No. 877,191. PATENTED JAN. 21, 1908.

N. K. F. HANSON.

CENTRIFUGAL PUMP, BLOWER, AND THE LIKE.

APPLICATION FILED OCT. 21, 1905.

Fig. 1

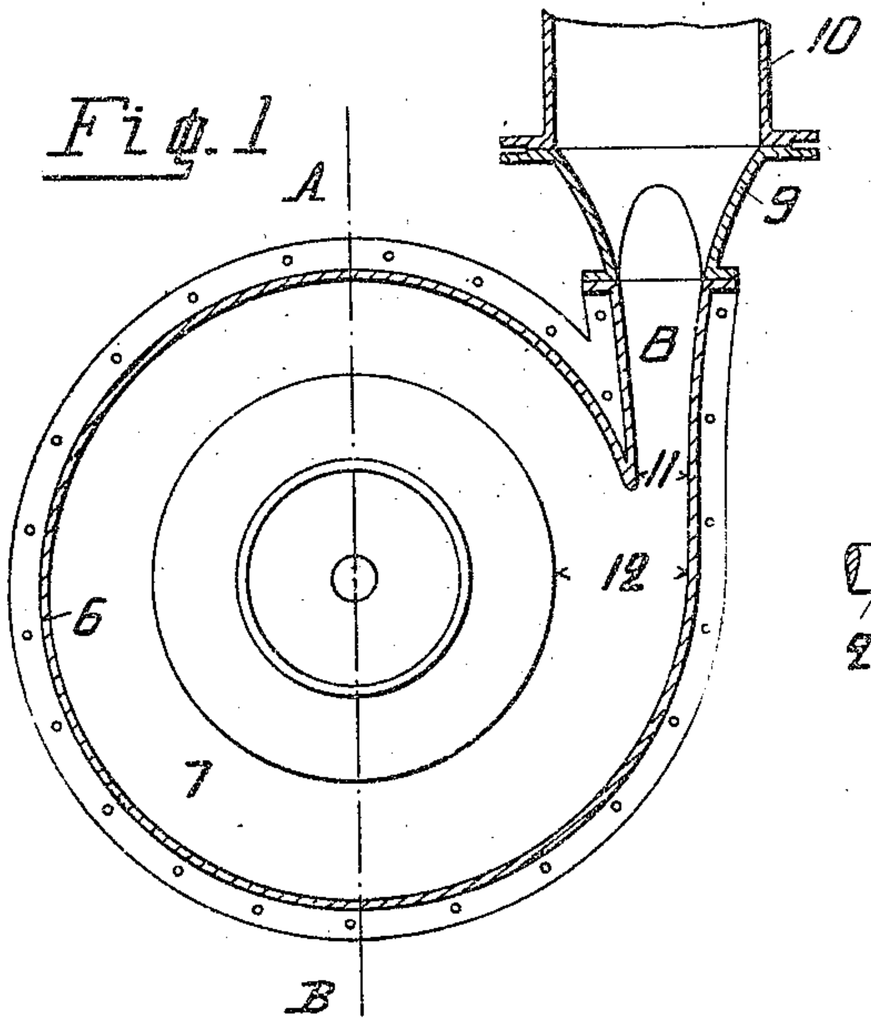


Fig. 2

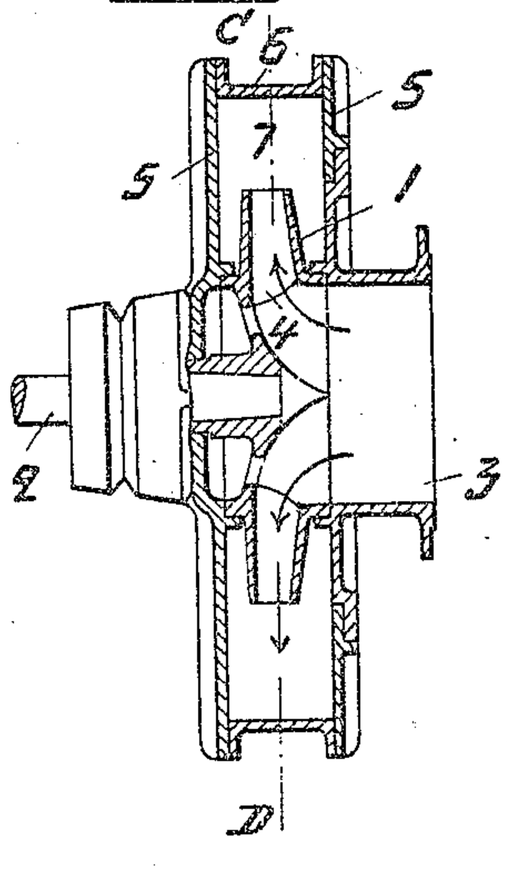


Fig. 3

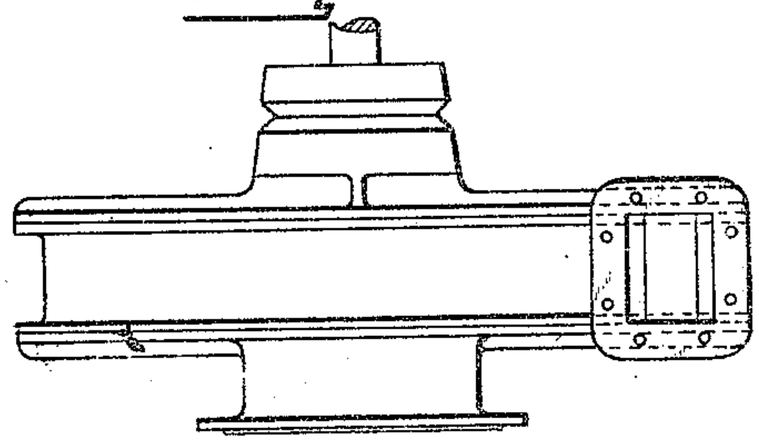
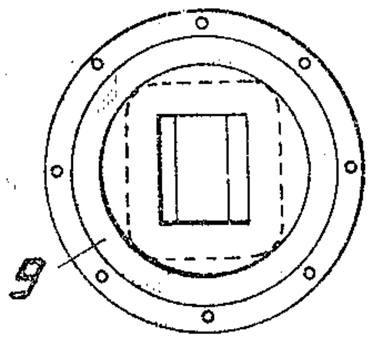


Fig. 4



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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL PUMP, BLOWER, AND THE LIKE.

No. 877,191. Specification of Letters Patent. Patented Jan. 21, 1908.

Application filed October 21, 1905. Serial No. 283,776.

To all whom it may concern:

Be it known that I, NILS KNUT FREDRIK HANSON, a subject of the King of Sweden, and resident of Svanö, Fränö, in the Kingdom of Sweden, have invented certain new and useful Improvements in Centrifugal Pumps, Blowers, and the Like, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to improvements in centrifugal pumps, blowers and the like, in which the fluid or substance moves from the wheel in a passage following the circumference of the said wheel in order to obtain an effect whereby the fluid or substance has the same or approximately the same rapidity in the said passage as the circumference of the wheel has, or, in other words, whereby the rapidity that the fluid has obtained from the wheel is approximately maintained and is thus not transformed into pressure. The rapidity of the fluid in the passage being dependent on the area in cross-section of the latter for a certain amount of fluid, the desired effect is accomplished by reducing said passage. A reduction of the cross-section of the passage entails, however, so great a friction that the effect in this way is less, instead of higher.

The present invention, therefore, has for its object to attain the desired result in another way consisting in increasing the axial width of the passage equally or nearly equally at both sides of the wheel so that the axial width of the passage is greater than the axial width of the wheel at the periphery thereof, further in that the said difference in measure is constant or nearly constant in radial direction all the way to the outer circumference of the passage, and, further, in that the outlet opening of the passage is made considerably less than the passage, regarding the measure of the latter between the outer edge of the wheel and the outer side of the passage measured in the plane of the wheel near the outlet opening. With this construction the mass of fluid will form, in the passage, a body of revolution having a broad outer side, from which body a layer lying next to the said outer side and, thus, having a very great rapidity continuously streams into the outlet passage while the remainder continues and makes a new revolution about the wheel. In this manner any lateral or radial pressure of the fluid as it flows out from the wheel is avoided, and the friction is reduced to the least possible.

With reference to the drawing Figure 1 is a section, on line C—D of Fig. 2, of a pump constructed according to this invention. Fig. 2 is a section on line A—B of Fig. 1. Fig. 3 shows the pump from above. Fig. 4 is an extension piece to be inserted in the conduit between the tube 10 and the pump.

The parts forming the pump are the impeller wheel 1 attached to the shaft 2, said wheel being located co-axially with the wide inlet passage 3 to which it fits closely with one side having a central opening in order to allow the fluid to reach and enter between the impellers 4. The latter may be of any known construction. The wheel is inclosed by the pump casing consisting of the two plane sides 5, 5 and the outer wall 6 bent in the form of a spiral and forming together with the sides 5, 5 a channel or passage 7. The wall 6 is in one piece with the sides of the outlet passage 8. Attached to the latter is a short pipe 9 having at one end a quadrangular cross-section corresponding to that of the passage 8 but entering into a round shape next to the opposite end to fit to the pipe or conduit 10.

As shown in Fig. 2, the axial width of the passage 7 is considerably greater than the axial width of the wheel 1 at its periphery, the overplus being equally divided on both sides of the wheel, so that the latter is to a great extent inclosed or surrounded by the passage. The straight shape of the wall 6 in the direction of the wheel shaft and the plane shape of the sides 5, 5 have the effect that the fluid has good room or, in other words, that the cross-section, if the fluid is thought to be divided in equally thick layers parallel to the wall 6, is equally great in the layer next to the said wall as in the layer next to the circumference of the wheel. Further it is seen in Fig. 1 that the radial measure of the passage 7 is relatively great and increases towards the outlet opening and that the latter, that is situated next to the wall 6, has considerably less cross-section 11 than the passage 7 concerning the measure ½ of the latter between the wall 6 and the circumference of the wheel near the opening, the measure being taken in both cases in the plane of the wheel. In axial direction both have the same measure. The cross-sectional area of the quadrangular opening leading to

the passage 8 is thus considerably less than the cross-sectional area of the likewise quadrangular passage 7, so that a considerable, likewise quadrangular opening remains between the side of the outlet opening next to the wheel and the circumference of the wheel. This entails, as before mentioned, that the fluid spread on the wall 6 obtains a rapidity in tangential direction that is equal to the rapidity of the fluid in tangential direction away from the wheel, due to the small cross-sectional area of the outlet opening and, in consequence thereof, to the fact that the fluid makes more than one revolution about the wheel. The difference or the increased length of way, that may seem to involve a loss of work, is outweighed by the diminished resistance, so that the effect, nevertheless, is greater than in a pump or turbine of the kind hitherto employed. On account of the great width of the passage the friction will also be very little.

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

1. In a centrifugal pump, or the like, the combination of a case or body provided with inlet and outlet passages, an impeller or runner wheel equi-distant from the sides of the case, a water space concentric with said wheel and inclosing the same, and a spiral water space eccentric to said wheel and to the water space concentric therewith, the outlet passage from the case or body being less in cross sectional area than the cross sectional area of the chamber in which the wheel rotates but equal to the effective cross sectional area of the fluid emerging from the periphery of the wheel, and said case or body being rectangular in cross section in a plane parallel with the axis of the impeller or runner wheel.

2. In a centrifugal pump, or the like, the combination of a case or body provided with inlet and outlet passages, an impeller or runner wheel equi-distant from the sides of the case, a water space concentric with said wheel and inclosing the same, and a spiral water space eccentric to said wheel and to the water space concentric therewith, the outlet passage from the case or body being less in cross sectional area than the cross sectional area of the chamber in which the wheel rotates but equal to the effective cross sectional area of the fluid emerging from the periphery of the wheel, the said spiral water space being also rectangular in cross section.

In witness whereof I have hereunto signed my name this 3d day of October 1905, in the presence of two subscribing witnesses.

NILS KNUT FREDRIK HANSON.

Witnesses:

CARL FRIBERG,

ROBERT APELGREN.