No. 812,688. PATENTED FEB. 13, 1906.

J. SHARP.

ROTARY EXHAUSTER.

APPLICATION FILED MAR. 10, 1905.

3 SHEETS—SHEET 1.

FIG. 1.

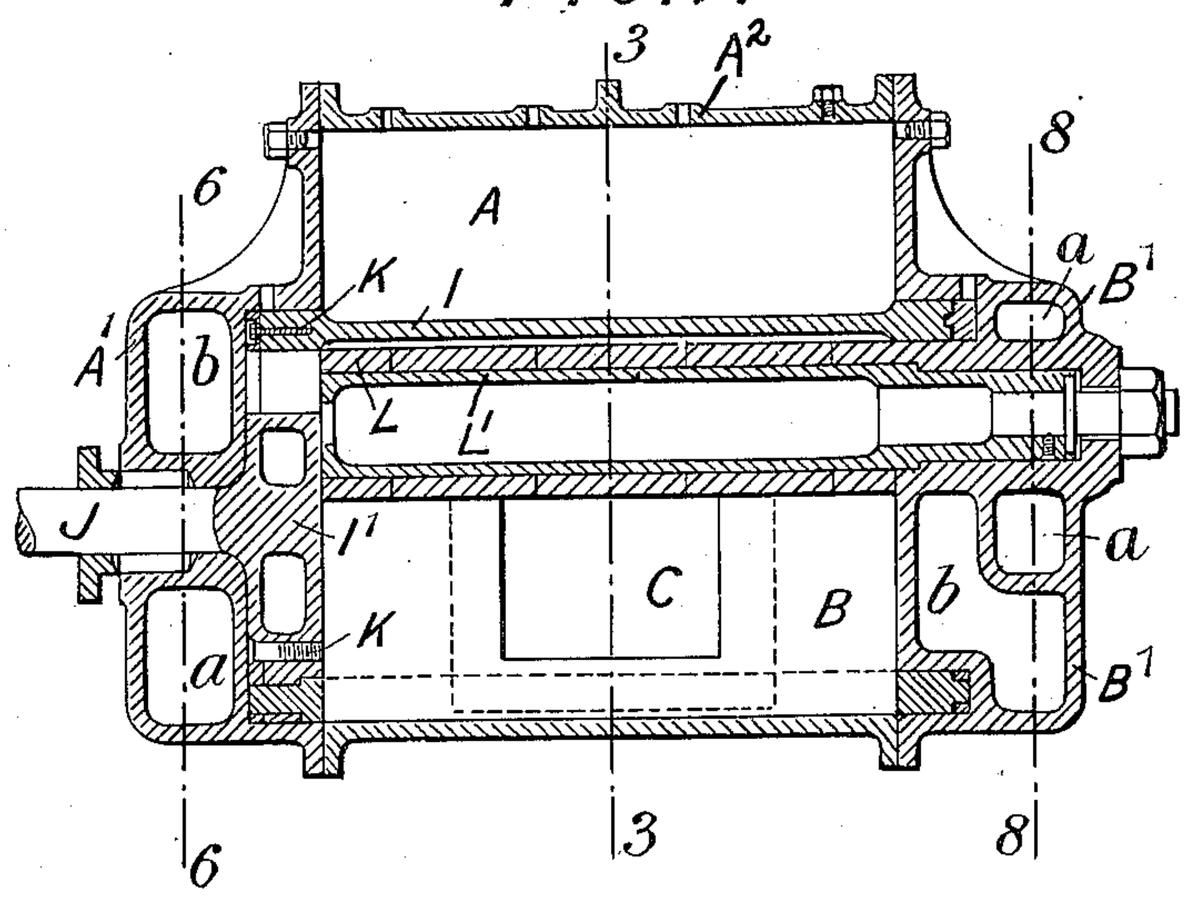
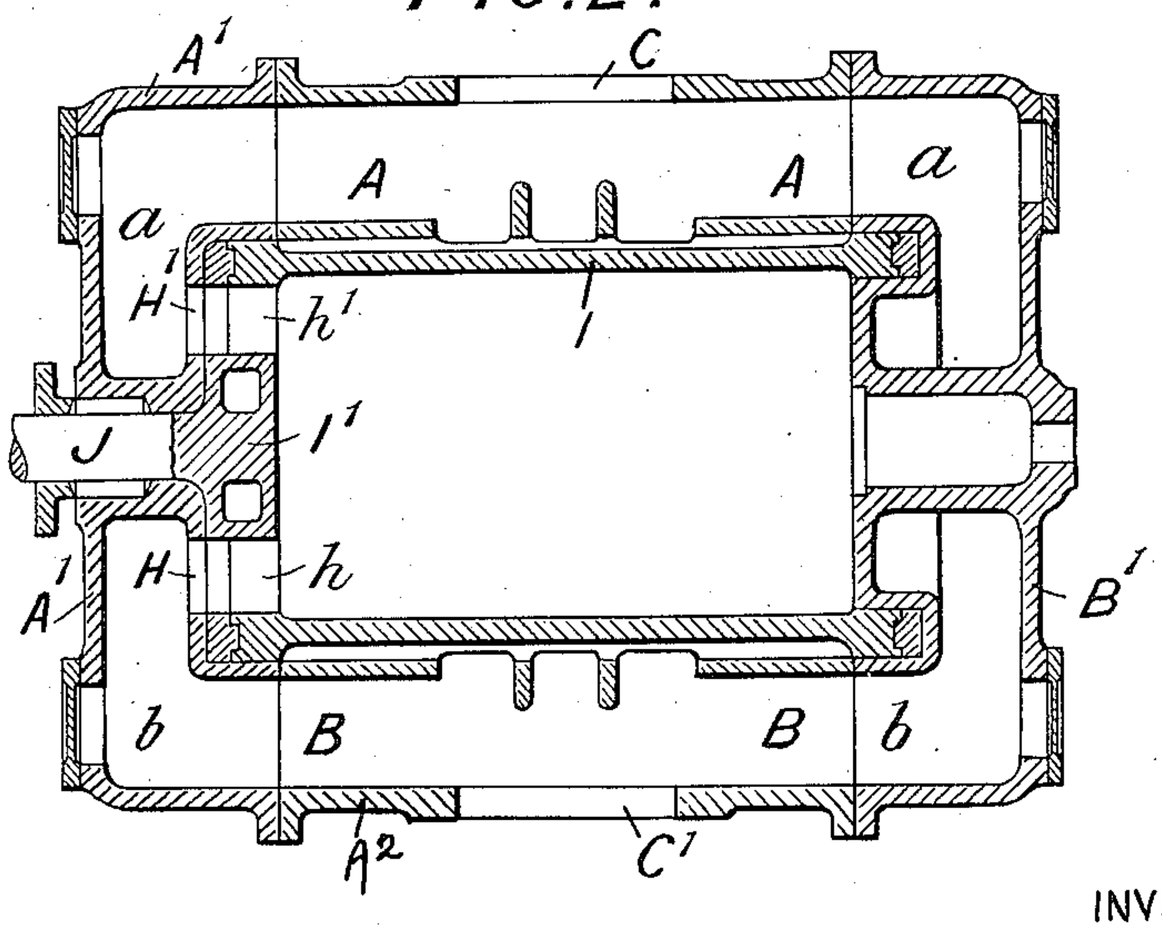


FIG. 2.



WITNESSES

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3 SHEETS—SHEET 2.

FIG. 3.

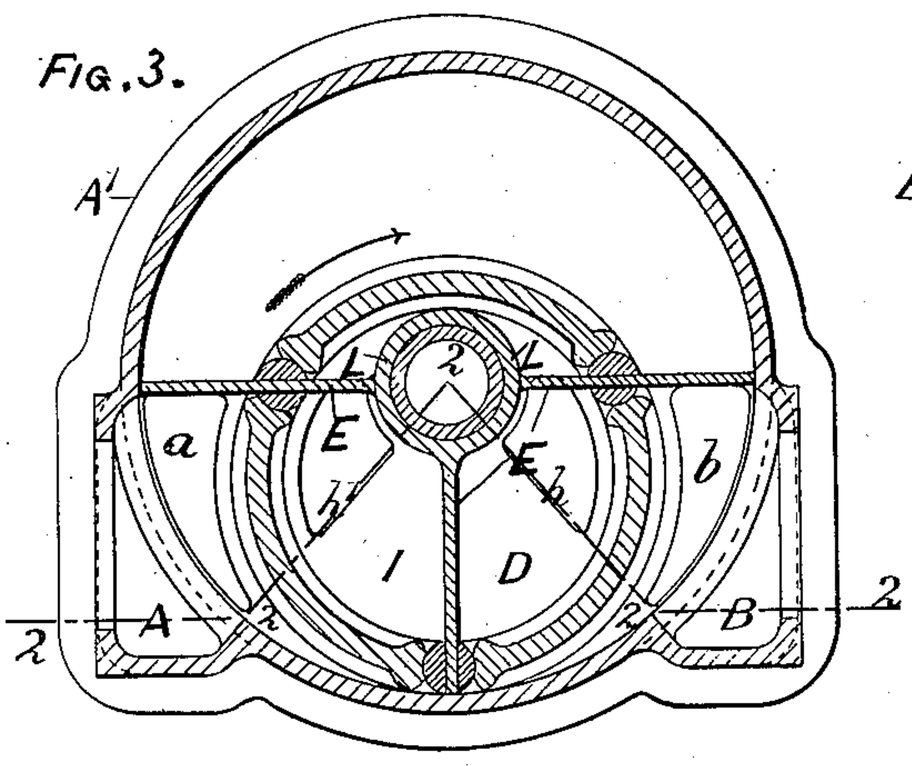


FIG. 4.

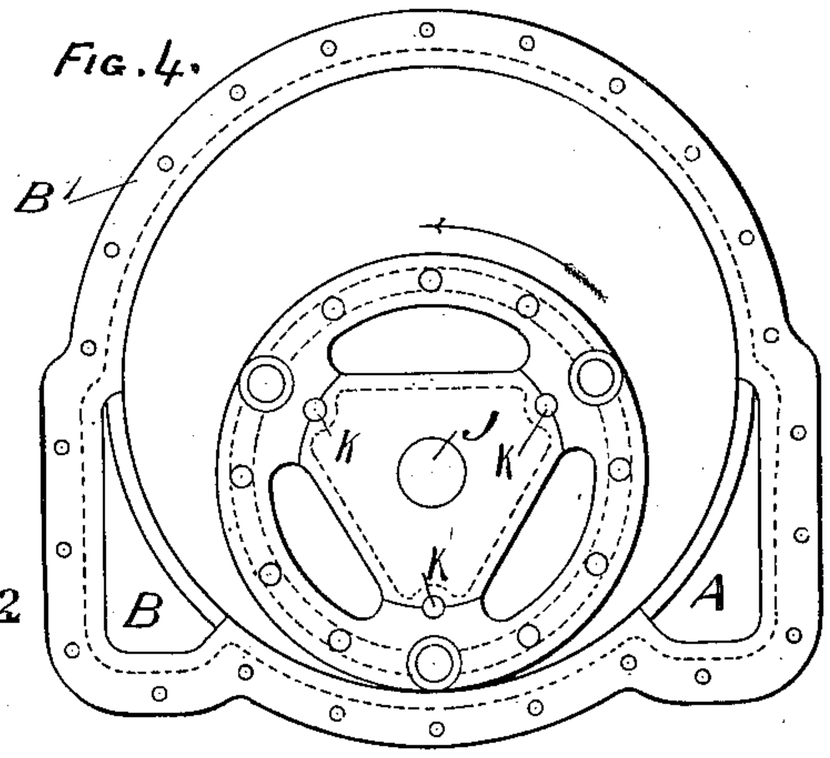


FIG. 5.

FIG. 6.

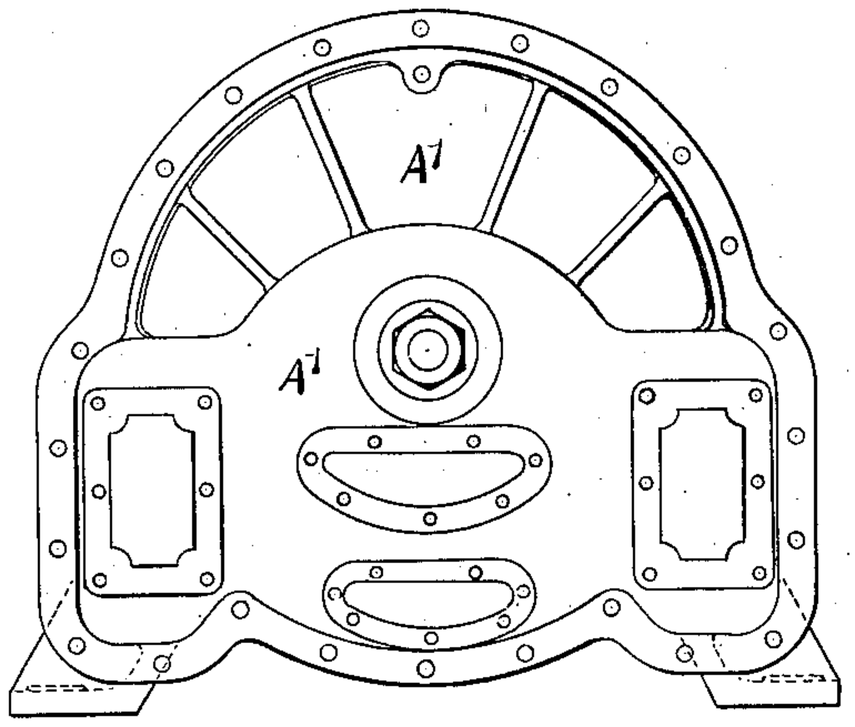
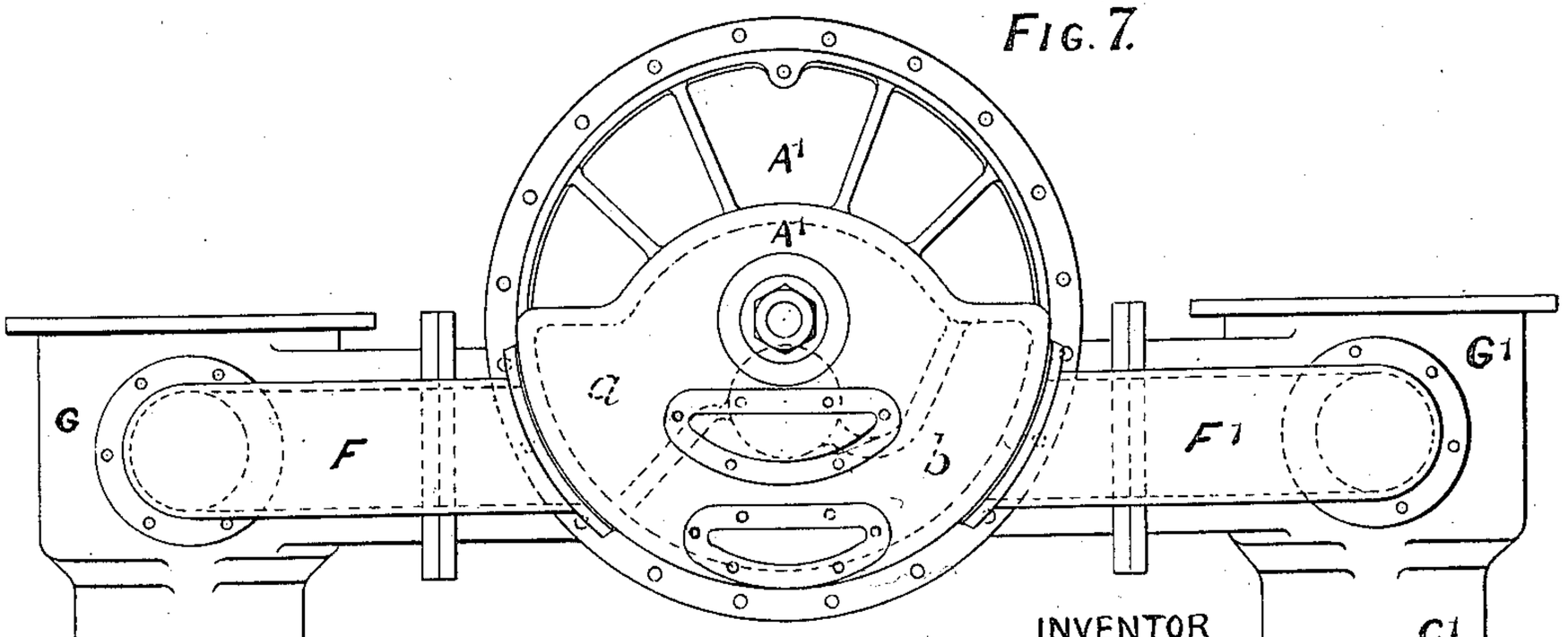


FIG. 7.



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3 SHEETS—SHEET 3.

FIG. 8.

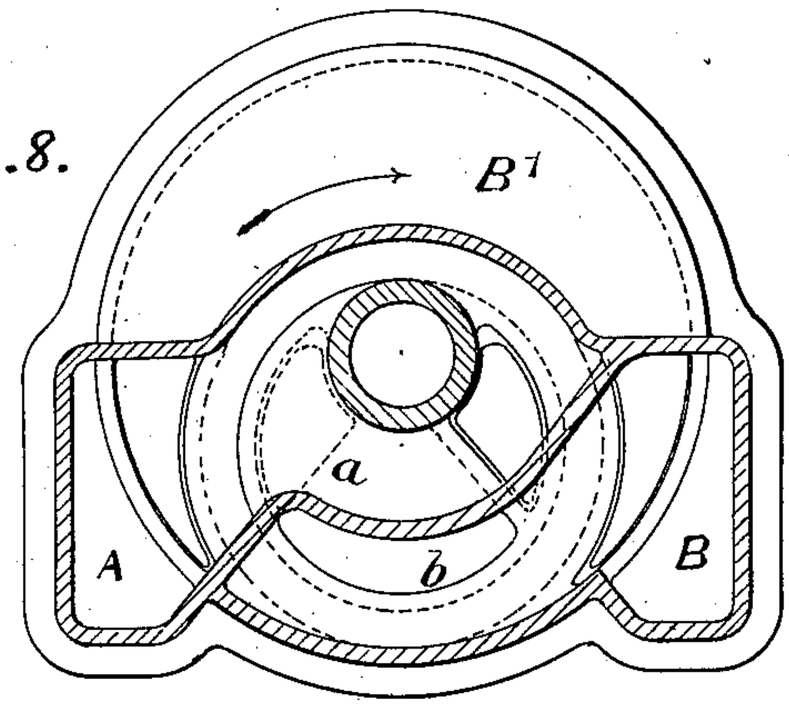


FIG. 9.

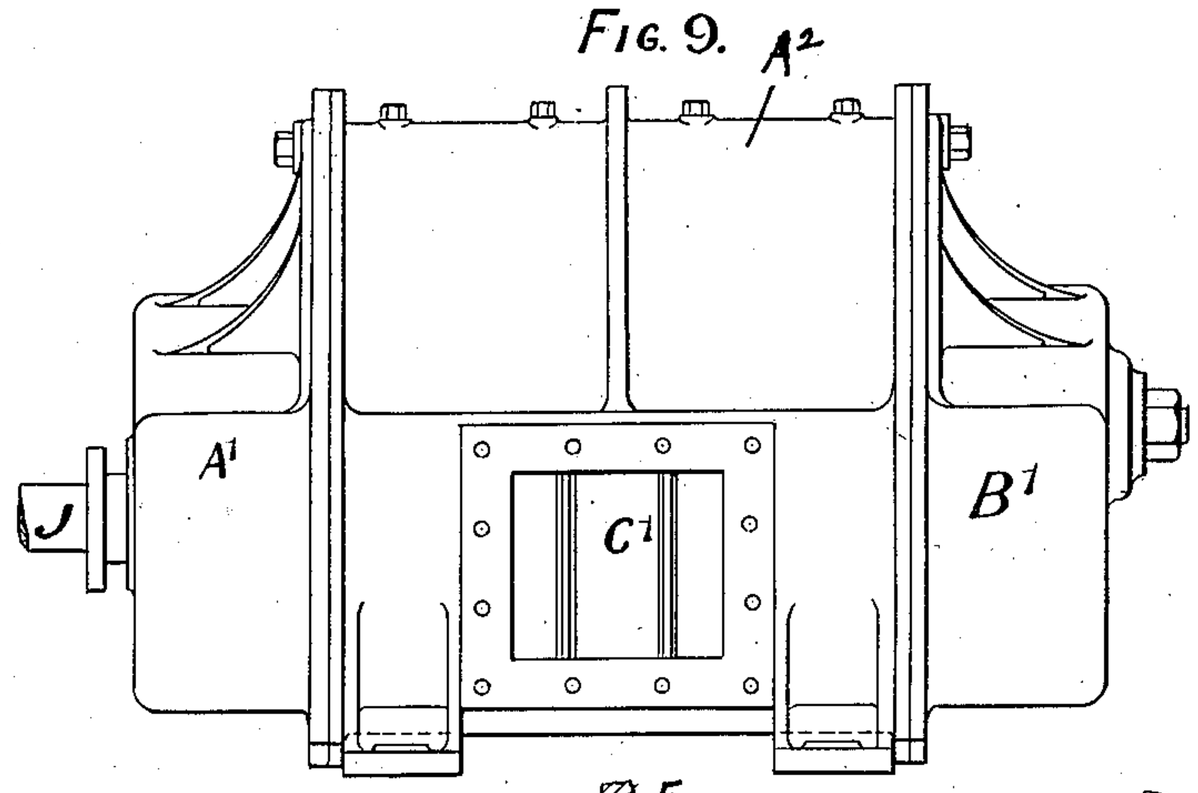
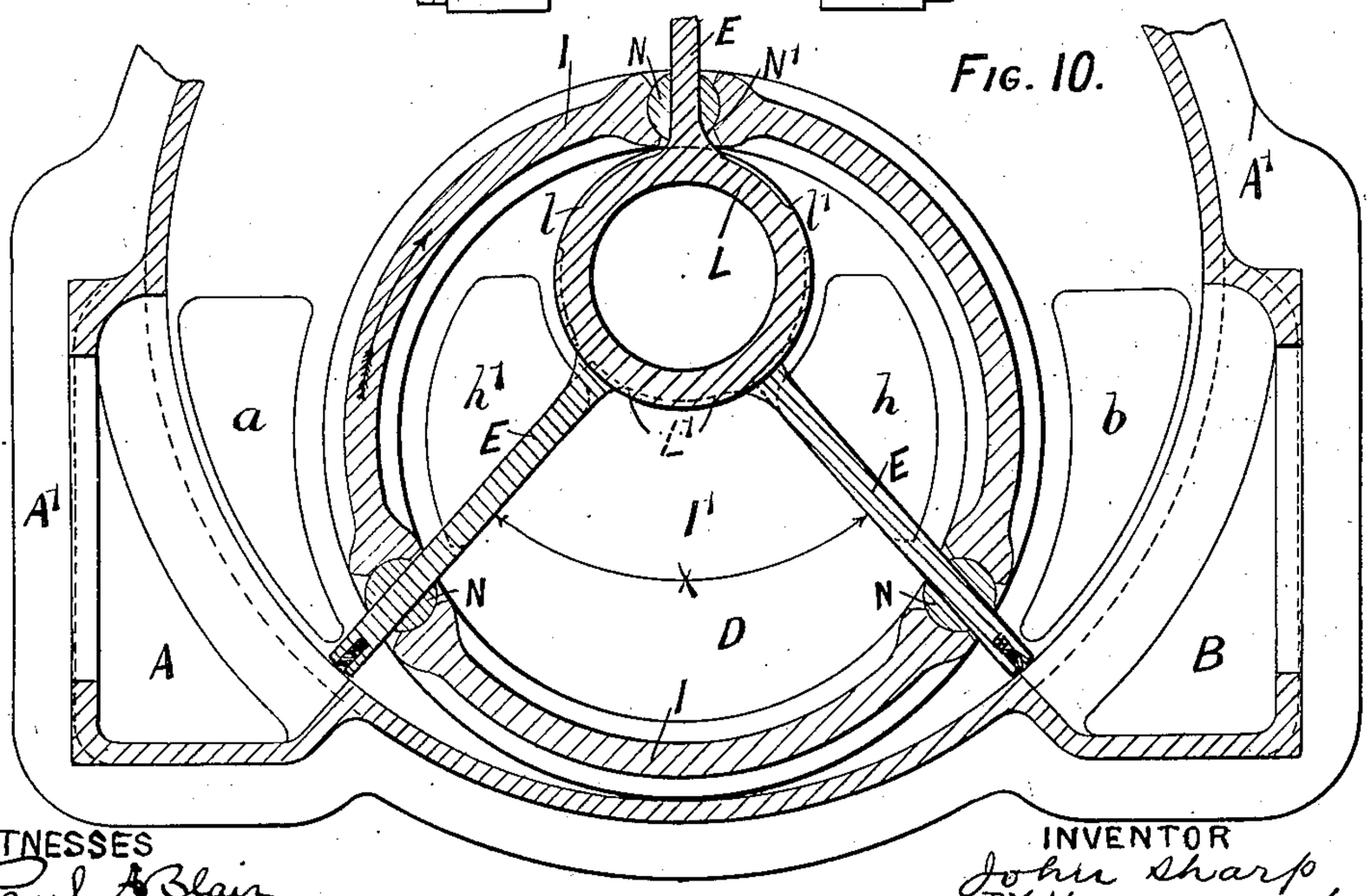


FIG. 10.



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UNITED STATES PATENT OFFICE.

JOHN SHARP, OF GLASGOW, SCOTLAND.

ROTARY EXHAUSTER.

No. 812,688. Specification of Letters Patent. Patented Feb. 13, 1906.

Application filed March 10, 1905. Serial No. 249,425.

To all whom it may concern:

Be it known that I, JOHN SHARP, engineer, a subject of the King of Great Britain and Ireland, and a resident of Glasgow, Scotland, have invented certain new and useful Improvements in Rotary Gas-Exhausters, of which the following is a specification.

This invention relates more particularly to improvements in rotary gas-exhausters; but the improvements are also applicable to pumps and engines.

The main object of my invention is to increase the efficiency of the exhauster, pump, or engine by means of the additional gas-passages, which insure the complete charging of the pumping-chamber at each stroke, while the maximum amount of fluid is pumped at each cycle of operations.

In the accompanying drawings, Figure 1 represents a longitudinal sectional elevation of a rotary exhauster as constructed in accordance with my improvements. Fig. 2 is a sectional plan view as taken on the line 2 2 of Fig. 3. Fig. 3 is a vertical section as taken on the line 3 3 of Fig. 1. Fig. 4 is an end elevation of the exhauster with the driving end cover removed. Fig. 5 is an outside elevation of the outer end cover of the exhauster shown in Fig. 1. Fig. 6 is a section taken on the line 6 6 of Fig. 1. Fig. 7 is an end view of the outer end cover with the additional inlet and outlet ports and connecting-pipes to the main inlet and outlet pipes and valves. Fig. 8 is a vertical section of outer end cover as taken on the line 8 8 of Fig. 1. Fig. 9 is a longitudinal outside elevation corresponding to Fig. 1, showing the outer covers at both ends, in which the inlet and outlet passages are formed; and Fig. 10 is a detached enlarged transverse section of the revolving blades and eyes.

Although my improvements are applicable to rotary pumps or rotary engines, I will in the following specification describe them as applied to a gas-exhauster.

A^2 represents a hollow cylindrical casing having a central stationary shaft L′ therein. On this shaft I mount a series of (preferably three) radial arms or blades E at spaced distances apart, the blades being mounted on the shaft by their hubs L. A hollow drum or barrel I is mounted eccentrically within the outer casing, and where the blades E pass through the revolving barrel I to the circumference of the outer casing the barrel is fitted with long slotted cylindrical tongue pieces or rollers N to form rocking joints, so as to be automatically adjustable to suit the varying relative angles of the blades E during each rotation. The inner barrel I has a central driving-shaft J, so that when the barrel I revolves the blades E, mounted on the inner stationary shaft L′, are carried around with it. Connecting with the outer casing A^2 are the inlet and outlet passages C and C′. The gases pass through a port C into the outer casing A^2 and discharge through the port C′ on the opposite side. In addition to this the gases are also conducted from the inlet side through a port on the end cover into the interior D of the inner barrel I and are discharged through another port, preferably diametrically opposite to this, or other suitable equivalent, and by these means a volume equal to the part denoted by D, Fig. 10, of the inner barrel and a volume substantially equal to one-half the space between the inner barrel and the outer casing are discharged three times per revolution, and both sets of inlet and outlet ports may be discharged in one end cover, or one inlet and outlet may be formed in each end cover.

Referring particularly to my present improvements, I cast in the main casing an additional gas-inlet passage A and an outlet-passage B, leading toward each end to the corresponding inlet and outlet passages *a* and *b*, respectively, in the end covers A′ B′, and said passages would communicate direct with the main inlet and outlet branches or ports C C′, the object being to increase the free flow of gas toward the chambers or passages A and B in the end covers A′ B′, leading to and from the inner chamber D of the revolving barrel I (seen particularly in Fig. 10) and so increasing the pumping efficiency, due to the portions of the blades E acting in the inner chamber D. By a modified arrangement, as shown in Fig. 7, the additional inlet and outlet passages may be formed by connecting the main inlet and outlet passages C C′ to the passages *a b* in the end covers A′ B′ by the inlet and outlet pipes F F′ and valves G′. In the case of the valves G G′ being connected as described the said communicating pipes F F′ would be connected in such a position that when the inlet and outlet valves were shut off these pipes would also be cut off. These improvements would be applicable for the purpose of conducting gas to both ends of the exhauster and inner

chamber or barrel from the working valve G or to either end separately.

In order to secure an inlet-passage of gas at both ends of working-barrel I, the usually-closed or driving end will have placed on it an arrangement of ports *h h'*, Fig. 2, suitable for communicating with corresponding ports H H' in the driving end cover A'. This is carried into practice by removing the usual closed end of the barrel I and replacing it with preferably a cast-steel end I', on which is also formed the main driving-shaft J of barrel, and the necessary ports *h h'* referred to are cast thereon. This casting would be made large enough to embrace the three corresponding segmental ends of the revolving barrel, and each of which segments would be fixed by separate bolts or pins K, Fig. 1, which would partially act as drivers.

The revolving blades E where they are attached to their respective eyes L would be strengthened at the junction by recessing a portion *l l'* of the eye at each side, so that correspondingly larger fillets can be adopted, while by cutting a portion N^2 of the oscillating slotted roller N opposite the connection of blade E with the eye L on the side of slot opposite the driving-face that portion of blade E joining the eye may be correspondingly increased and strengthened accordingly. The portion of surface of eyes L to be recessed from *l* to *l'*, and therefore not necessarily machined, is limited by the relative position of the inner edges of two adjacent blades when the angle between them is the minimum at or during every revolution, as shown at X in Fig. 10. The remaining portions of eye from *l'* to *l* are machined in the usual manner, so as to maintain a comparatively fluid-tight working fit between said eyes and the corresponding or inner working edges of the revolving blades.

I claim as my invention—

1. A rotary exhauster, or the like, comprising an outer casing, a revolving barrel therein, blades in said barrel, and inlet and outlet passages to said casing, in combination with covers at opposite ends of said casing, both said end covers having passages therein opening to the interior of the barrel, and both inlet and outlet passages communicating with both end cover passages.

2. A rotary exhauster, or the like, comprising an outer casing, a revolving barrel with blades therein, and inlet and outlet passages to said casing, in combination with end covers for said casing, passages therein with ports, corresponding ports in the driving end of the barrel, both of said end covers communicating with both inlet and outlet passages.

3. A rotary exhauster, or the like, comprising an outer casing, a revolving barrel with blades therein and having longitudinally-slotted rollers in its circumference, said blades passing through said rollers and having recessed portions on the eyes thereof, in combination with inlet and outlet passages to said casing and revolving barrel.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

J. SHARP.

Witnesses:
J. SIME,
R. C. THOMSON.