

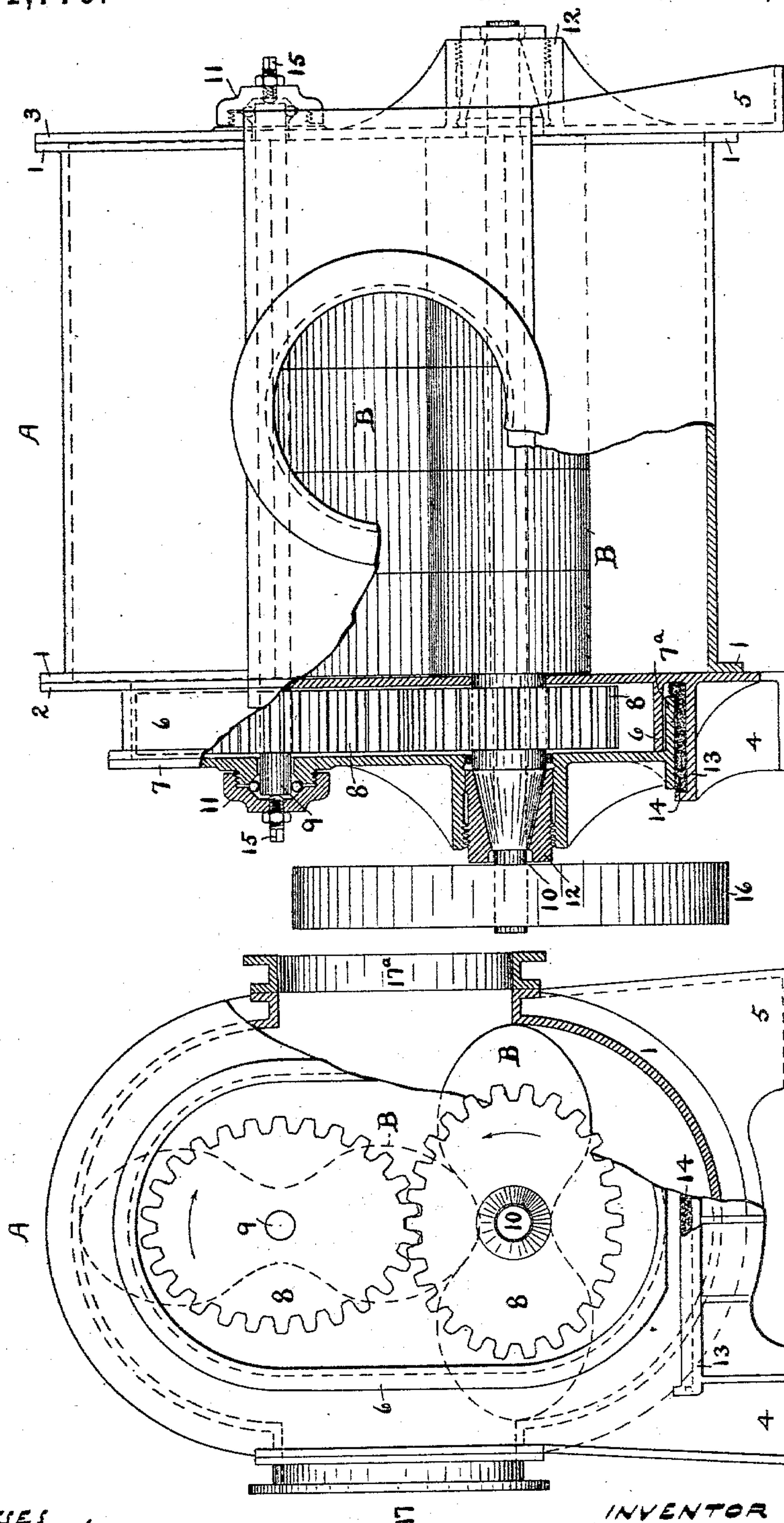
(No Model.)

2 Sheets—Sheet 1.

A. W. KURZ.  
ROTARY BLOWER, EXHAUSTER, OR PUMP.

No. 571,770.

Patented Nov. 24, 1896.



WITNESSES  
O. B. Pond  
H. P. Bailey

INVENTOR  
August W. Kurz  
By ATTORNEYS  
Burridge & Cutter.

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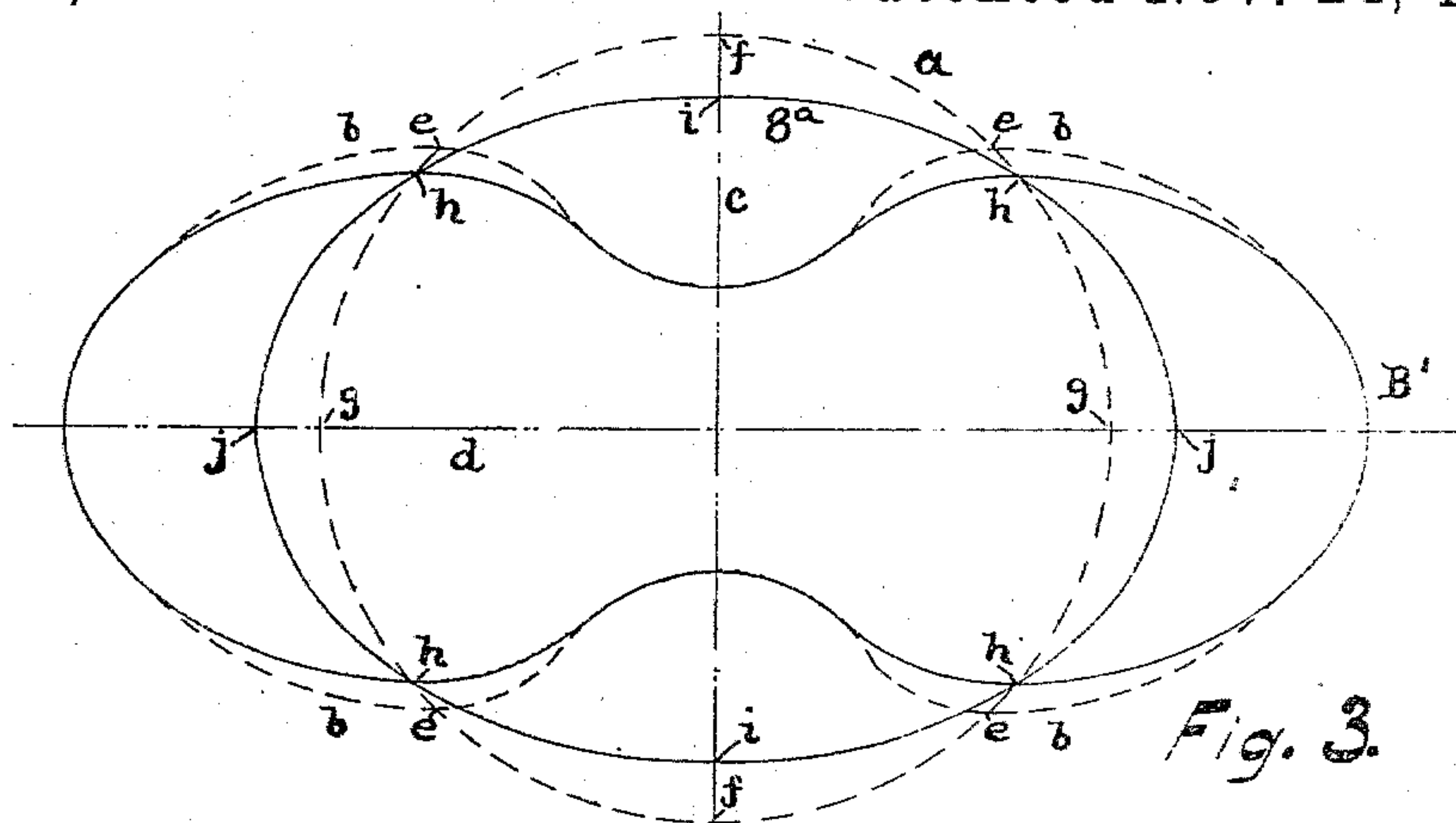
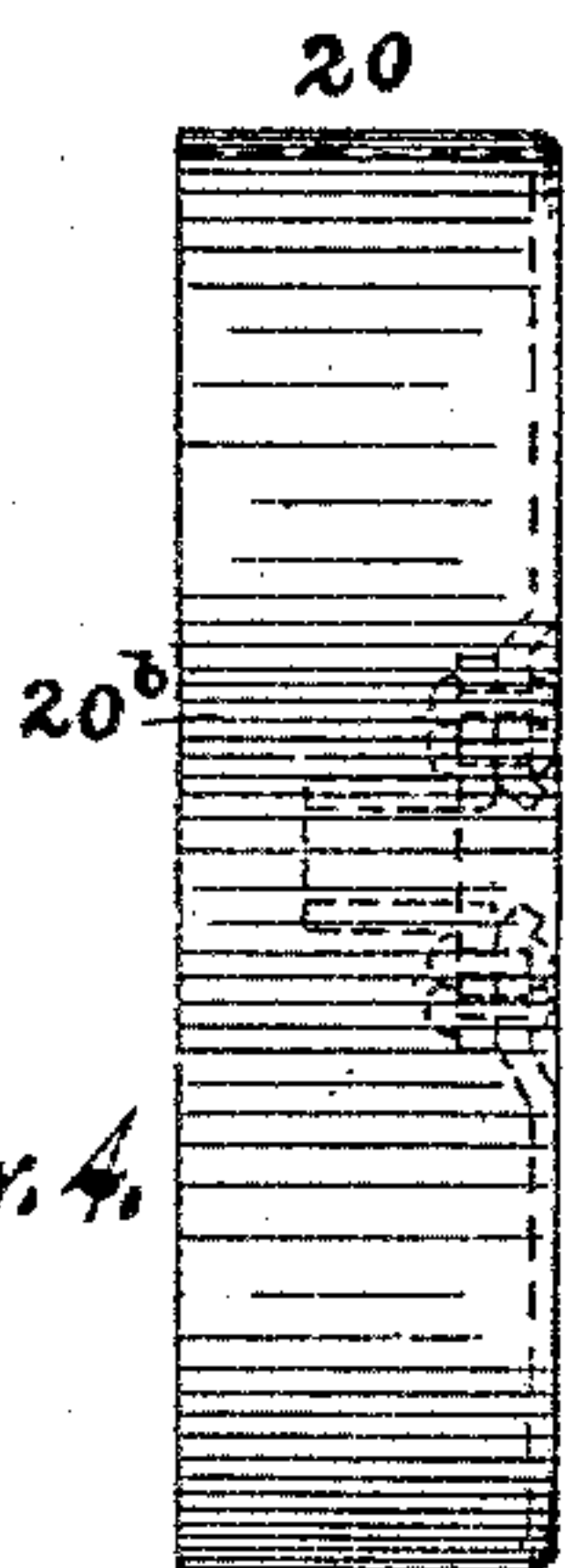
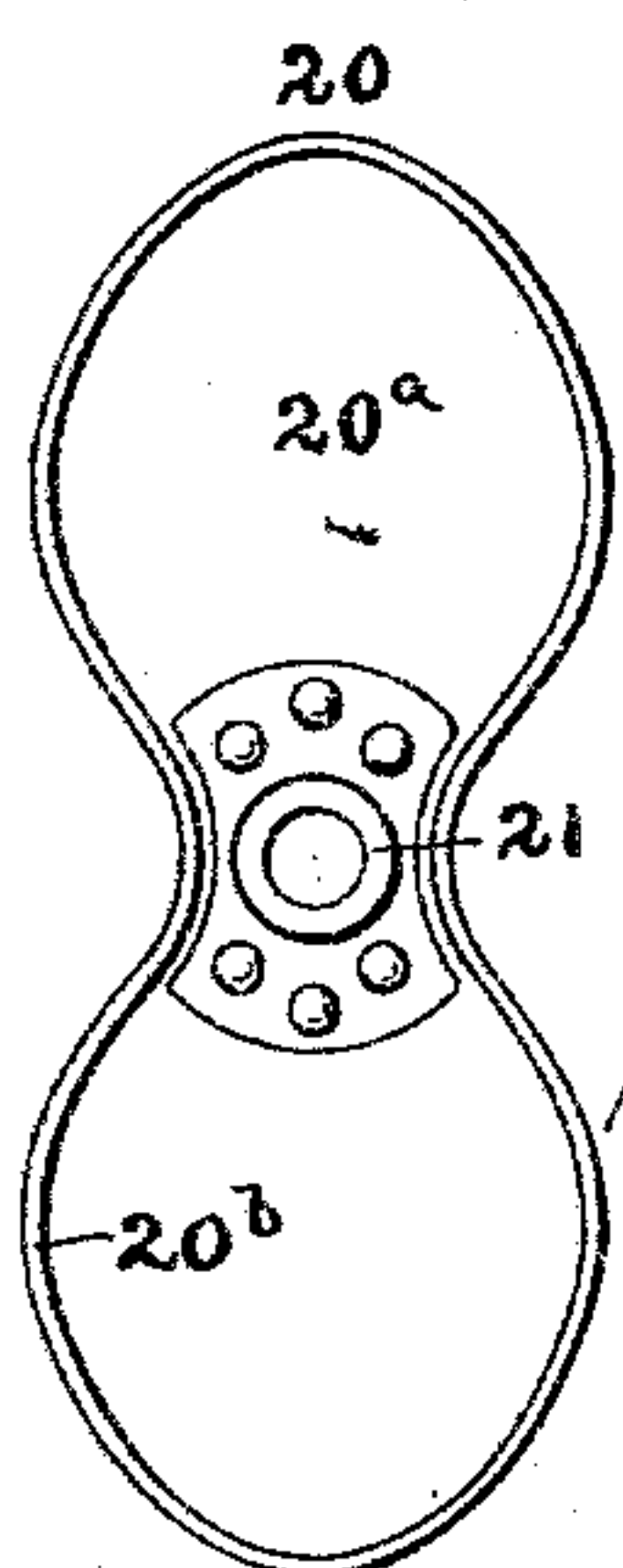


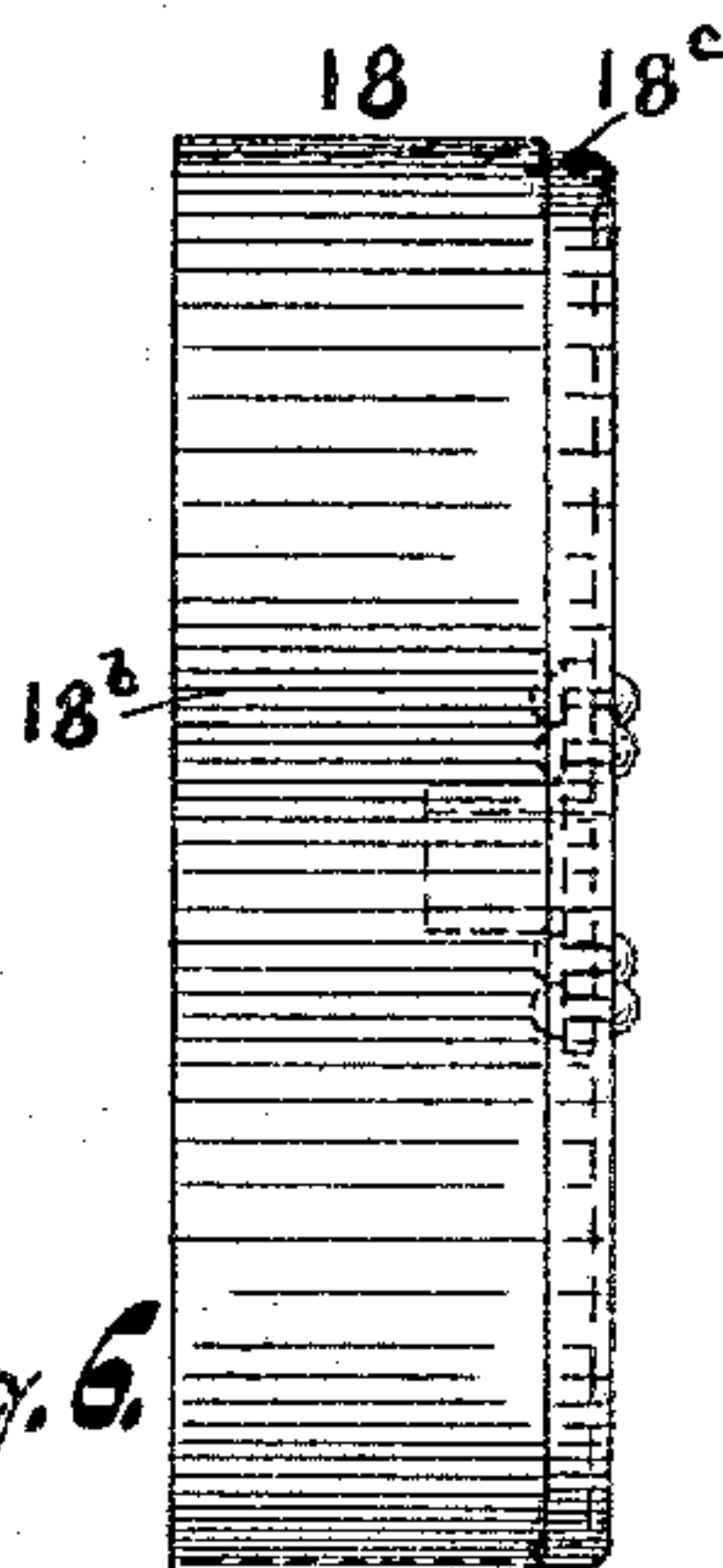
Fig. 3.



**Fig. 4.**



*Fig. 5.*



*Fig. 6.*

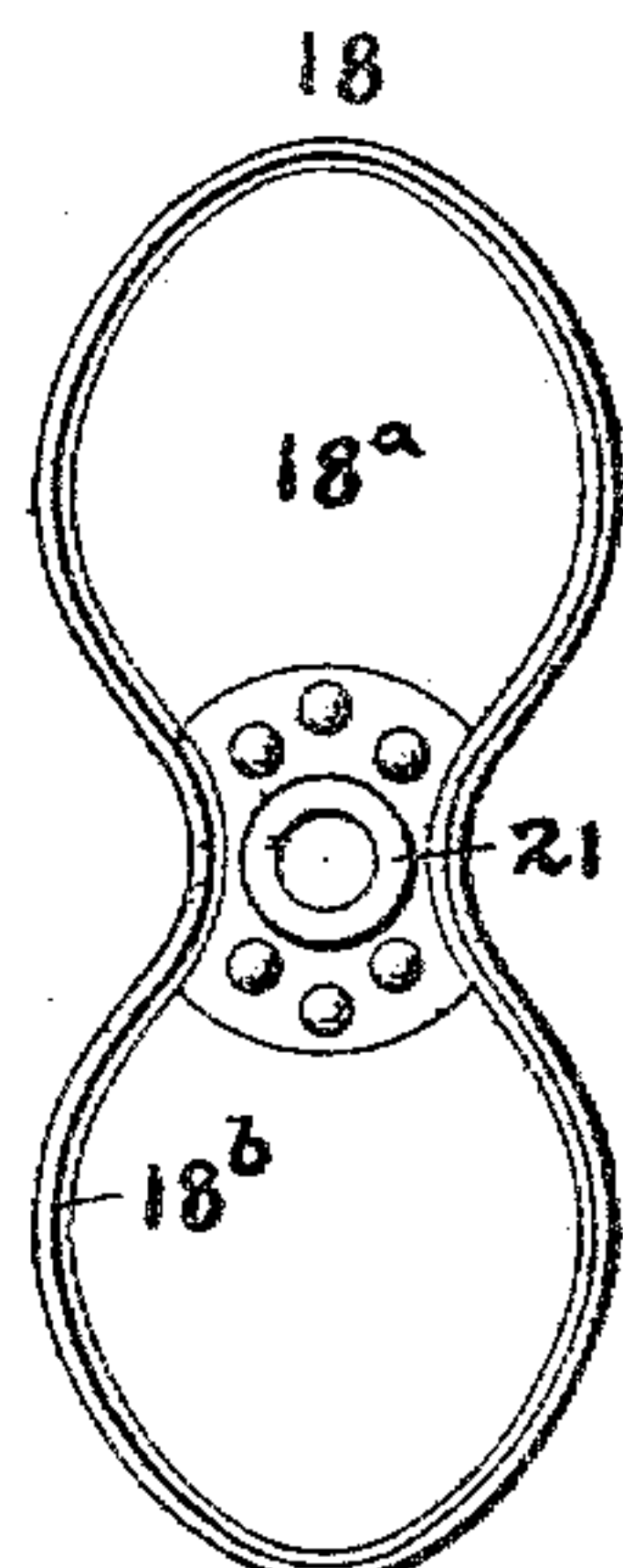
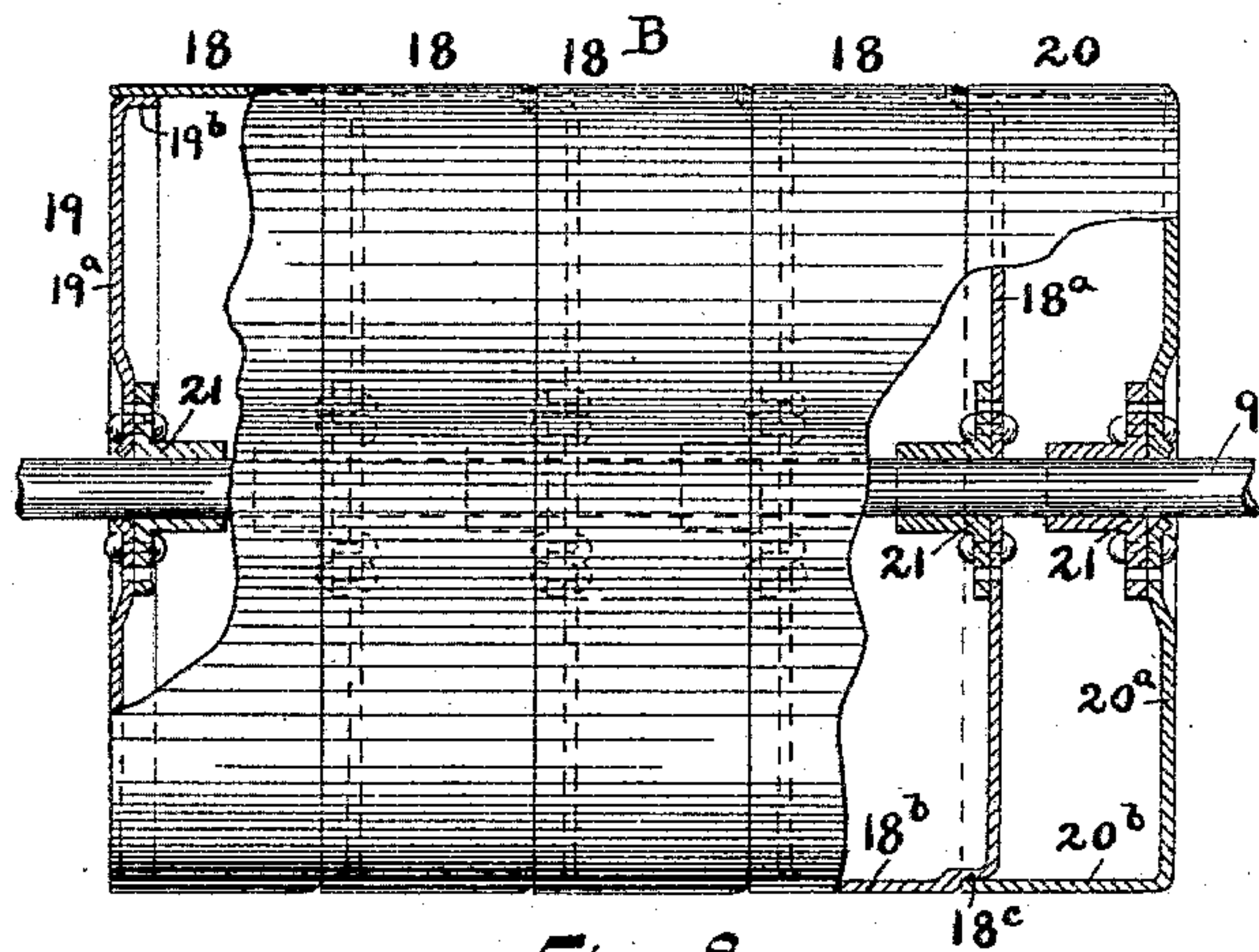


Fig. 7.



*Fig. 8.*

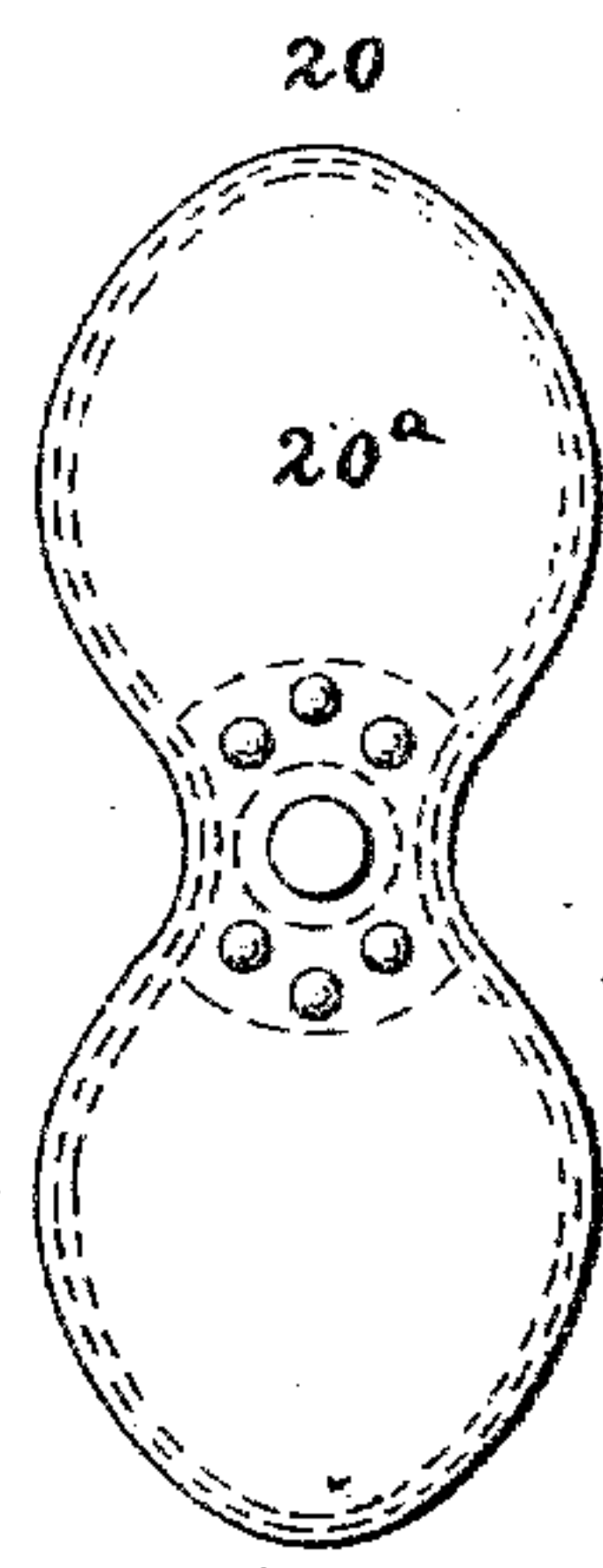


Fig 9.

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# UNITED STATES PATENT OFFICE.

AUGUST W. KURZ, OF CLEVELAND, OHIO, ASSIGNOR OF ONE-HALF TO  
JOHN P. DOWD, OF SAME PLACE.

## ROTARY BLOWER, EXHAUSTER, OR PUMP.

SPECIFICATION forming part of Letters Patent No. 571,770, dated November 24, 1896.

Application filed February 5, 1896. Serial No. 578,086. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST W. KURZ, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Rotary Blowers, Exhausters, or Pumps, of which the following is a full, clear, and exact description.

My invention relates to rotary engines employed in forcing air, gas, or liquid in one direction; and it consists of the several parts and combinations of parts hereinafter fully described and especially claimed.

The object of my invention is to provide a rotary blower, exhauster, or pump of the class designated above which is strong, durable, and economical in construction and operation, of larger working capacity, and more steady and even in operation than similar engines of the same size.

My device is so constructed that the gears are easily accessible and the upper revolver is rendered adjustable in order to obviate wear at the ends. The revolvers have perfect contact with each other throughout their entire revolution, so there can be no backward escape of the element acted upon. The gears can be exposed without disturbing or interfering with any part of the engine except the end plate of the gear-casing, which is practically independent of said casing and the revolver-case, although bolted to the former when in position and supported in part by the latter. My construction lessens the wear and tear of the engine in several respects, thereby prolonging the life of the same.

That my invention may be seen and fully understood by those skilled in the art, reference will be had to the following specification and annexed drawings, forming a part thereof, in which—

Figure 1 is an end view and partial section of my engine, the end plate of the gear-casing being entirely removed; Fig. 2, a side elevation and partial section of said engine; Fig. 3, a diagram illustrating the gain in capacity of my construction over those using annular gears; Fig. 4, a side elevation of one of the end sections of one of the revolvers; Fig. 5, an end view of the same; Fig. 6, a side elevation of one of the intermediate re-

volver-sections; Fig. 7, an end view of the same; Fig. 8, a side elevation and partial section of one of said revolvers, and Fig. 9 an end view of the same.

Similar letters and figures of reference designate like parts in the drawings and specification.

The oval-shaped case A is provided at both ends, top and bottom, with the flanges 1, to which the plates 2 and 3 are secured. The plates 2 and 3 terminate at their bases in the feet 4 and 5, which support the case A. The horizontal flange 6 projects from the outer face of the plate 2 to form with said plate and the end plate 7 a casing for the gears 8 8. The shafts 9 and 10, which carry the abutting revolvers B B, pass through openings in the plates 2 and 3, said openings being accurately located in said plates to retain said revolvers in their proper relative position.

The plates 7 and 3 are respectively provided with the ball-bearings 11 and the cone-bearings 12. After the revolvers B have been placed in the shell A the end plates 2 and 3 are bolted or riveted into place, with the rear ends of the shafts 9 and 10 resting in the rear bearings 11 and 12. Now secure the gears 8 to the shafts 9 and 10 outside of the plate 2, place the plate 7 against the flange 6, with the front ends of said shafts in the corresponding bearings 11 and 12, and bolt said plate to said flange.

Integral with the plate 2, below the base of the flange 6, is the bracket 13, between which and said flange is the extension 7<sup>a</sup>, integral with the plate 7. The extension 7<sup>a</sup> projects beneath the flange 6 nearly to the plate 2, and the Babbitt or other soft metal filling 14 is poured onto the bracket 13 to fill the space between the same and said extension, thus forming a bed for the plate 7 and rendering the removal and replacing of said plate easy and convenient.

The cone-bearings 12 permit the shaft 10 to be accurately adjusted laterally and serve to keep the same in place when so adjusted. A fine lateral adjustment for the shaft 9 is had by means of the set-bolts 15 in each bearing 11. It is very essential that the ends of the revolvers B should not come in con-



tact with the plates 2 and 3, and I readily provide against such an occurrence, in connection with the upper revolver, by the use of the bolts 15, which bear against the ends of the shaft 9 and may be turned from the outside to adjust said shaft with great nicety. The shaft 10 is driven by the pulley 16 on the front end thereof, and owing to the fact that power is thus directly imparted thereto and because of its heavy cone-bearings quick means of adjustment of the same are not so essential as with the shaft 9.

As before intimated, the peculiar construction of the casing for the gears 8 renders said gears easily accessible by simply removing the plate 7 and attached bearings with the pulley 6, without being obliged to block up the front of the case A, as in some engines of this class, or disturbing any other members except those just enumerated.

The case A has the inlet-opening 17 and the outlet-opening 17<sup>a</sup> in opposite sides.

I use the intermeshing oval gears 8 instead of annular gears on the shafts 9 and 10, and am thereby able to gain an increased capacity, as will be seen by referring to Fig. 3. The dotted line *a* indicates the pitch-line of an annular gear and the dotted lines *b* indicate a revolver operated thereby. The pitch-line of one of the oval gears 8 is represented by the full line 8<sup>a</sup> and the outline of one of the revolvers B by the full line B'. In order to insure perfect contact between the revolvers of a device of this kind, the junction of the major and minor convex curves of each of said revolvers should cut the pitch-line of each gear midway between the intersections of radii with said pitch-line, said radii to pass through the gear-center at right angles to each other and be in line with the respective major and minor diameters of the revolvers. The right-angle radii in Fig. 3 are represented by the lines *c* and *d*, and the junction of the major and minor convex curves of the dotted revolver intersects the gear pitch-line *a* at *e*, or half-way between the intersecting-points *f* and *g* of said radii with said pitch-line, four points *e* appearing, of course, on each revolver. The junction of the major and minor convex curves of the revolver-outline B' cuts the oval pitch-line 8<sup>a</sup> at *h*, or nearer the horizontal radius *d* than the point *e*. Hence the revolver having an oval gear is flatter than the revolver having an annular gear, less room is occupied thereby in the case, and an increased capacity for receiving and forcing out air, gas, or liquid is provided. The points *h* are midway between the intersections *i* and *j* of the radii *c* and *d* with the line B'.

A further very important advantage of employing oval in place of annular gears lies in the fact that a change of speed ensues at each revolution of the former, said change occurring when the positions of the revolvers are such as to produce the best results, as will appear from the following explanation.

The motion of the lower gear 8 on the shaft 10 is constant; but because of the oval shape of said gear and its companion their relative motion is not constant, one traveling at a greater speed than the other during two alternate quarters of the revolution and at a less speed during the two intermediate quarters. When the gears 8 and the revolvers B are in the position shown in Fig. 1, the shaft 9, with attached members, is driven at a less speed than when the position is reversed, and two of these changes take place at each revolution of the parts. Now if air, gas, or liquid be taken into the case A at the opening 17 and discharged at the opening 17<sup>a</sup>, and the revolvers B rotate in the direction indicated by the arrows in Fig. 1, it will be seen that the relative speed of said revolvers is faster at the instant of induction when the element acted upon is of a less density and slower at the instant of expulsion when said element is of a greater density. This quadruple change of speed at each revolution of the revoluble parts causes my engine to work in a more steady and even manner and thus produce better results than can be obtained in the old way.

Each revolver B consists of the steel-plate sections 18 and the end sections 19 and 20. Four sections 18 are shown in the drawings; but this number may vary to accommodate the length of the revolver B to that of the case A. Each section 18 consists of the plate 18<sup>a</sup> and the wide peripheral flange 18<sup>b</sup>, and has the shoulder 18<sup>c</sup> at one end, onto which the flange of the contiguous section is shrunk when the metal is in a heated state. The end section 19 consists of the plate 19<sup>a</sup> and the narrow peripheral flange 19<sup>b</sup>, extending into the contiguous section 18, the flange 18<sup>b</sup> of which is shrunk onto the same, and the opposite end section 20 consists of the plate 20<sup>a</sup> and the wide peripheral flange 20<sup>b</sup>, which is shrunk onto the shoulder 18<sup>c</sup> of the contiguous section 18. The complete revolver B is perfectly smooth on the outside and combines the advantages of being easily constructed and very durable.

An opening for the shaft 9 (or 10) is provided in the center of the section-plates 18<sup>a</sup>, 19<sup>a</sup>, and 20<sup>a</sup>, around which are the flanged collars 21, bolted or otherwise secured to said plates. The collars 21 are shrunk onto the shaft 9 (or 10) while in a heated state, and thus render a very rigid connection between the latter and the revolver B.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination in a revolver for rotary blowers, exhausters or pumps, of a series of flanged transverse sections assembled in line, a shaft, and means for rigidly attaching said sections to said shaft, substantially as and for the purpose set forth.

2. The combination in a revolver for rotary blowers, exhausters or pumps, of a series of flanged and shouldered intermediate and



flanged end sections peripherally shrunk together, a shaft, and means for rigidly attaching said sections to said shaft, substantially as and for the purpose set forth.

5 3. The combination in a revolver for rotary blowers, exhausters or pumps, of a series of flanged and shouldered intermediate and flanged end sections peripherally shrunk together, a shaft passing through the section-

plates, and collars secured to said plates and shrunk onto said shaft, substantially as and for the purpose set forth. 10

In testimony whereof I affix my signature in presence of two witnesses.

AUGUST W. KURZ.

Witnesses:

F. A. CUTTER,  
H. H. MUNN.