

W. T. GRAY.
TWO-STAGE PUMP.
APPLICATION FILED NOV. 22, 1909.

963,756.

Patented July 12, 1910.

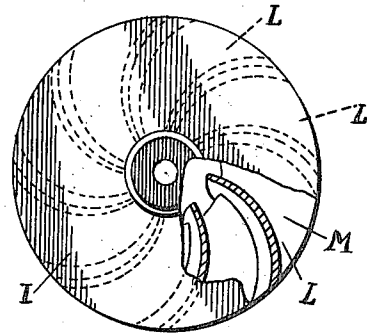
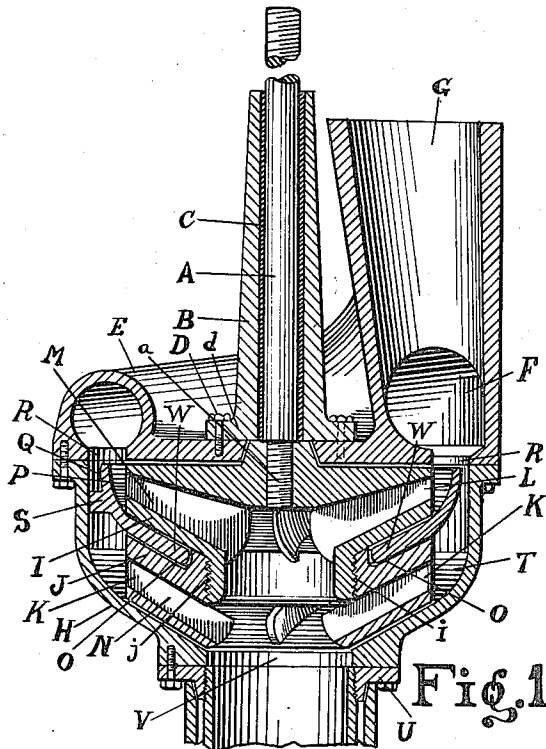


Fig. 2

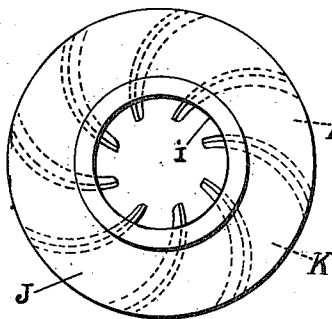


Fig. 3

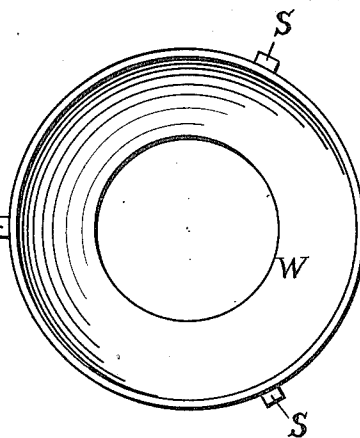


Fig. 4

Witnesses
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UNITED STATES PATENT OFFICE.

WILLIAM T. GRAY, OF EL CAMPO, TEXAS, ASSIGNOR TO EL CAMPO MACHINE COMPANY,
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TWO-STAGE PUMP.

963,756.

Specification of Letters Patent.

Patented July 12, 1910.

Application filed November 22, 1909. Serial No. 529,337.

To all whom it may concern:

Be it known that I, WILLIAM T. GRAY, a citizen of the United States, residing at El Campo, in the county of Wharton and State of Texas, have invented certain new and useful Improvements in Two-Stage Pumps; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to rotary pumps of the double-runner or two story type. Its chief object is to provide for the separate discharge of the water from each runner into a common channel, in order that the flow may be unimpeded, it coming first in a single volume, then being divided into the two independent parts above indicated and again uniting in a single volume without eddies or returning currents or any obstruction of the pump. I also aim to make the several elements of the pump conveniently separable, without lessening its strength and to increase its simplicity and durability.

To these ends my invention consists in the construction and combination of parts hereinafter particularly set forth and claimed.

In the accompanying drawings Figure 1 represents a vertical central section of a pump and attachments embodying my invention; Fig. 2 represents a detail plan view of the upper runner; Fig. 3 represents a similar view of the lower runner; Fig. 4 represents a similar view of the annular saucer shaped partition or deflector.

A designates the lowest section of the pump-shaft, screw-threaded at its upper end for engagement with the next section above it and provided with a reduced screw-threaded lower end *a* for engagement with the rotary double runner or pump.

B designates the pedestal or lowest section of a tubular pump casing, inclosing said shaft and having a Babbitt metal bushing C between them. Said pedestal serves as a bearing box for said shaft and is fastened detachably, through its spread annular foot *d*, by bolts D to the upper section E of a two-part pump casing. This section E is provided with a trumpet form expansion chamber F, communicating with an up-

wardly flaring vertical discharge pipe pedestal G and is fastened in any convenient way upon the lower section H of said casing. This casing and the parts F G above mentioned, also the pump-shaft tubular pedestal, bushing and a rotating pump used in combination with such casing are claimed in my application No. 529,336, hence I do not claim them in this application; and no further description seems necessary. The chief difference in construction of these parts in the present case is in the greater depth of the lower section of the casing to accommodate the two separate runners. These runners are designated respectively I and J, and screwed together in the center by means of screw-threaded parts *i* and *j*. Each of these runners has a series of discharge passages K or L between vanes M or N, said vanes and passages being either strictly radial or preferably of scroll form and spreading laterally toward the discharge end, though growing shallower as shown in Fig. 1. The upper part of lower runner J is recessed on top and near its periphery to form with the proximate face of the upper runner I a pocket O, for the reception of the inclined inner part of an annular approximately bowl-form deflector or partition, the nearly vertical peripheral part of which separates from each other the two independent annular passages P and Q, respectively admitting the water from runners I and J to the curved outlet opening R, through which in a single current or volume it flows to the said expansion chamber and discharge pipe. This deflector is held in place by screwing together the two runners I and J, as stated, to form the double runner or complete rotary pump. Space blocks S are attached to its exterior at intervals and by contact with the inner face of the lower section H of the pump casing keep said deflector braced and in proper form and position, but are not large enough to seriously impede the upward flow from the lower runner J. An annular space T, between the said rotary pump and deflector on one side and said casing section H on the other, receives the discharge from runner J and guides it up to the outer passage Q.

The pump is provided with a downwardly

flaring inlet passage V, supplying both runners with the least degree of obstruction. This inlet passage receives water at the bottom, through an annular flange or collar U, which is bolted to casing H and internally screw-threaded to engage an inlet or suction pipe not shown.

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

1. A rotary pump consisting of two superposed runners, which are screwed together, each being provided with a set of vanes and a set of discharge passages.

2. A rotary pump consisting of two separable superposed runners, each being provided with a set of vanes and a set of passages alternating therewith, the said runners being further provided with a central tapering inlet passage, communicating with the inner ends of all such discharge passages.

3. A rotary double runner pump consisting of two superposed runners discharging peripherally, each runner being complete in itself and having a base plate and a series of vanes distinct from the corresponding parts of the other runner, in combination with a pump-casing surrounding said runners and having an outlet at its top and a partition separating the two volumes of water discharged from the respective runners though permitting these volumes to unite in passing through said casing.

4. A rotary pump consisting of two separable superposed runners, each being provided with a set of vanes and a set of passages alternating therewith, the said runners being further provided with an inlet passage communicating with the inner ends of all such discharge passages.

5. A pump casing and double runner pump turning therein, each runner having a web and blades distinct from those of the other, the said parts being arranged to leave a space between said casing and the periphery of said pump for connecting the discharge passages of the lower runner with an outlet passage above the pump and a partition dividing said outlet passage into two concentric passages and separating the volumes of water discharged by the said runners respectively.

6. A pump casing and double runner pump turning therein, the runners of said pump having a central inlet in common, but provided with independent passages discharging peripherally, in combination with an annular bowl-form partition or deflector carried by said pump and arranged to separate from each other the volumes of water discharged by the said runner, the upper part of said partition being provided with spacing-blocks interposed between it and said casing.

7. In combination with a pump casing, a pump turning therein, composed of two separable superposed runners and a partition held between said runners when they are fastened together and separating the volumes of water discharged by the runners of said pump.

8. A rotary pump, consisting of two runners in vertical series fastened together, one of said runners having an annular recess in its face opposed to the other, in combination with a bowl-form annular partition, the inner part of which fits into said recess and is held between said runners when they are fastened together, said runners being provided with a common central water inlet and having independent series of vanes and passages for discharging peripherally the water received therefrom, said partition being arranged to separate the water discharged by one runner from that discharged by the other runner substantially as set forth.

9. A rotary pump, comprising two superposed runners and a deflector for separating the volumes of water discharged thereby, these three parts being separable, in combination with a casing in which said pump turns and which is provided with a central inlet therefor below, and an outlet above, said pump.

10. A casing consisting of two sections and having the upper one provided with an outlet and a curved passage leading thereto, in combination with a double runner pump turning in said casing, each runner having a web and blades distinct from those of the other runner, said parts being arranged to leave an annular space at the top between said pump and said casing, and a partition turning with said pump, dividing the said annular space into two passages and directing through one of the latter passages the water discharged by one of said runners and through the other passage the water discharged by the other runner substantially as set forth.

11. In combination with a pump casing having an outlet at its top and a central inlet at its bottom, a double runner turning in said casing and a deflector or partition for separating the water discharged by one runner from the water discharged by the other, said partition being annular and approximately of bowl-form and said pump being in two sections constituting detachable runners, one of which has an externally screw-threaded central part turning into a corresponding internally threaded part of the other runner, the lower section being recessed on its upper side to receive the inner part of said bowl-form partition and clamping the same against the upper section, these sections having also in common a central inlet passage and being provided with series of discharge passages and vanes.

12. A rotary pump consisting of a plurality of separable contiguous superposed runners, discharging peripherally at points contiguous to each other separate volumes of
5 water into a common outlet substantially as set forth.

name to this specification in the presence of two subscribing witnesses.

WILLIAM T. GRAY.

Witnesses:

F. M. BRUNS,
GEO. P. WILLIS.

In testimony whereof, I have signed my