June 24, 1930. J. T. JANETTE 1,765,490

CIRCULATING APPARATUS

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Fig. 1.

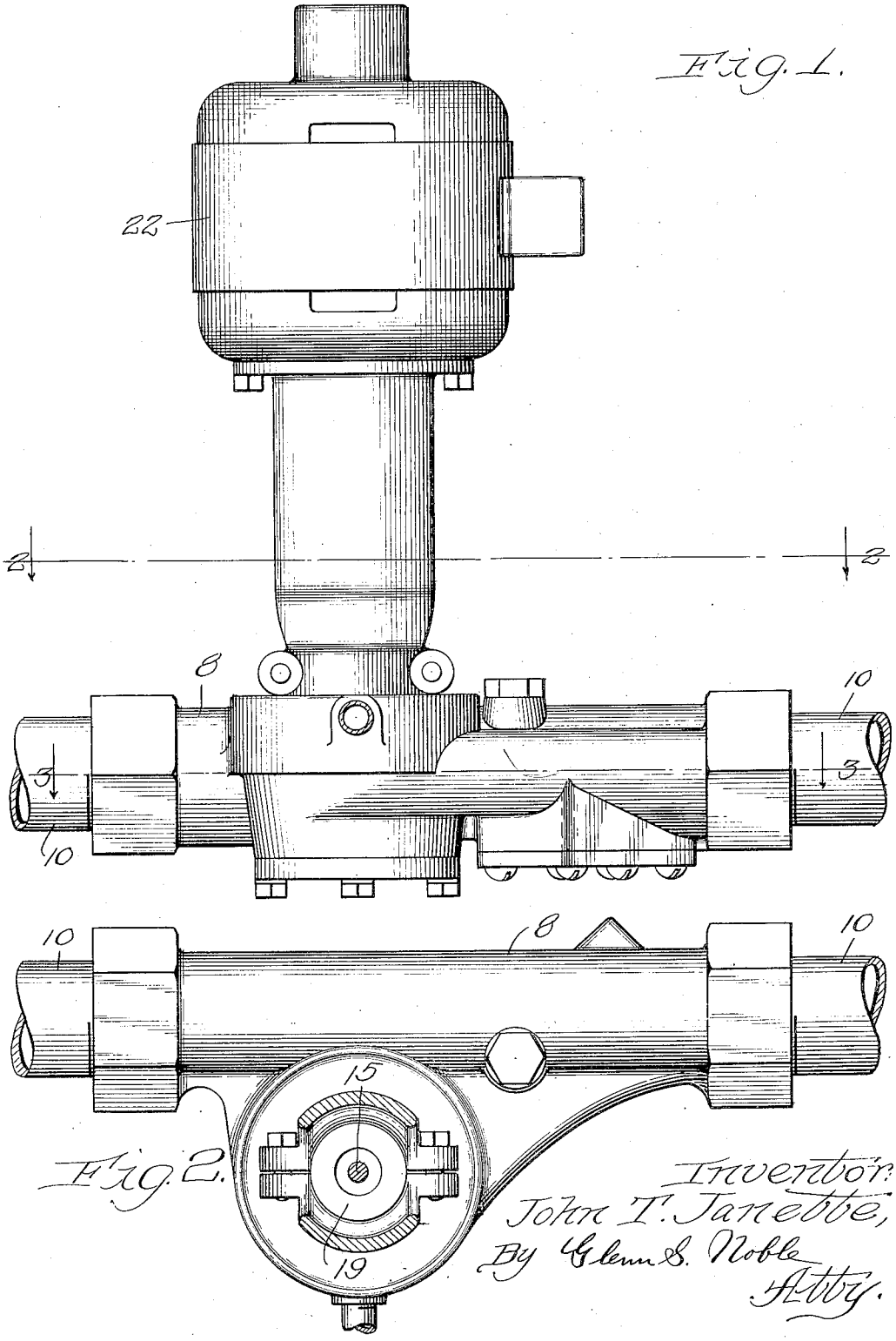


Fig. 2.

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Fig. 3.

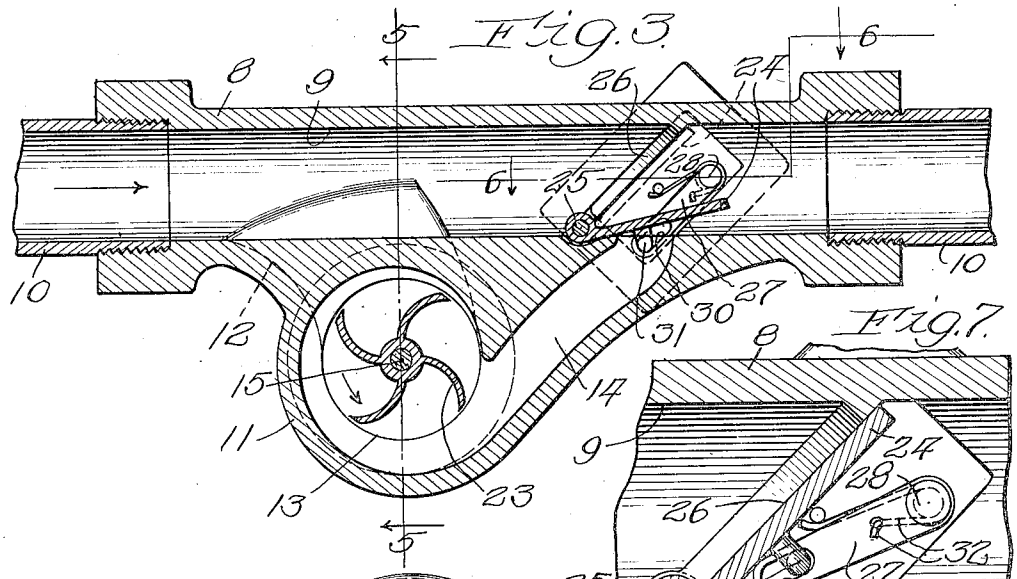


Fig. 7.

Fig. 4.

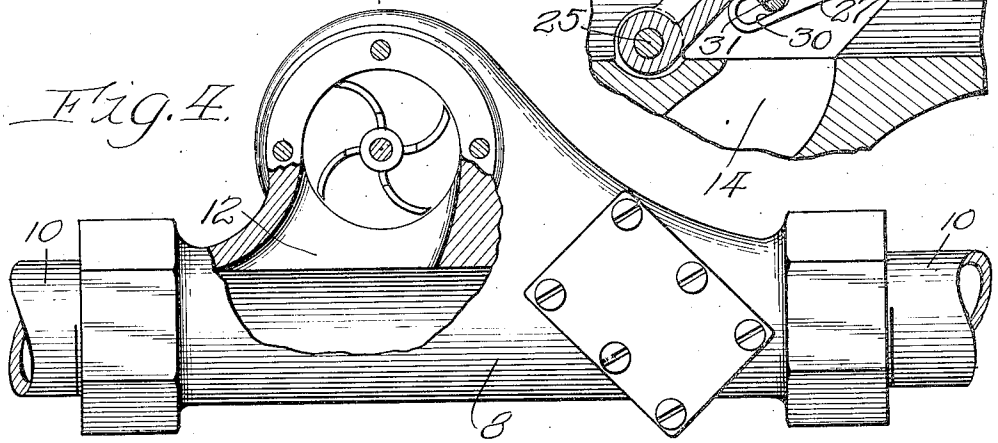


Fig. 5.

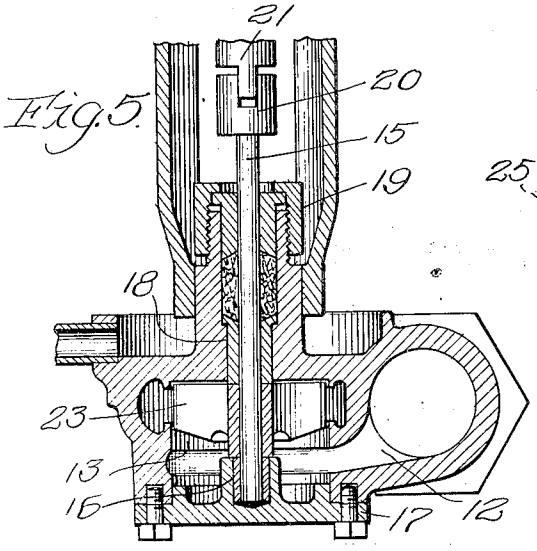
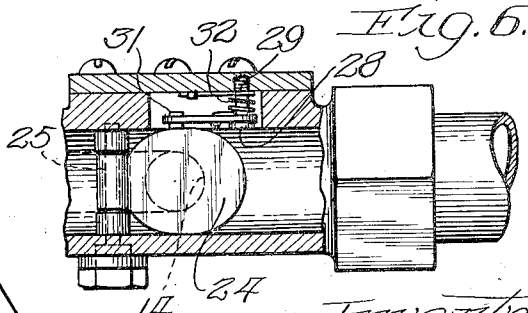


Fig. 6.



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UNITED STATES PATENT OFFICE

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CIRCULATING APPARATUS

Application filed June 24, 1927. Serial No. 201,100.

It is well known that in heat transference, as in heating water in a boiler or tank it is desirable to have the liquid which is to be heated passed over the heating surfaces at a sufficiently rapid rate to absorb all of the heat possible from such surfaces. The natural circulation of the water is depended upon to carry it over the heating surfaces, but in many cases, as in hot water heating systems or heating water for general domestic use, such natural circulation is not sufficient to utilize all of the heat generated in the furnace, and as a consequence, there is apt to be considerable waste. Furthermore, in heating water for general domestic purposes, as in a hot water system in a building, a small amount of the water is apt to be heated to a very high temperature and a large amount of the water remains at a comparatively low temperature; and as a consequence, when the water is to be used, there is only a small amount available for quick use.

The present invention relates to means whereby fluid may be circulated and more particularly to means for providing either a natural or forced circulation.

The objects of this invention are to provide an improved circulating apparatus for fluids; to provide means whereby a fluid or liquid which is to be circulated may circulate either by a natural circulation due to differences in temperature or may be given a forced circulation; to provide a conduit having a normally open passageway and a bypass having propelling means associated therewith; to provide a conduit or passageway which is normally open and a bypass having circulating means associated therewith and means for closing the conduit when the circulation is through the bypass; and to provide such other advantages and desirable features as will appear more fully from the following description.

In the accompanying drawings illustrating this invention,

Figure 1 is a side view of my improved circulating apparatus;

Figure 2 is a plan view with the motor removed and parts shown in section;

Figure 3 is a sectional plan view taken on the line 3—3 of Figure 1;

Figure 4 is a bottom view with parts broken away;

Figure 5 is a cross section taken on the line 5—5 of Figure 3;

Figure 6 is a section taken on the line 6—6 of Figure 3; and

Figure 7 is a sectional detail showing the valve for the main conduit or passageway in closed position.

My improved device is adapted for use in connection with hot water heating systems and for convenience will be described in this connection, although it may, of course, be used wherever applicable. As shown in the drawings, 8 represents a casting or coupling member having a conduit or passageway 9 therethrough and provided at either end with suitable means for coupling or inserting the same in the return pipe 10, such means in the present instance comprising threaded openings for receiving the correspondingly threaded ends of the pipe. The casting or body portion 8 is provided with a lateral projection or protuberance 11 which serves as a housing for the circulating pump. An inlet passage or port 12 leads from the upstream portion of the conduit 8 to the pump chamber 13, and an outlet passage 14 leads from this chamber toward the downstream portion of the conduit.

A shaft 15 extends downwardly through the pump chamber and engages with a bearing 16 in the bottom plate 17. This shaft passes through a second bearing 18 in the top of the casing which is provided with a packing gland 19, and its upper end has a joint or coupling 20 which is engaged by a coacting coupling member 21 of the shaft of the motor 22, which motor is detachably

mounted on the main casing or housing 8. The shaft 15 is provided with propelling vanes 23 which rotate in the chamber 13, thus providing a centrifugal pump for circulating the water.

The main conduit or connection 8 in the pipe 10 provides for the natural circulation, and the centrifugal pump provides means for forcing the circulation when desired. While in some instances the pump may be driven at a sufficiently high speed to force the circulation with an apparatus as thus far described, it is apparent that in the event of resistance in the pipe 10, to the discharge from the pump, there will be a tendency for a local circulation merely through the pump and passageway 9. In other words the water discharged through the discharge orifice 14 might return to the intake orifice 12 so that there would not be sufficient circulating action for the entire system. In order to overcome such a contingency, I provide means for stopping this return circulation, preferably by means of a valve control in the conduit or passageway 9 between the pump intake and outlet orifice. In the arrangement shown, a valve 24 is pivoted at 25 at one side of the passageway 9 and is adapted to close against a seat 26 in the pipe 8, thereby serving as a check valve to prevent the return of water through this pipe. This valve is, however, yieldingly held in normally open position by any suitable spring actuated device. As shown, an arm 27 is pivoted on a screw 28 secured in a plate 29 which covers the valve opening and is provided with a slot 30 for receiving a pin 31 on the valve 24. A spring 32 tends to swing the arm to hold the valve in open postion, as indicated in Figure 3.

The valve 24 when in open position projects across the outlet from the discharge orifice 14 into the passageway 9 so that it will be acted upon by water passing through such discharge and swung to closed position.

My improved device is arranged so that it may be readily inserted in the piping of a system which has already been installed or may be readily installed in a new system as the pipe or casing 8 may first be connected and then the motor may be attached as the motor and its supporting bracket are readily detachable from the casing or body member. The motor driving means may be removed from the casing while leaving the pump intact which greatly facilitates the repair or replacement of the motor which may be done without taking the casing or apparatus out of the system. The valve 24 will remain in open position when natural circulation occurs or when the pump is stopped. When the pump is started, the water or fluid passing therethrough is discharged against the valve, thereby holding the valve in closed position and thus preventing any local or recirculation of the fluid. A comparatively small amount of current will ordinarily be required for operating the pump, and by means of this apparatus the water or liquid may be readily circulated by means of the pump, either continuously or intermittently, as desired, in order to utilize the largest amount of heat possible, or keeping the water throughout the system at a more or less uniform temperature, as for hot water purposes.

It will also be apparent that changes may be made in the details of construction and in the arrangement of the parts in order to adapt the device for different conditions or for making different sizes, and therefore I do not wish to be limited to the exact construction or arrangement herein shown and described, except as pointed out in the following claims, in which I claim:

1. Circulating apparatus comprising an integral pipe section having a main passage and a bypass therethrough, a centrifugal pump in the bypass having its shaft at right angles to the main passage, a spring pressed valve at the outlet of the bypass adapted to be operated by the discharge from the pump to close the main passage in any position of the bypass relative to the main passage, a motor having its shaft in alignment with and connected to the pump shaft, and a bearing on said pipe section which is engaged by a portion of the motor frame for detachably mounting the motor on said section.

2. A circulating apparatus, comprising a casing having a straight longitudinal passageway therethrough and having a bypass with an inlet from the main passageway and an outlet into the main passageway, said bypass have a pump chamber formed therein, a plate forming the bottom of said chamber, a vertically arranged shaft having its lower end supported in said plate, pump vanes mounted on the shaft and operating in the pump chamber, a bearing for said shaft projecting upwardly from the casing, a packing gland for making a tight closure between the bearing and shaft, a motor detachably secured to said bearing, a detachable coupling between the motor shaft and the first named shaft, a valve pivoted in one side of the main passageway and adapted to close the main passageway, and yielding means tending to hold the valve in open position, the valve being positioned in front of said outlet whereby it will be closed by the liquid when the pump is operated.

3. In a circulating apparatus, the combination of a casing having a main passageway and having a by-pass with an inlet orifice and an outlet orifice opening into the main passageway, a centrifugal pump mounted in the by-pass and adapted to force liquid therethrough, a bearing for the pump shaft extending upwardly from the casing, a motor having a supporting bracket detachably se-

cured to said bearing, a separable connection between the motor shaft and the pump shaft, a valve pivotally mounted at one side of the main passageway and adapted to close against a seat in the main passageway, a recess in the bottom of the casing adjacent to the valve, a plate covering said recess, a screw engaging with said plate, an arm pivotally mounted on the screw, a pin on the valve which engages with a slot in the arm and a spring coacting with the arm and tending to hold the valve in open position.

JOHN T. JANETTE.