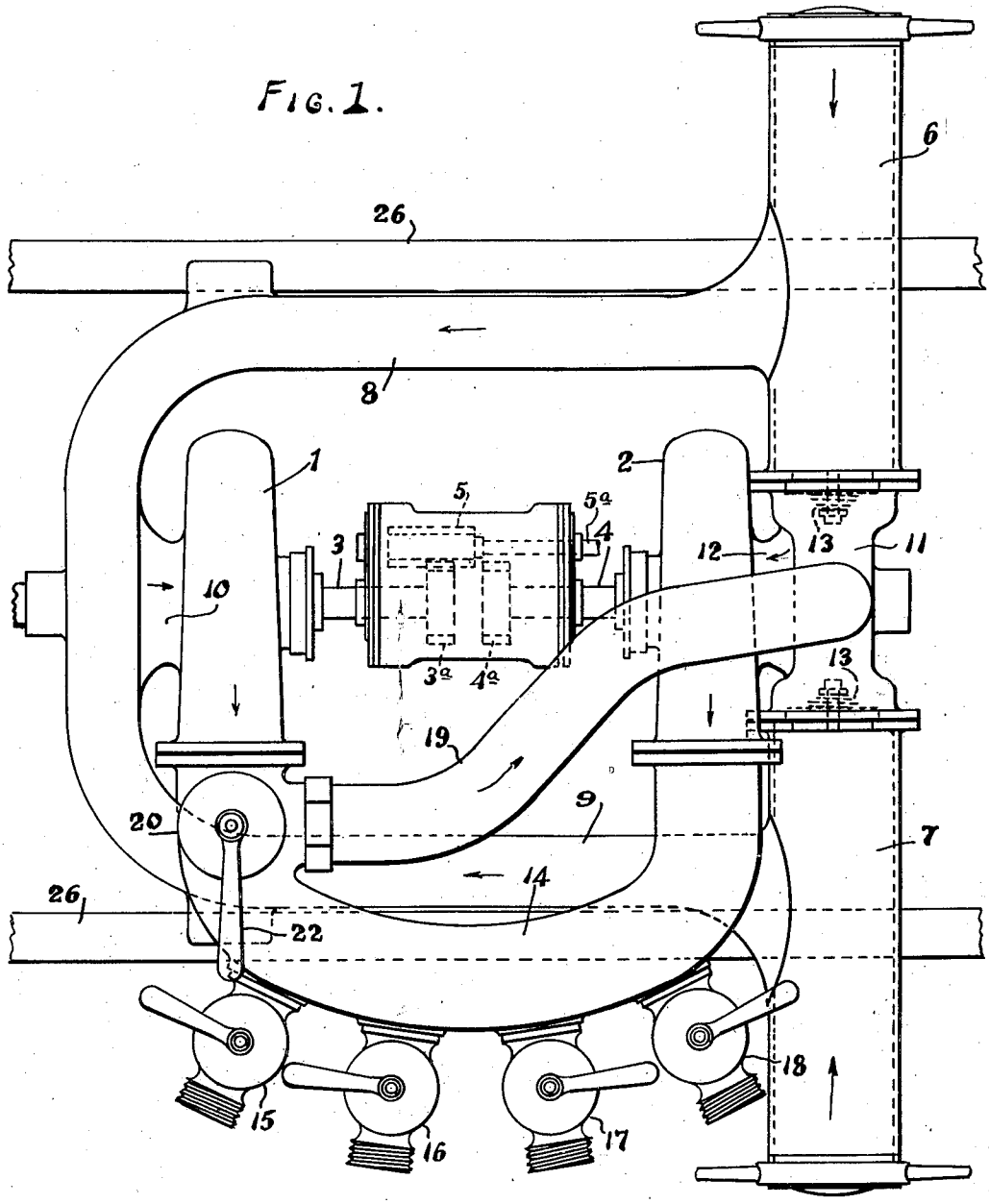
April 21, 1936. C. H. FOX 2,037,775

PARALLEL SERIES CENTRIFUGAL FIRE PUMP

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FIG. 1.



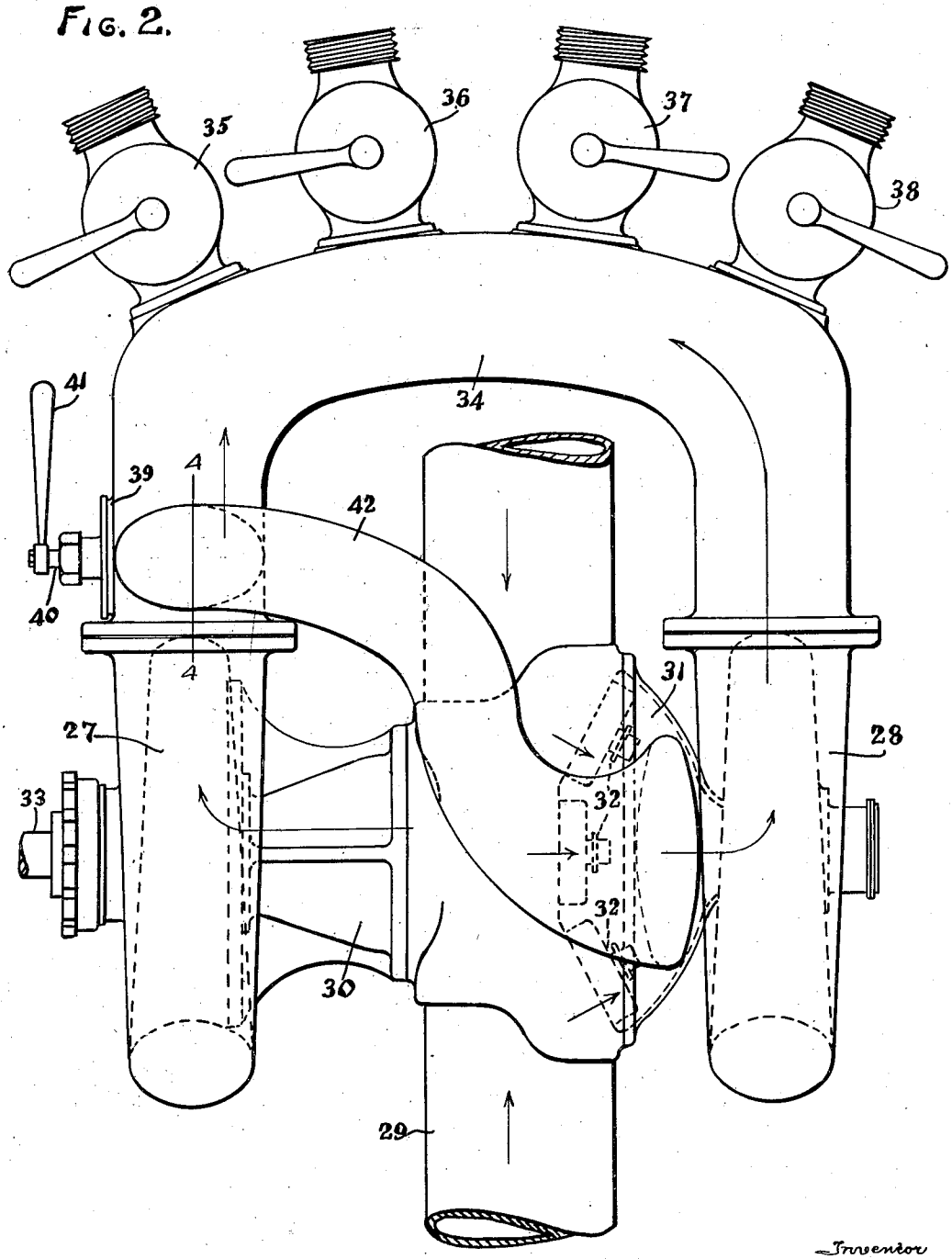
Inventor
CHARLES H. FOX,
By Toulmin & Toulmin
Attorneys

April 21, 1936. C. H. FOX 2,037,775

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FIG. 2.



Inventor
CHARLES H. FOX,
By
Toulmin & Toulmin
Attorneys

April 21, 1936. C. H. FOX 2,037,775

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FIG. 4.

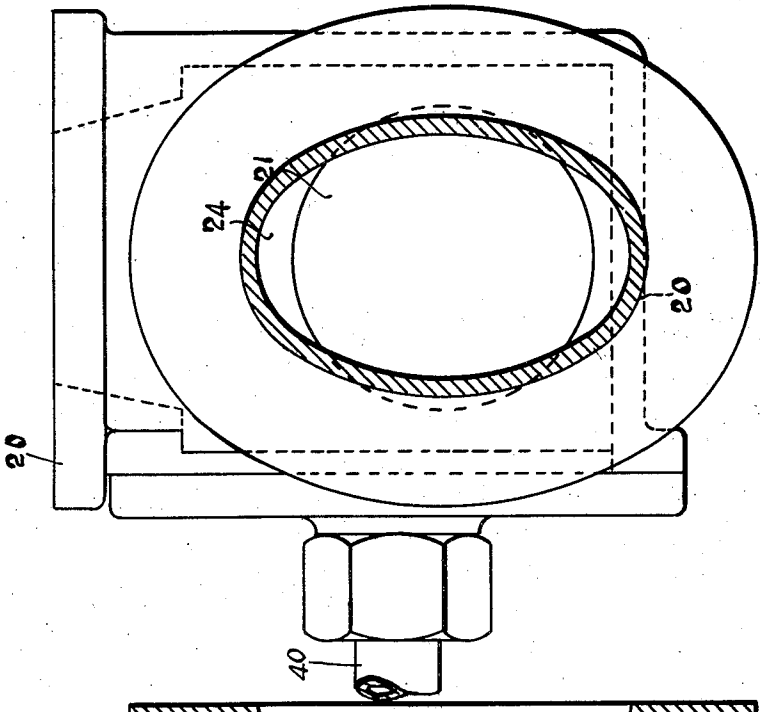
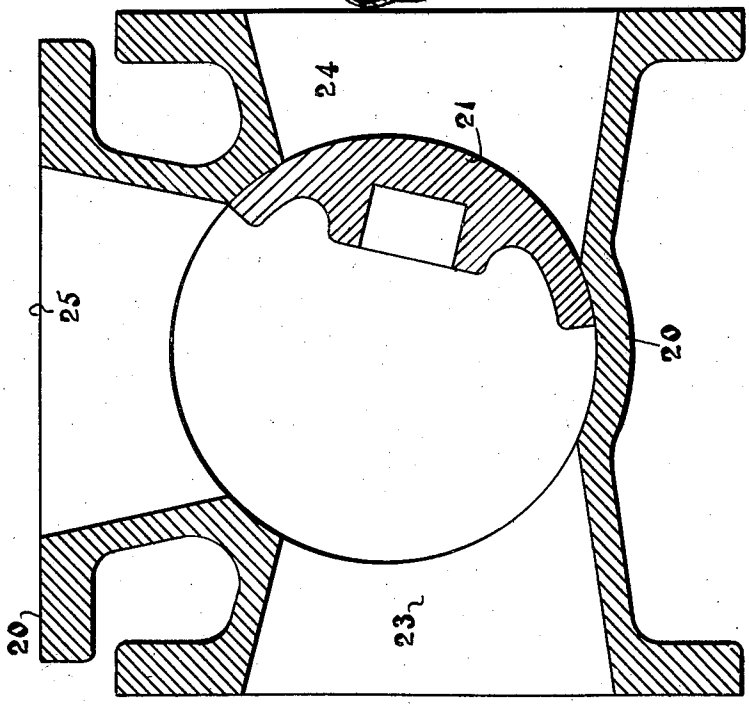


FIG. 3.



Inventor
CHARLES H. FOX,
By Toulmin & Toulmin
Attorneys

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2,037,775

PARALLEL SERIES CENTRIFUGAL FIRE PUMP

Charles H. Fox, Cincinnati, Ohio

Application April 16, 1934, Serial No. 720,765

3 Claims. (Cl. 103—106)

This invention relates to improvements in fire pumps, and has for its object to provide, in connection with a pumping apparatus, a pair of pumps, and so connecting these pumps that they may operate in series or in parallel, or one may operate independently of the other.

It is an object of this invention to provide a fire pump which has on each side a hose connection, and on one side discharge connections.

The arrangement of the pumps is shown in a form more especially adapted for fire engine service and wherein the tubular extensions, comprising the intake ports, are disposed crosswise of the chassis.

While two 500-gallon single-stage pumps are used to illustrate the scheme, the arrangement obviously is equally feasible when multi-stage types are substituted for the single-stage pumps shown.

The "duty" as between volume of discharge and pump pressure, exceeding the scope allowable for economical and efficient operation, the purpose is to devise means by which the pump can readily be caused to function in parallel or in series, as may best meet the varying demands of the fire service with respect to volume of discharge and pump pressure.

Referring to the drawings:

Figure 1 is a top plan view of one form of pump mounted on a truck frame.

Figure 2 is a modified form of pump in which the intake pipe is located between the primary and the secondary pumps.

Figure 3 is a horizontal section through the transfer valve casing.

Figure 4 is a section on the line 4—4 of Figure 2.

The numeral 1 is used to designate a primary centrifugal pump spaced apart from and parallel with a secondary centrifugal pump 2. The primary pump has an operating shaft 3 which is adapted to be connected to an operating shaft 4 for the secondary pump by means of a gear mechanism consisting of a gear 3*a*, fixed to the shaft 3, a gear 4*a* fixed to the shaft 4, and a gear 5 slidably mounted on a shaft 5*a* for engagement with the gear 3*a*, or for engagement with both gears 3*a* and 4*a*.

There are intakes 6 and 7 provided for the pump 2. From the intake 6 there extends a connection 8, while from the intake 7 there extends a connection 9. These two connections are continuous with each other and serve to direct water from the intakes to an inlet 10 of the primary centrifugal pump 1. The two intakes 6 and 7 are preferably arranged in alignment and are connected by means of a tubular connection 11, from which there extends an inlet 12 leading into the inlet side of the secondary centrifugal pump 2. Between the intake 6 and the tubular connection 11 is a check valve 13, while a similar check valve 13 is located between the intake 7 and the tubular connection 11.

The outlets of the pumps are connected to a discharge leader 14. This leader is arcuate in shape and is located on one side of the frame, preferably on the lefthand side. This discharge leader is provided with a plurality of discharge gates. In the present instance there are four of these gates designated 15, 16, 17 and 18. Extending from the discharge leader adjacent the outlet from the primary centrifugal pump 1 is a connection 19, which terminates in the tubular connection 11 between the two valves 13.

At the point where the connection 19 leaves the discharge leader there is a valve casing 20, which has therein a valve 21 operated by a valve handle 22. The valve 21 is for the purpose of controlling the direction of flow of the water which leaves the pump through a passageway 23 leading into the casing. With the valve 21 in the position shown in Figure 3 the outlet 24 from the valve casing 20 leading into the discharge leader 14 is closed so that the water will be diverted from the valve casing through the outlet 25, into the connection 19.

With the valve 21 in the position shown in Figure 3 the pumps are operating in series. The water leaving the pump 1 passes through the connection 19 into the connection 11 and through the pump 2 into the discharge leader 14, from which the water may be discharged through any one or all of the discharge gates. When the valve 21 is so positioned that it closes the outlet 25 the water will pass from the pump 1 directly into the discharge leader 14. With the valve in this position the two pumps are acting in parallel. If the two shafts 3 and 4 were disconnected the pump 1 only would operate.

When the water is discharged from the primary pump through the connection 19 the pump 2 may idle, or it may operate in conjunction with the pump 1. The pressure produced by the pump 1 tends to maintain the check valves 13 in closed position. These valves will remain in closed position so long as the pressure produced from the pump 1 in the tubular connection 11 is greater than the hydrant pressure against the valves 13. If the hydrant pressure should be greater than the pressure produced by the pump 1 in the tubular connection 11 part of the hydrant water

will pass into the pump 2, and through the pump 2 into the discharge leader.

The pump structure as shown in Figure 1 is supported on frame members 26 running longitudinally of the fire truck.

In the form shown in Figure 2 there is a primary centrifugal pump 27 and a secondary centrifugal pump 28. These pumps are provided with water through an intake pipe 29, which has an inlet 30 leading into the inlet side of the pump 27. This pipe 29 is provided with an inlet 31 leading into the inlet side of the secondary pump 28. Between the inlet 31 and the interior of the pipe 29 is a plurality of check valves 32. In the present instance there are three of these valves.

The pumps are operated by means of a shaft 33. This shaft may be common to both pumps or the pumps may have separate shafts connected by means of a clutch mechanism, such as that shown in Figure 1. To the outlets of the two pumps 27 and 28 there is attached a discharge leader 34, similar to the leader 14 shown in Figure 1. This leader is provided with a plurality of discharge gates. In the present instance there are four, designated 35, 36, 37 and 38.

The discharge leader adjacent the outlet of the primary pump 27 is provided with a valve casing 39, which has a valve therein similar to the valve shown in connection with the form shown in Figure 1 and operated by means of a stem 40 and a handle 41. Extending from this casing to the inlet 31 is a connection 42, similar to the connection 19 in purpose. The valve located within the valve casing 39 operates to close passageways similar to those disclosed in Figure 3 and found in connection with the form shown in Figure 1.

When the gear 5 is in mesh with the gears 3*a* and 4*a* both pumps operate, and if the valve 21 is properly adjusted the pumps act in parallel, both supplying water directly into the leader 14. When the valve 21 is shifted to close the outlet from the pump 2 from the leader 14 to direct the water through the pipe or connection 19, the two pumps will operate in series. Should the gear 5 be shifted so that it is not in engagement with the gear 4*a* the pump 2 floats.

It will be understood that I desire to comprehend within my invention such modifications as come within the scope of my claims and my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a pump mechanism, in combination with a truck frame having a pair of oppositely disposed longitudinal frame members, a pair of pumps, a pair of aligned spaced intakes, a tubular connection from each intake to the inlet of one pump extending along and supported by each frame member, a tubular connection between the intakes, to the inlet of the other pump and forming with said intakes a conduit transversely supported between said frame members, a check valve between each intake and the last-named connection, and a common outlet leader for the pumps.

2. In a pump mechanism, in combination with a truck frame having a pair of oppositely disposed longitudinal frame members, a pair of pumps, a pair of aligned spaced intakes, a tubular connection from each intake to the inlet of one pump extending along and supported by each frame member, a tubular connection between the intakes, to the inlet of the other pump and forming with said intakes a conduit transversely supported between said frame members, a check valve between each intake and the last-named connection, a common outlet leader for the pumps at one side of the frame, and means to cut the outlet of one pump off from the leader and connect it to the inlet of the other pump, whereby the pumps will act in series.

3. In a pump mechanism, in combination with a truck frame having a pair of oppositely disposed longitudinal frame members, a pair of pumps, a pair of aligned spaced intakes, a tubular connection from each intake to the inlet of one pump extending along and supported by each frame member, a tubular connection between the intakes to the inlet of the other pump and forming with said intakes a conduit transversely supported between said frame members, a check valve between each intake and the last-named connection, a common outlet leader for the pumps, and means for selectively operating said one pump individually or both pumps simultaneously.

CHARLES H. FOX.