved in the construction illustrated in Fig. 2 is the
45 same as that involved in the construction illustrated in Fig. 1, the tension of the spring 45 being adjusted by turning the main section 42 of the housing or casing. Under either arrangement the adjustment of the tension of the spring 38 or 45, as the case
50 may be, may be accomplished while the pump is in operation. In all other respects, the operation is the same as that described in connection with Fig. 1.

60 The amount of liquid pumped to the machine or engine may be thus easily regulated while the engine is in operation, the plunger obtaining a full or partial stroke or none at all according to the adjustment
65 of the regulating valve 20. The spring 38

thus acts as a safety device in that it prevents any possibility of an excessive pressure in the pump and liquid feed pipe. As a whole the device is particularly advantageous for use in connection with hydraulic
70 machines or in connection with engines requiring a great variation in speed while in operation as, for example, in engines of the marine type, automobiles and traction engines.

75 Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:

1. In a liquid pump, the combination
80 with the pump plunger and a regulating valve for controlling the amount of liquid forced by the pump, of a lever pivotally connected intermediate its ends with said pump plunger, means connected to one end
85 of said lever to oscillate same, and means engaging with the other end of said lever for forming a stationary fulcrum for said lever when the counter pressure upon the plunger due to the adjustment of said regulating valve does not exceed a certain value, while allowing the lever to swing without imparting any motion to the plunger when said pressure exceeds said certain value.

2. In a liquid pump, the combination
95 with the pump plunger and a regulating valve for controlling the amount of liquid forced by the pump, of a lever pivotally connected intermediate its ends with said pump plunger, an eccentric rod connected
100 to one end of said lever to oscillate same, and means engaging with the other end of said lever for forming a stationary fulcrum for said lever when the counter pressure upon the plunger due to the adjustment of said regulating valve does not exceed a certain value, while allowing the lever to swing without imparting any motion to the plunger when said pressure exceeds said certain value.

3. In a liquid pump, the combination
110 with the pump plunger and a regulating valve for controlling the amount of liquid forced by the pump, of a lever pivotally connected intermediate its ends with said pump plunger, means connected to one end of said lever to oscillate same, a stationary stop engaging with one side of the other end of said lever for forming a rigid fulcrum for said lever when moving in the direction for effecting the suction stroke of the pump plunger, and a yielding stop engaging with the opposite side of said last mentioned end of the lever.

4. In a liquid pump, the combination
125 with the pump plunger and a regulating valve for controlling the amount of liquid forced by the pump, of a lever pivotally connected intermediate its ends with said pump plunger, means connected to one end
130

of said lever to oscillate same, a stationary
stop engaging with one side of the other
end of said lever for forming a rigid ful-
crum for said lever when moving in the
5 direction for effecting the suction stroke of
the pump plunger, a sliding abutment en-
gaging with the opposite side of said last

mentioned end of the lever, a spring acting
on said sliding abutment for maintaining
it in engagement with said lever, and means 10
for adjusting the tension of said spring.

In testimony whereof I have signed my
name.

KARL DELLGREN.