No. 895,604. PATENTED AUG. 11, 1908.

S. UDSTAD.

CENTRIFUGAL PUMP.

APPLICATION FILED OCT. 25, 1907.

Fig. 1

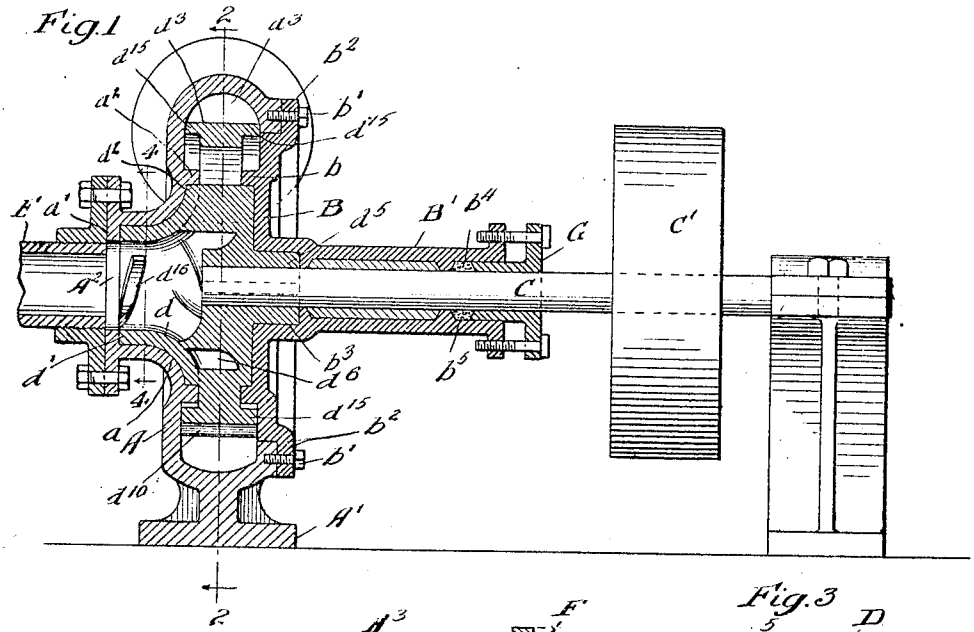


Fig. 2

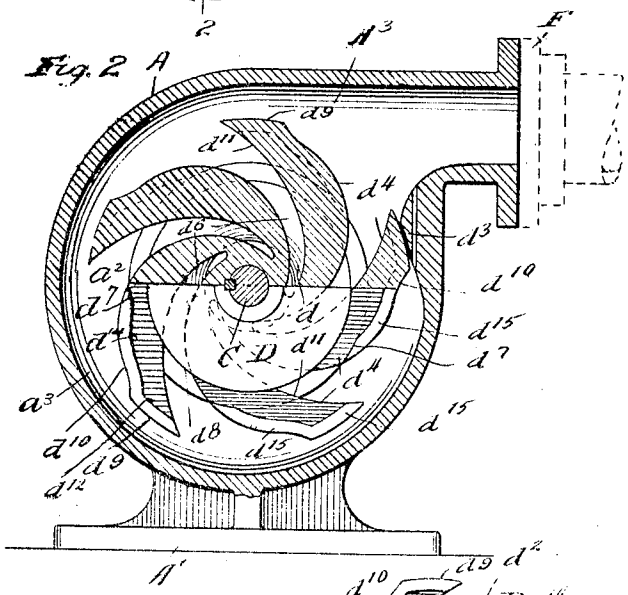


Fig. 3

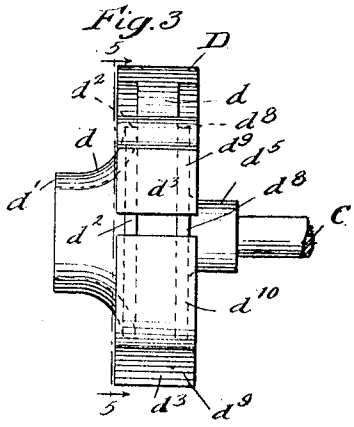


Fig. 4

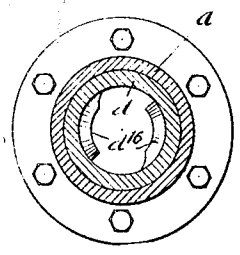
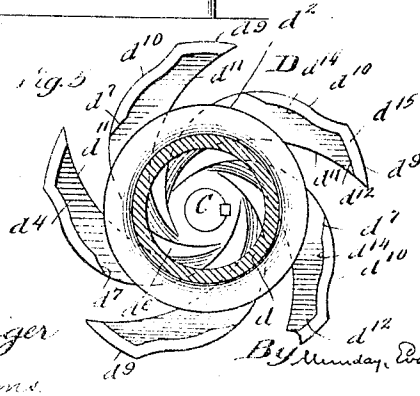


Fig. 5



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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL PUMP.

No. 895,604. Specification of Letters Patent. Patented Aug. 11, 1908.

Application filed October 25, 1907. Serial No. 399,093.

To all whom it may concern:

Be it known that I, SIVERT UDSTAD, a citizen of the United States, residing in Aurora, in the county of Kane and State of Illinois, have invented a new and useful Improvement in Centrifugal Pumps, of which the following is a specification.

My invention relates to centrifugal pumps.

The object of my invention is to provide a centrifugal pump of a simple, strong and durable construction, composed of few parts and which will be more efficient in operation and of greater pumping capacity for its size than the constructions heretofore generally in use.

My invention consists in the means I employ to practically accomplish this object or result. That is to say, it consists in a hollow shell having a central inlet and peripheral outlet for the water, and provided with an enlargement at the inlet throat to receive an inwardly flaring hollow throat on the rotary head or piston of the pump so that the water as it enters may come at once into contact with a rotating part instead of striking the stationary interior surface of the shell, thus diminishing the frictional resistance to the inflowing water; and the shell is further provided with an enlarged annular peripheral chamber to receive the widened or broadened outer or tip portion of the ribs, vanes or wings of the rotary head or piston; said shell being combined with a rotary head or piston provided with an integral central inwardly flaring throat fitting the corresponding throat portion of the shell, and provided with spiral ribs, vanes or wings and intermediate spiral water ways, the ribs, vanes or wings being widened or extended in area at their outer end or tip portions to fit the correspondingly enlarged annular peripheral chambers of the shell; thereby materially increasing the centrifugal action of the rotary head or piston on the water and the efficiency and capacity of the pump as a whole.

My invention further consists in the novel construction of parts and devices and in the novel combinations of parts and devices herein shown and described.

In the accompanying drawing forming a part of this specification, Figure 1 is a central vertical section of a centrifugal pump embodying my invention. Fig. 2 is a section on line 2—2 of Fig. 1. Fig. 3 is a detail elevation of the rotary head or piston. Fig. 4 is a detail section on line 4—4 of Fig. 1. Fig. 5 is a detail section on line 5—5 of Fig. 3.

In the drawing, A represents the shell, the same preferably having an integral base or bed plate A^1; B is the cap or cover of the shell, C the driving shaft and D the rotary head or piston. The shell A has a central inlet A^2 for the water with which the water supply pipe E connects and a peripheral outlet A^3 for its discharge with which the discharge pipe connects. The shell A is provided with an enlarged inwardly flaring throat portion a adjacent to the water inlet opening A^2 to receive the corresponding inwardly flaring hollow throat portion d of the rotary head or piston D. The enlarged throat portion a has an annular shoulder a^1 for the end d^1 of the throat d to fit against, and a further annular rib or shoulder a^2 for the enlarged annular end d^2 of the curved or flaring hollow throat d to fit against. The hollow shell A is also provided with an enlarged annular peripheral chamber a^3 beyond the annular rib or shoulder a^2 to receive the widened end portions d^3 of the spiral ribs, vanes or wings d^4 of the rotary head or piston D.

The cap or cover B of the shell A is provided with an inwardly projecting annular rib or shoulder b corresponding to the annular rib or shoulder a^2 of the shell A, and it is secured to the shell A by bolts or screws b^1 extending through the marginal flange or rim b^2 of the cover. The cover B is further provided with a central cavity b^3 to receive the hub d^5 of the rotary head or piston D, and preferably with an integral stuffing box extension B^1 having a packing chamber b^4 fo fiber or other packing b^5 and stuffing box sleeve G to make a water tight joint with the shaft C. The rotary head or piston D is secured to the driving shaft C and is provided with spiral water ways d^6 formed by the spiral ribs, vanes or wings d^4, these water ways extending from the central hollow throat d and widening and enlarging in capacity to the periphery of the rotary head or piston. The widened or broadened tip portions d^3 of the vanes or wings d have curved shoulders d^7 d^7 which fit the annular ribs or shoulders a^2 and b on the shell A and its cover B. And the rotary head or piston D, on its face adjacent to the cover B, is provided with an annular shoulder d^8 fitting the inner face of the annular rib b of the cover B.

C^1 is the driving pulley on the shaft C.

In operation, the water entering the shell A through the inlet A^2 comes at once into contact with the rotating throat portion d of the head or piston D and by centrifugal action is drawn or thrown by the rotating head or piston D through its spiral water ways outwardly into the annular peripheral chamber a^3 of the shell A and is thence forced out through the peripheral outlet A^3, the enlarged annular chamber a^3 of the shell and the extended area of the end or tip portions d^3 of the wings or vanes d^4 of the rotary head or piston D materially facilitating the flow of the water and increasing the efficiency and operative capacity of the pump.

The widened or broadened tip portions d^3 of the spiral ribs or wings d^4 of the rotary head or piston D preferably have circularly curved extreme outer faces d^9 and double reverse or ogee curve and spirally curved outer faces d^{10}. The inner faces d^{11} of the narrower or contracted portion of the spiral ribs or wings d are preferably concavely curved. The inner faces d^{12} and d^{14} of the flanges d^{15} of the spiral ribs or wings d are preferably curved correspondingly to the curved outer faces before mentioned. The hollow outwardly flaring or curved throat d of the rotary head or piston D is preferably furnished with inwardly projecting segmental spiral ribs d^{16} for the purpose of giving the entering water an initial spiral impulse and thus increase the effective capacity of the pump.

I claim:—

1. In a centrifugal pump, the combination with a shell having an enlarged inwardly flaring central throat and an enlarged annular peripheral chamber, of a rotary head or piston closing one side or face of said shell and having an inwardly flaring central hollow throat and spiral wings furnished with widened end or tip portions projecting partly into said annular peripheral chamber, substantially as specified.

2. In a centrifugal pump, the combination with a shell having an enlarged, annular peripheral chamber, of a rotary head or piston closing one side or face of said shell and having spiral wings widened at their outer ends the outer widened ends of said wings projecting partly into said annular peripheral chamber of the shell, substantially as specified.

3. In a centrifugal pump, the combination with a shell having an inwardly flaring central throat, of a cover for said shell, said shell and cover having oppositely facing annular ribs and an enlarged annular peripheral chamber, and a rotary head or piston closing one side or face of said shell and having spiral wings and waterways and an inwardly flaring hollow throat, said spiral wings having widened or extended tip portions projecting partly into said annular peripheral chamber, substantially as specified.

4. In a centrifugal pump, the combination with a shell having an inwardly flaring central throat, of a cover for said shell, said shell and cover having oppositely facing annular ribs and an enlarged annular peripheral chamber, and a rotary head or piston closing one side or face of said shell and having spiral wings and waterways and an inwardly flaring throat, said spiral wings having widened or extended tip portions projecting partly into said annular peripheral chamber, furnished with shoulders fitting said annular ribs on said shell and cover, substantially as specified.

5. In a centrifugal pump, the combination with a shell, of a cover for the shell, said shell and cover having oppositely facing annular ribs and an enlarged annular chamber, and a rotary head or piston closing one side or face of said shell and having spiral wings furnished with enlarged or widened tips at their ends the outer widened ends of said wings projecting partly into said annular peripheral chamber of the shell, substantially as specified.

6. In a centrifugal pump, the combination with a shell, of a cover for the shell, said shell and cover having oppositely facing annular ribs and an enlarged annular chamber, and a rotary head or piston closing one side or face of said shell and having spiral wings furnished with enlarged or widened tips at their ends the outer widened ends of said wings projecting partly into said annular peripheral chamber of the shell, said rotary head or piston having an inwardly flaring central hollow throat, substantially as specified.

7. In a centrifugal pump, the combination with a shell, of a cover for the shell, said shell and cover having oppositely facing annular ribs and an enlarged annular chamber and a rotary head or piston closing one side or face of said shell and having spiral wings furnished each with curved flanges at their outer portion to widen or broaden them at their outer portion, said widened outer ends of said wings projecting partly into said annular chamber of said shell, substantially as specified.

8. In a centrifugal pump, the combination with a shell, of a cover for the shell, said shell and cover having oppositely facing annular ribs and an enlarged annular chamber and a rotary head or piston closing one side or face of said shell and having spiral wings provided with circularly curved outer faces and convex spiral curved outer faces and concave spirally curved inner faces, and said spiral wings being furnished with integral flanges to widen or broaden them at their outer portions the outer widened ends of said wings projecting partly into said annular peripheral chamber of the shell, substantially as specified.

9. In a centrifugal pump, the combination

with a shell, of a cover for the shell, said shell and cover having oppositely facing annular ribs and an enlarged chamber and a rotary head or piston closing one side or face of said shell and having spiral wings provided with circularly curved outer faces and convex spirally curved outer faces and concave spirally curved inner faces, and said spiral wings being furnished with integral flanges to widen or broaden them at their outer portions the outer widened ends of said wings projecting partly into said annular peripheral chamber of the shell, and said rotary head or piston having an inwardly flaring central hollow throat, substantially as specified.

10. In a centrifugal pump, the combination with a shell, of a cover for the shell, said shell and cover having oppositely facing annular ribs and an enlarged chamber and a rotary head or piston closing one side or face of said shell and having spiral wings provided with circularly curved outer faces and convex spirally curved outer faces and concave spirally curved inner faces, and said spiral wings being furnished with integral flanges to widen or broaden them at their outer portions the outer widened ends of said wings projecting partly into said annular peripheral chamber of the shell, and said rotary head or piston having an inwardly flaring central hollow throat furnished with spiral ribs, substantially as specified.

SIVERT UDSTAD.

Witnesses:
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