

N. McCARTY.

PUMP.

APPLICATION FILED MAR. 13, 1909.

943,988.

Patented Dec. 21, 1909.

Fig. 2.

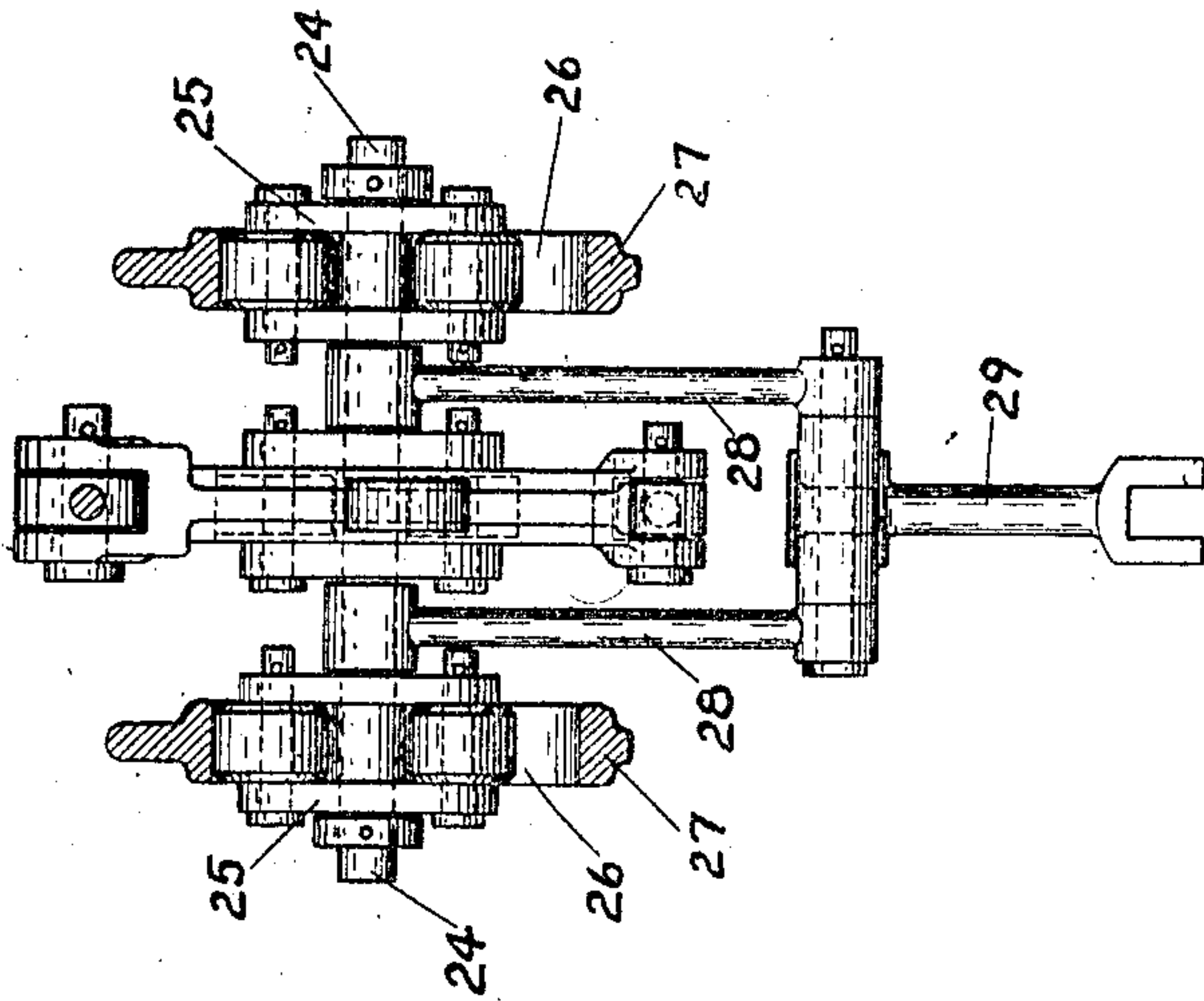
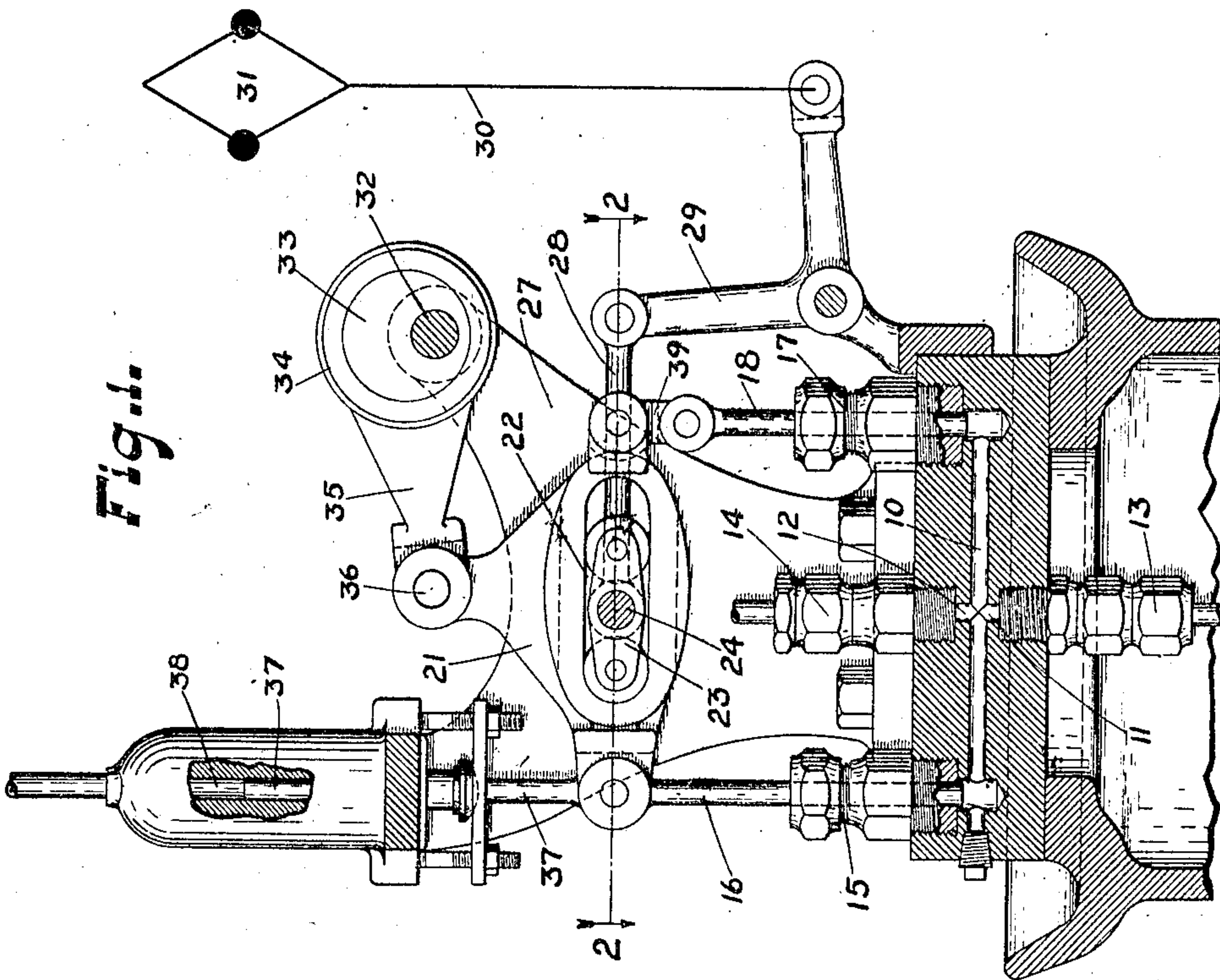


Fig. 1.



Witnesses  
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# UNITED STATES PATENT OFFICE.

NORMAN McCARTY, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO ATLAS ENGINE WORKS,  
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## PUMP.

943,988.

Specification of Letters Patent.

Patented Dec. 21, 1909.

Application filed March 13, 1909. Serial No. 483,161.

*To all whom it may concern:*

Be it known that I, NORMAN McCARTY, a citizen of the United States, residing at Indianapolis, in the county of Marion and State of Indiana, have invented certain new and useful Improvements in Pumps, of which the following is a specification.

The object of my invention is to produce a pump of such construction that any desired quantity of output may be obtained between maximum and minimum.

The accompanying drawings illustrate my invention.

Figure 1 is a section of a pump embodying my invention; Fig. 2 a section on line 2-2 of Fig. 1.

In the drawings, 10 indicates a pump chamber having a supply passage 11 and an outlet passage 12, the supply passage 11 being preferably provided with an inwardly opening check valve 13 and the outlet passage 12 being preferably provided with an outwardly opening check valve 14. Projected into chamber 10 through a suitable packing gland 15 is an ejecting plunger 16 and projecting into chamber 10 through a suitable packing gland 17 is a compensating plunger 18. The two plungers 16 and 18 are connected by a lever 21 provided with a slot 22 in which is mounted a fulcrum carriage 23 carrying a fulcrum pin 24 said fulcrum pin being also carried by two fulcrum carriages 25 25, each of which is mounted in a suitable slot or guideway 26 formed in the supporting frame 27. Connected to the fulcrum pin 24, so as to shift the same transversely, are two links 28 28 which are connected to one arm of the bell crank lever 29 the other arm of which is connected by a suitable link 30 with the speed controlled governor 31. Journaled in the main frame 27 is an operating shaft 32 provided with an eccentric 33 on which is mounted an eccentric strap 34 carrying an arm 35 pivotally connected at 36 with lever 21 so as to rock said lever upon the fulcrum pin 24. In the position shown in Fig. 1 fulcrum pin 24 lies just half way between the points of attachment of lever 21 with the two plungers 16 and 18 and said fulcrum pin may be shifted transversely to the right so as to decrease the movement of the compensating plunger 18 for a given angular movement of lever 21.

In order to prevent lateral bending of the

plungers 16 and 18 it is advisable to provide one of said plungers with a guide which will hold it rigidly transversely and for this purpose I have shown a plunger 37 which fits within a pressure chamber 38 into which may be introduced a compensating pressure equal to the pressure which will be exerted upon plunger 16 whenever any discharge is taking place. The plunger 18 might also be provided with a guide but in that case a slotted or link connection would have to be made, between lever 21 and both of the plungers 16 and 18. In practice this is unnecessary as the lever 21 may be directly pivoted to plunger 16 and connected to plunger 18 by means of a short link 39.

The operation is as follows: With the parts in the position shown in Fig. 1, a rocking of lever 21 to the left will cause plunger 16 to enter chamber 10 but will withdraw plunger 18 an equal amount so that, the two plungers being equal in displacement, there will be no ejection of material from the pump chamber, and upon the movement of lever 21 to the right, plunger 16 will be withdrawn at the same speed and to the same extent as plunger 18 will be projected into chamber 10 so that there will be no entry of material into the pump chamber from the supply passage 11. If the fulcrum pin 24 is shifted bodily to the right, however, the ratio of lever 21 to the two plungers 16 and 18 will be changed so that the movement of plunger 16 will be greater than the movement of plunger 18 and therefore the amount of discharge upon the instroke of plunger 16, will be equal to the difference of displacements of the two pistons due to their difference in movement, and the inflow of material into the pump chamber will also be determined by the same difference of movement of the two plungers. It will be seen therefore that no attempt need be made to have the axis of pin 24 approximate the axis of one or the other of the plungers in order to produce a minimum or maximum discharge because minimum discharge is obtained by producing an exactly equal movement of the ejecting plunger and compensating plunger in opposite directions. Assuming that the pump operates under such circumstances that there is a maintained pressure in the discharge pipe normally holding the check valve 14 closed, there will be no material pressure upon pis-



tons 16 and 18 so long as there is no discharge from the pump chamber, but whenever there is the least discharge, this discharge is distributed, as to time, throughout the time of inward movement of plunger 16 and, as this pressure is acting upon both plungers 16 and 18 there will be a pressure exerted by both of these plungers upon the opposite ends of lever 21, which would tend to resist transverse adjustment of fulcrum 24. This pressure may be reduced by the application of pressure upon the guide plunger 37 within the pressure chamber 38.

I claim as my invention:—

1. In a pump, the combination with a pump chamber, of a pair of plungers projected into said chamber, means for reciprocating the said plungers simultaneously in opposite directions relative to the pump chamber, and means for inversely varying the movement of both said plungers.

2. In a pump, the combination with a pump chamber, of a pair of plungers projected into said pump chamber, an operating lever connecting said plungers, a fulcrum for said lever arranged between said plungers, and means for varying the relation between the fulcrum and lever to inversely vary the relation between said lever and the two plungers.

3. In a pump, the combination with a pump chamber, of a pair of plungers pro-

jected into said chamber, a lever connecting said plungers, a fulcrum for said lever engaging the lever between the plungers, and means for shifting said fulcrum with relation to said lever toward and from the medial line of said lever between the two plungers.

4. In a pump, the combination with a pump chamber, of a pair of plungers projected into said chamber, a lever connected at its opposite ends to the two plungers, a fulcrum for said lever, and means for simultaneously inversely varying the lever ratio relative to the two plungers.

5. In a pump, the combination with a pump chamber, of a pair of plungers alternately projectable into said chamber, a lever connected to the two plungers, and means for shifting the fulcrum to and from the medial line of the lever between the plungers, whereby the output of the pump is proportional to the difference in stroke of the two plungers.

In witness whereof, I have hereunto set my hand and seal at Indianapolis, Indiana, this sixth day of March, A. D. one thousand nine hundred and nine.

NORMAN McCARTY. [L. S.]

Witnesses:

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