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W. B. ENSIGN

BLADE AND SHOE FOR ROTARY PUMPS

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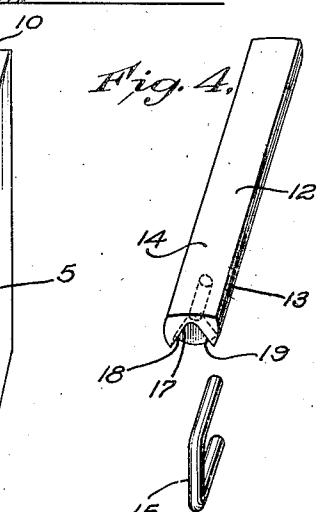
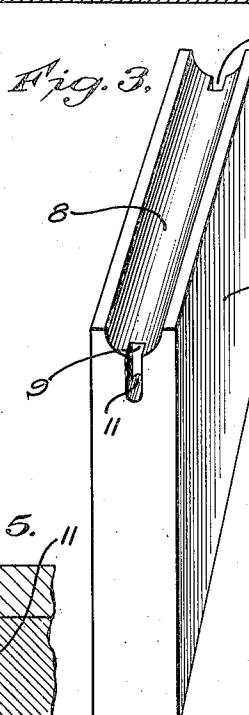
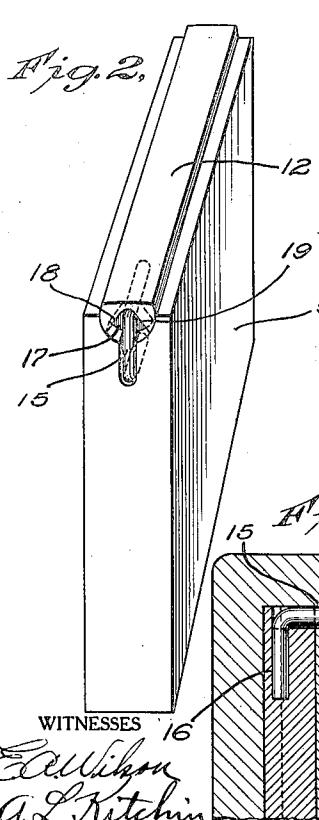
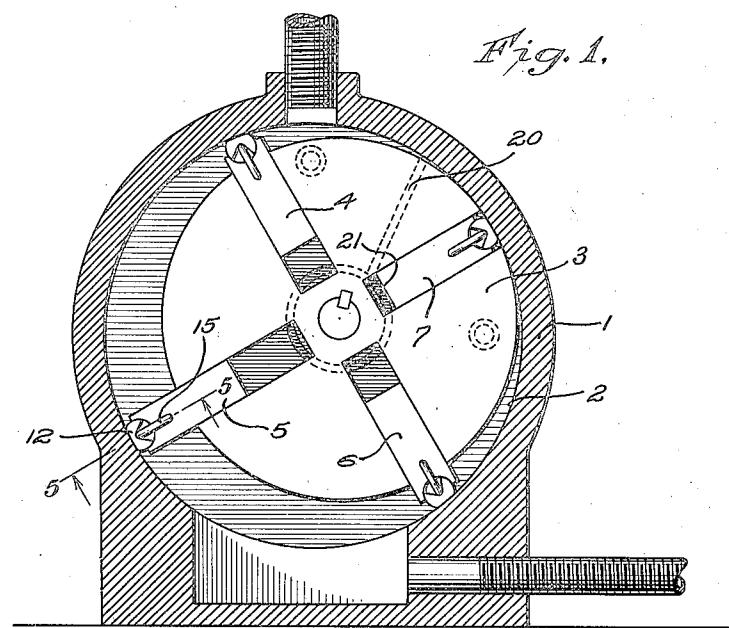


Fig. 5.

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UNITED STATES PATENT OFFICE.

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BLADE AND SHOE FOR ROTARY PUMPS.

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To all whom it may concern:

Be it known that I, WILLIAM B. ENSIGN, a citizen of the United States, and a resident of the city of New York, borough of the Bronx, in the county of Bronx and State of New York, have invented a new and Improved Blade and Shoe for Rotary Pumps, of which the following is a full, clear, and exact description.

10 This invention relates to rotary pumps and particularly to an improved blade and shoe therefor and has for an object to provide a construction wherein the parts are so formed and positioned that high efficiency 15 is secured and very little noise produced.

Another object of the invention is to provide a blade and shoe wherein the shoe is allowed to rock as the blade moves whereby it will always engage flatwise the surface of 20 the pump casing.

A still further object of the invention is to provide a rockable shoe for rotary pump blades wherein the shoe is limited to fixed 25 rocking movement and is at all times held in contact with the blade.

A further object of the invention is to provide a rockable shoe for rotary pump blades wherein the shoe automatically seals 30 itself at all times without regard to the angle in which it may be moved.

In the accompanying drawing—

Figure 1 is a vertical sectional view through a rotary pump showing blades and shoes embodying the invention.

35 Figure 2 is a perspective view of one of the complete blades and shoes shown in Figure 1.

Figure 3 is a perspective view of one of the blades shown in Figure 1 with the shoe 40 removed.

Figure 4 is a perspective view of one of the shoes shown in Figure 1 and a holding member therefor.

45 Figure 5 is an enlarged detail fragmentary sectional view through Figure 1 on line 5—5.

50 Referring to the accompanying drawing by numerals, 1 indicates a casing or pump which may be of any desired kind having a circular inner surface 2. Arranged in the casing 1 is a rotary piston 3 which carries the various blades 4, 5, 6 and 7, said blades being of identical construction so that the description of one will apply to all.

55 As indicated in Figures 2 and 3, the blade

5 is substantially rectangular in general formation and along the outer edge is provided with a groove 8 extending the full length of the blade. Merging into this groove are notches 9 and 10, which at their inner ends merge into bores 11. Co-acting with the blade 5 and particularly with the grooved part 8 is a shoe 12 which is provided with an arc-shaped inner surface 13 conforming to the arc of the groove 8 which is substantially semicircle and a contact surface 14 formed on the same arc as the surface 2 so as to fit flatwise against the same when in operation. The shoe 12 is of the same length as the blade 5 and is held 70 in place by a pair of U-shaped pins 15 positioned as shown in Figure 5, namely, with one end of the bore 11 and the opposite end in the bore 16 of shoe 12 and the connecting body in the notch 9 or 10 as the case may be. The shoe 12 at each end is provided with a notch or cut-away portion 17, the walls 18 and 19 thereof being at the desired angle for limiting the rocking movement of the shoe 12 as said walls strike the body of 75 the U-shaped member 15. The various blades 4, 5, 6 and 7 may be held in the outer position by any suitable means, as for instance, the pressure derived from the motor itself, the compressed matter being 80 forced through the groove 20 and from thence to the annular groove 21 into the space back of the various blades. In this way, the shoes are all held in contact with surface 12 but when the pump is stopped the blades are 85 entirely loose and if in a certain position will move under the action of gravity towards the center of the piston 3. For this reason it is necessary to have means provided for holding the shoe 12 always in operative position so that when the pump is again started the contact surface 14 will properly engage the surface 2. In forming the blades 4 to 7 inclusive and also the various shoes 12, the same may be constructed 90 of any desired material but preferably both the blades and shoes are made from metal. The various shoes 2 are of the same length as the blades and are integral throughout so that there will be an even rocking action as the blades function. From Figures 1 and 2 it will be observed that the arc-shaped inner surface of the shoe is so formed 95 that an appreciable portion of part of this surface is always in contact with the blade 100 105 110

in groove 8 even when the shoe is tilted to its extreme position as allowed by the walls 18 and 19.

What I claim is:—

5. 1. A blade and shoe for rotary pumps, comprising a blade body, a rockable contact shoe arranged along one edge of the body, said shoe having a notch in each end and a bore extending inwardly from each of said 10 notches, said blade having a notch at each end and a bore extending inwardly from one part of the respective notches, and a U-shaped holding member at each end of the blade for holding the contact shoe in place, 15 said holding members having the legs thereof extending into said bores with part of the body fitting into the respective notches whereby the shoe may rock within certain fixed limits and yet be held in engagement 20 with the blade body.

2. In a rotary pump, a blade and a shoe therefor, said shoe having an outer contact surface conforming to the arc of the pump casing, an inner surface on a different arc, and a pair of U-shaped members 25 for holding said shoe in place on the blade, said U-shaped members being countersunk.

3. In a blade and shoe for rotary pumps, a blade body and a shoe therefor having a 30 contact surface of a given arc and the remaining surface of a different arc, said shoe having a notch at each end merging into a bore, and means fitting into said notches and said bores for holding the shoe in place 35 while permitting a limited rocking movement of the shoe.

4. A blade and shoe for rotary pumps,

comprising a blade body having a notch in each end near one edge, each of said notches at their inner ends merging into longitudinally positioned bores, a shoe mounted on the edge of said blade body, said shoe having a notch at each end, each of said notches merging into a longitudinally positioned bore, and a U-shaped member fitting into 45 said bores with part of the body fitting into said notches, the notches on the shoe being appreciably larger than the body of the U-shaped member whereby the shoe may have a limited rocking movement. 50

5. A blade and shoe for rotary pumps, comprising a blade body having a longitudinally positioned groove in one edge extending from one edge to the other, a notch at each end merging into said groove, each of 55 said notches at the end opposite the groove being provided with a bore extending longitudinally of the blade body, a shoe having an arc-shaped surface fitting into said groove and conforming to the shape thereof, 60 said shoe having a contact surface of a different arc, said shoe also being formed with a notch at each end, each of said notches at their upper parts merging into longitudinally positioned bores, said notches being appreciably wider than the notches in the 65 blade, and a U-shaped member at each end of the blade positioned with their respective legs in the respective bores and the connecting body in said notches whereby the 70 blade is permitted to rock within certain limits.

WILLIAM B. ENSIGN.