March 12, 1940. J. H. ASHLAND 2,193,705

PUMP GOVERNOR

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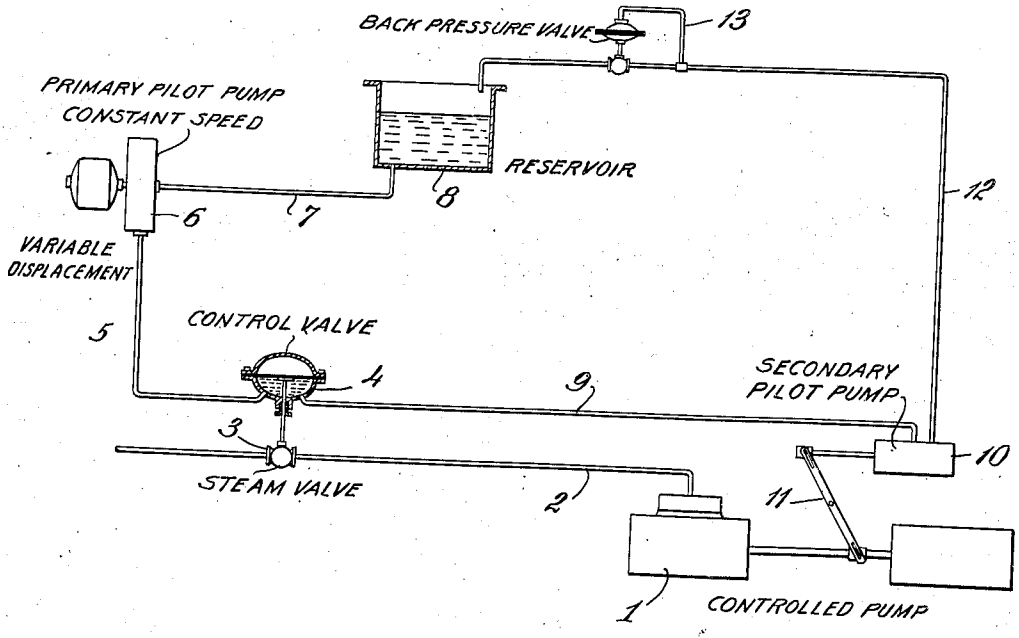

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PUMP GOVERNOR

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Application February 4, 1939, Serial No. 254,528

2 Claims. (Cl. 103—19)

This invention is concerned with the provision of a regulating mechanism applicable to pumps to insure constancy of delivery therefrom at predetermined variable rates of delivery.

The invention may be understood readily by reference to the drawing attached to the specification, which shows in diagram form a governor according to my invention.

In the drawing, 1 is the steam end of the pump to be controlled; 2 is the steam line leading thereto; 3 is the control valve in the steam line. To operate the control valve there is used a diaphragm mechanism 4 of usual type, so mounted that increase of pressure upon the diaphragm or of volume in the diaphragm chamber serves to open the steam valve 3. Actuating fluid, any suitable liquid, is supplied to the diaphragm mechanism 4 by pipe 5 and originates in a source of supply such as a constant speed pump 6, which may be, for example, a centrifugal pump driven by a synchronous motor or a variable stroke reciprocating pump, or other pump or pumps suitable for predetermined constant volume delivery. This pump derives its supply of liquid by pipe 7 from reservoir 8. A second pipe 9 communicates with the liquid space of diaphragm mechanism 4 and leads to secondary pilot pump 10, which is a reciprocating pump directly connected to governed pump 1 by some linkage such as 11. Liquid withdrawn from 4 by pump 10 is returned to reservoir 8 by pipe 12 in which any suitable back pressure, if desired or felt necessary, may be held by a valve 13.

In operation, a selected or predetermined displacement for pump 6, which corresponds to desired discharge rate of pump 1 is arranged for, for example by throttling the constant speed pump 1. This delivers a constant volume of liquid per unit of time to controller 4. Secondary pilot pump 10 removes liquid from 4 at a rate entirely concurrent with the speed (and rate of delivery) of pump 1. If pump 10 does not remove liquid from 4 as fast as it is supplied by pump 6, then mechanism 4 opens valve 3, increasing the rate of operation of pump 1 and consequently of pump 10. Conversely, 4 may act to decrease the speed of pump 1. Other constant rates of operation of pump 1 may be achieved by selecting other rates of displacement for primary pilot pump 6.

With modifications readily apparent to those skilled in the art, the set up shown may be made applicable to centrifugal pumps. For example, pump 10 might also be any pump coordinated with a centrifugal pump. Similarly, the control valve action might be applied to an electrical prime mover.

Similarly, a multiple unit primary pilot pump, or a single primary pilot pump discharging through calibrated orifices or the like, could be installed in a central location for the service of a plurality of secondary pilot pumps each controlling the operation of an operation pump. Such a system would be readily adaptable to simultaneous proportional rate control of a number of pumps having interdependent functions, as, for example, the several service pumps of a "combination" still in which petroleum oil is both cracked and primarily distilled.

I claim:

1. A control system to secure constant discharge at predetermined rate from a pump comprising a prime mover connected to said pump, means to supply energy to said prime mover, means to control the amount of energy so supplied, a variable volume chamber operatively connected to said control means whereby increases in volume of said chamber act to increase energy supply, a constant delivery liquid pump discharging into said volumetric chamber, and a third pump removing liquid from said volumetric chamber, said third pump being operatively connected with the controlled pump so that its rate of suction is parallelly proportionate to the rate of discharge of the controlled pump.

2. A control system to secure constant discharge at predetermined rate from a pump comprising a controlled pump, a prime mover therefor, rate control means on said prime mover, a diaphragm to operate said rate control, a constant speed pump of predetermined displacement to supply operative liquid to said diaphragm, a variable displacement pump to remove operative liquid from said diaphragm, a linkage between the controlled pump and the variable displacement pump whereby the discharge rate of the second is maintained proportional and parallel to the first, the said diaphragm being mounted to increase the rate of the controlled pump in response to a deficient rate of removal of liquid from said diaphragm.

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