

Jan. 28, 1930.

G. L. FERGUSON

1,744,757

METHOD OF MAKING IMPELLERS

Filed Jan. 25, 1928

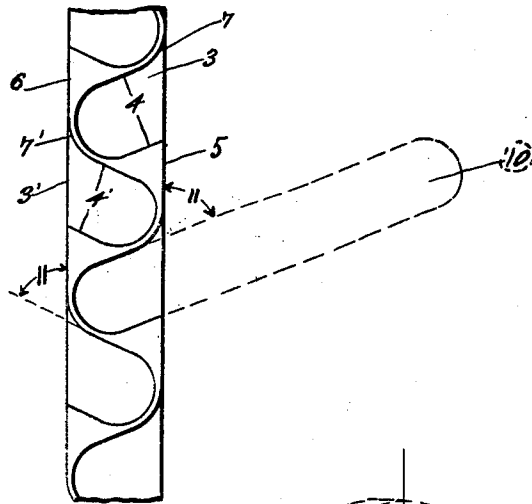


Fig. 2

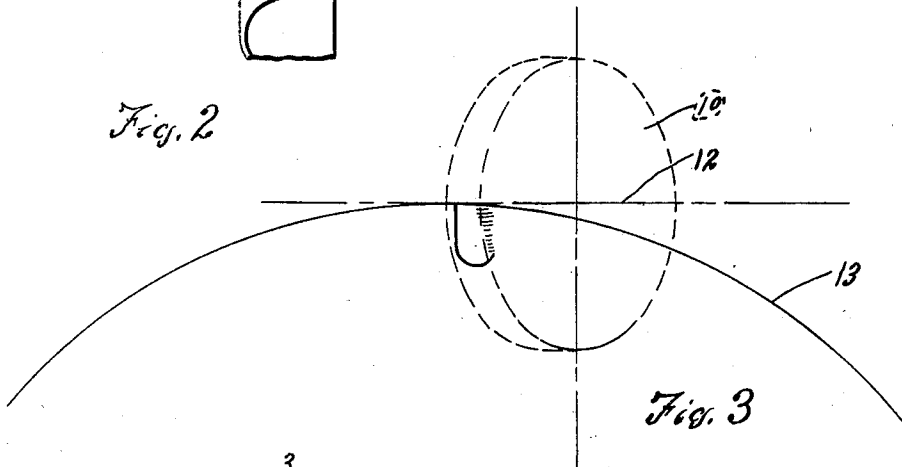


Fig. 3

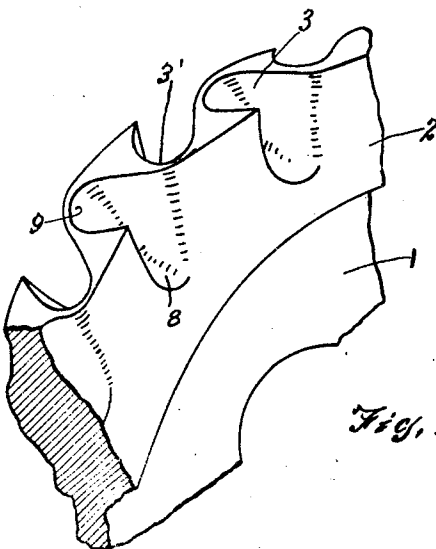


Fig. 1

INVENTOR.

Gale L. Ferguson

BY

Day, Oberlin & Day

ATTORNEYS.

## UNITED STATES PATENT OFFICE

GALE L. FERGUSON, OF CLEVELAND, OHIO, ASSIGNOR, BY MESNE ASSIGNMENTS, TO  
AUTO PRIME PUMP COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO

## METHOD OF MAKING IMPELLERS

Application filed January 25, 1928. Serial No. 249,343.

The present invention relates, as indicated, to an impeller for rotary pumps, and more particularly to an improved impeller of the type disclosed in my copending application  
5 Serial No. 174,251, filed March 10, 1927. The primary object of the invention is to provide an impeller of the class described which will be more efficient in its operation than other types of impellers and which will provide a  
10 higher pressure or suction for a given size without a corresponding increase in power consumption. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully  
15 described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed  
20 means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a perspective view of a fragment  
25 of an impeller of improved design; Fig. 2 is a plan view of said fragment; and Fig. 3 is a diagrammatic representation of the impeller blank and cutter during one step in the process of manufacturing the same.

Referring more particularly to the drawings, the reference numeral 1 indicates an  
30 impeller having a thickened peripheral portion 2. In the portion 2 buckets 3 and 3' are formed, said buckets opening through opposite sides of the impeller. It will be noted  
35 that alternate buckets open through opposite sides of the impeller at staggered points.

As is clearly shown in Fig. 2, the side walls  
4 of the buckets 3 meet the plane of the face  
40 5 of the impeller at the same acute angle, while the side walls 4' of the buckets 3' meet the plane of the opposite face 6 at the same acute angle. The front corners 7 of the buckets 3 and the front corners 7' of the  
45 buckets 3' are rounded as is clearly shown in Fig. 2. It will further be noted that the bottom wall 8 and the back wall 9 of each bucket form together a continuous arc of a circle.

The above described design for an impeller  
50 has been found materially to increase the effi-

ciency thereof. The impeller is adapted to rotate in a clockwise direction as seen in Fig. 1 between a pair of impeller rings such as are disclosed in my copending application  
55 hereinbefore identified, the thickened portion 2 of the impeller being received in a channel formed by said rings. The round corners 7 and 7' permit the fluid in the channel to enter the buckets without such swirling as would  
60 be caused by sharp corners, and the fact that the buckets are inclined rearwardly from their outer to their inner ends obviously increases the scooping effect of said buckets. The fluid is discharged peripherally from the  
65 impeller, and it will be apparent that the smooth curve formed by the walls 8 and 9 of the buckets increases the centrifugal throw of the impeller exerted upon the fluid.

In the manufacture of the impeller, a rotating disk-like cutter 10 is forced into the  
70 impeller blank, the plane of the cutter forming an acute angle 11 with the face of the impeller blank. During the cut, the horizontal diameter 12 of the cutter 10 is held in tangential relation with the periphery 13 of  
75 the impeller blank. Because of this particular setting of the cutter 10 with respect to the impeller blank, the upper end of the rear wall 9 forms a right angle with the peripheral plane of the impeller so that the fluid is  
80 thrown outwardly along a line exactly perpendicular to the peripheral surface of the impeller. The cutting operation is repeated at equally spaced points about the periphery  
85 of the impeller until the required number of buckets 3 have been formed. Then the impeller is reversed, and the cutter is forced into the face 6 thereof to form the buckets 3'.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards  
90 the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:

1. In a method of manufacturing a rotary pump impeller, the step which consists in forcing a disk-like cutter into one plane face  
100

of an impeller blank, the plane of said cutter forming an acute angle with said blank face during the cutting, but a vertical line in a face of said cutter being parallel to said blank face.

2. In a method of manufacturing a rotary pump impeller, the step which consists in forcing a disk-like cutter into one face of an impeller blank, the plane of said cutter forming an acute angle with a plane face of said impeller blank during the cutting.

3. In a method of manufacturing a rotary pump impeller, the steps which consist in forcing a disk-like cutter into one face of an impeller blank at equally spaced points about the rim of said blank, the plane of said cutter forming the same acute angle with a plane face of said impeller blank during all the cutting.

4. In a method of manufacturing a rotary pump impeller, the steps which consist in forcing a disk-like cutter into one face of an impeller blank, the plane of said cutting forming an acute angle with said face during the cutting, and forcing a disk-like cutter into the opposite face of said blank at a point slightly spaced from the point of entry of said first cut, the plane of said cutter forming the same acute angle with said opposite face during the cutting.

5. In a method of manufacturing a rotary pump impeller, the steps which consist in forcing a disk-like cutter into one face of an impeller blank at equally spaced points about the rim of said blank, the plane of said cutter forming the same acute angle with said face during all the cutting, and forcing a disk-like cutter into the opposite face of said blank at points spaced apart a like distance, but staggered with respect to said first points, said cutter forming the same acute angle with said opposite face during all the cutting.

6. In a method of manufacturing a rotary pump impeller, the step which consists in forcing a disk-like cutter into one face of an impeller blank, the plane of said cutter forming an acute angle with said face during the cutting, and a diameter of said cutter being held tangential with respect to the periphery of said blank.

7. In a method of manufacturing a rotary pump impeller, the steps which consist in forcing a disk-like cutter into one face of an impeller blank at equally spaced points about the rim of said blank, the plane of said cutter forming the same acute angle with said face during all the cutting, and forcing a disk-like cutter into the opposite face of said blank at points spaced apart a like distance, but staggered with respect to said first points, said cutter forming the same acute angle with said opposite face during all the cutting, and the horizontal diameter of said cutter being held tangential with respect to the pe-

riphery of said blank at all times during the completion of the above steps.

Signed by me this 23rd day of January, 1928.

GALE L. FERGUSON.

70

75

80

85

90

95

100

105

110

115

120

125

130