

C. J. WATTS.
CIRCULATOR.
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917,206.

Patented Apr. 6, 1909.

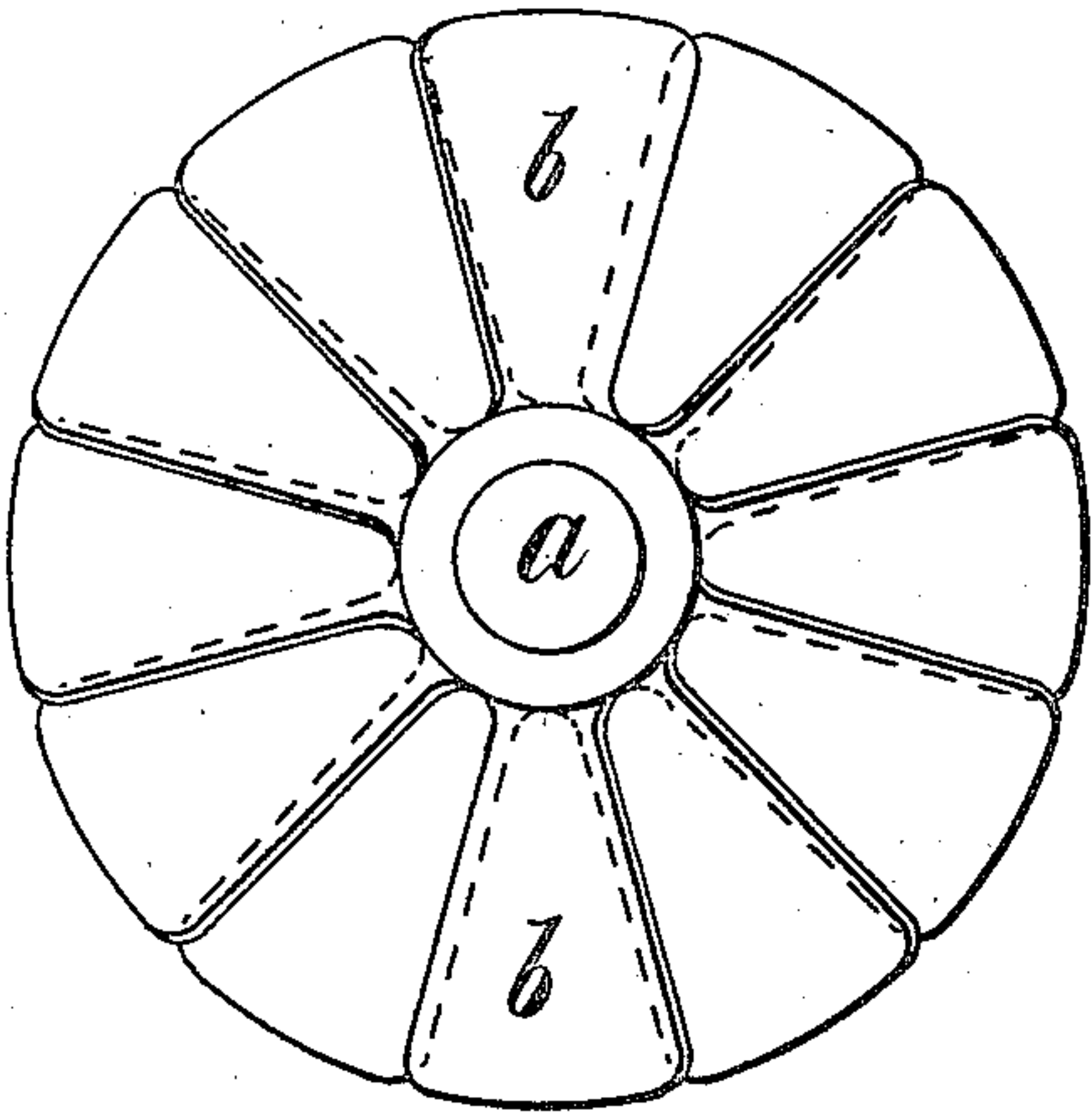


Fig. 1.

Fig. 2.

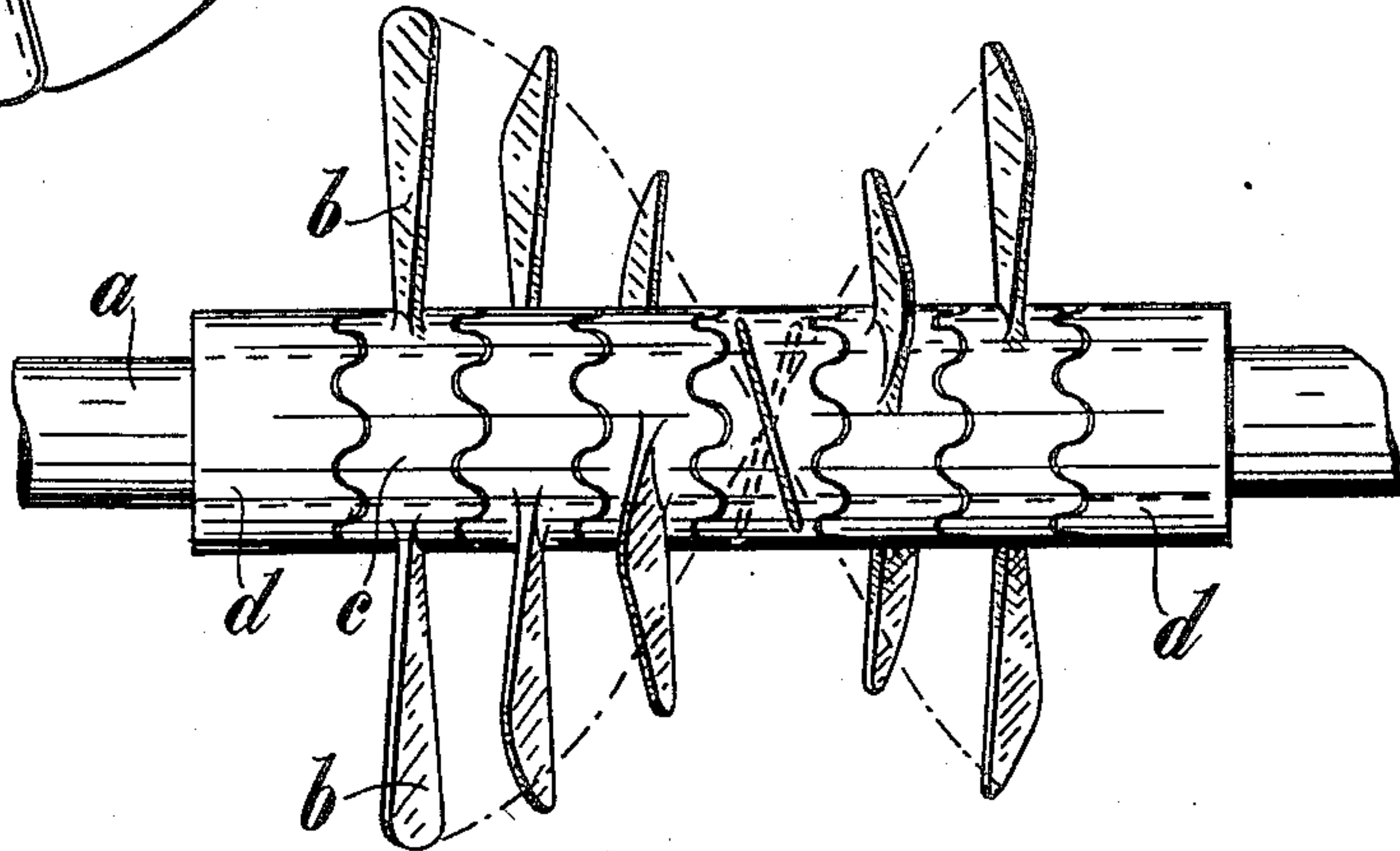
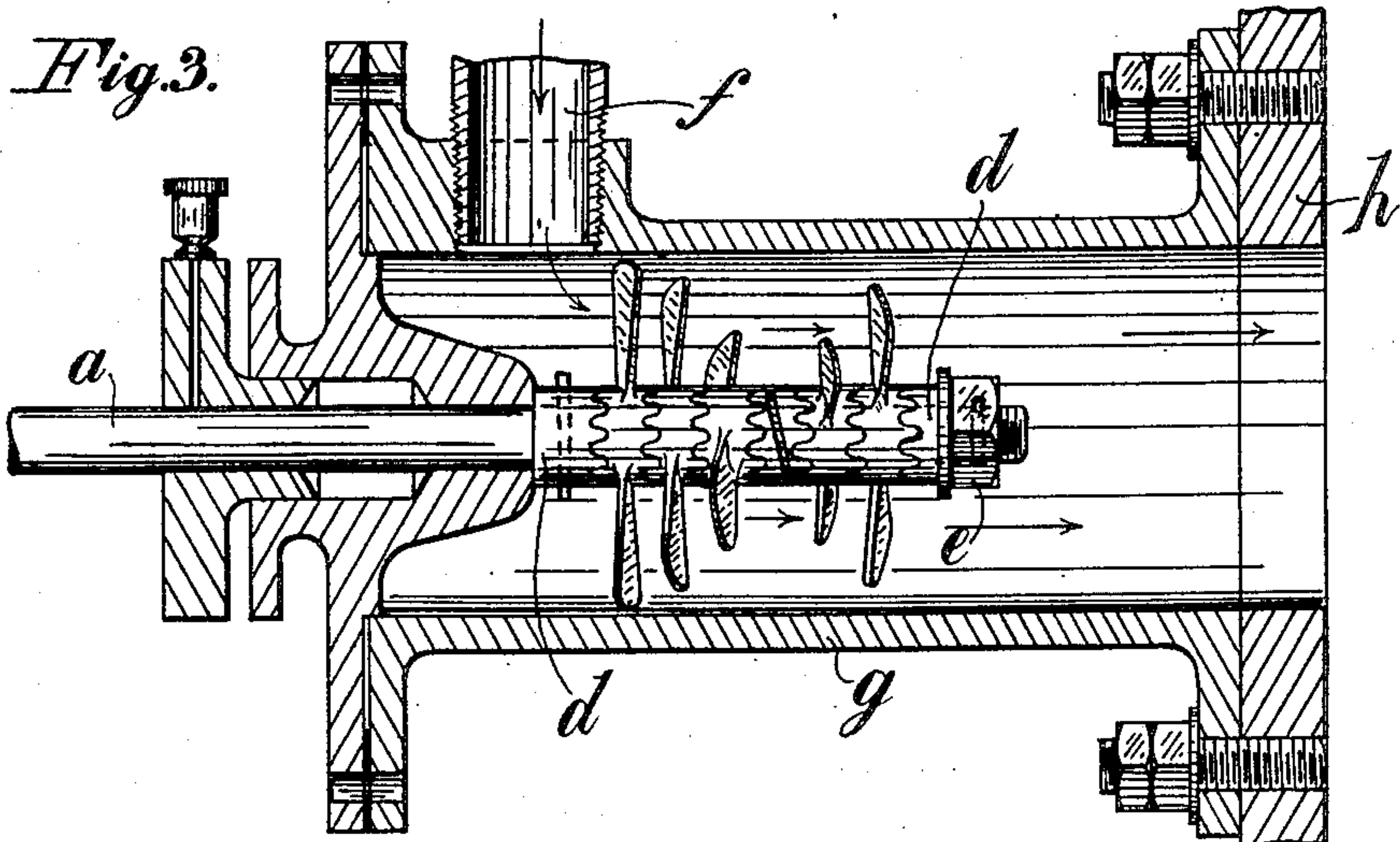


Fig. 3.



Witnesses:

J. Edwin Burch
L. C. Parkley.

Inventor:
Charles James Watts,
By G. Frank Appleman atty.

UNITED STATES PATENT OFFICE.

CHARLES JAMES WATTS, OF TROWBRIDGE, ENGLAND.

CIRCULATOR.

No. 917,206.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed December 4, 1908. Serial No. 486,020.

To all whom it may concern:

Be it known that I, CHARLES JAMES WATTS, a citizen of the United Kingdom of Great Britain and Ireland, and resident of St. Georges Works, Trowbridge, Wilts, England, have invented certain new and useful Improvements in Circulators, of which the following is a specification such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to devices which are used to accelerate the circulation of water within hot water boilers, pipes, radiators and the like.

It has hitherto been proposed to use propellers consisting of two or more blades on one boss or hub, also to use continuous screw or Archimedean propellers. The former method has the disadvantage of possessing too little power and the latter arrangement forms too circuitous a passage for the water, and has generally to be used in connection with by-passes.

My invention consists in the combined use of a number of propellers of particular construction and arrangement whereby the disadvantages of both systems are entirely overcome.

According to my invention I arrange a number of propellers on a common shaft the position of the propellers being similar to the direction or path followed by the edge of an Archimedean screw, that is to say, commencing at the end propeller and following the line indicated by the tip of the blades, the tip of the second propeller would be reached and from that a continuation of the same direction would touch the tip of the third propeller and so on to the fourth and the other propellers to that furthestmost from the one started with. These propellers are arranged as close to one another as is required to conform to the arrangement above described and while they possess practically all the features or driving power of an Archimedean or continuous screw, they allow for an adjustment of position with relation to each other, whereby the pitch of the Archimedean screw formed by their combination can be varied in a greater or lesser degree—and moreover they allow for the free passage of water in circulation between the blades whenever the propellers are at rest.

In my invention as with other methods already adopted the shaft carrying the pro-

pellers is driven by some external means—such as the continuation of the shaft through the pipe in which it is arranged and connected directly to a motor shaft—or by mounting a pulley on the end of the propeller shaft—said pulley being driven by a bolt or chain from a motor.

I will now describe my invention with reference to the accompanying drawings in which:—

Figure 1. is an end view of a shaft *a* carrying six two-blade propellers. Fig. 2. is a side view of the propellers shown in Fig. 1, and Fig. 3. illustrates a similar set of propellers arranged in a case in the waterway of the heating apparatus.

It will be observed that the propellers are formed of blades *b* mounted on bosses *c*, the construction of the individual propellers being identical but their arrangement on the shaft being in echelon and capable of adjustment so that a steep or shallow pitch can be obtained. The bosses *c* are formed with scalloped edges and after setting one propeller the next can be fitted to it one or more scallops in advance, and by following the same number with the next and following propellers each one in advance of that immediately proceeding it a perfectly formed and equally balanced device is arranged. Any suitable means may be employed for fixing the propellers to the shaft the examples showing sleeve-like ends or collars *d* having scalloped edges similar to those on the propellers, said collars being keyed or otherwise fixed, the examples shown in Fig. 3. illustrating one of the collars secured by a pin and the other by a nut *e* threaded on to the shaft and secured by a pin.

Any suitable number of inlets *f* to the case *g* may be provided and while the case is shown fixed to the side of a boiler *h* it will be obvious that it may be arranged in another part of the water circuit and the shape of the case may vary to suit requirements.

It will be readily seen that the number of propellers may vary to suit requirements and although they are advantageously made of similar construction for the purpose already mentioned it is not essential they should be, and any convenient means of fixing same to their shaft may be employed.

What I claim and desire to secure by Letters Patent is:—

1. In a circulator, a suitably driven shaft, sleeves on the shaft having scalloped edges,

the scallops of the contiguous sleeves being interlocked, and blades radiating from the said sleeves.

2. In a circulator, a suitably driven shaft, sleeves on the shaft having scalloped edges, the scallops of the contiguous sleeves being interlocked, and blades radiating from the said sleeves and arranged in echelon.

3. In a circulator, a shaft, sleeves thereon having scalloped edges, the scallops of one

sleeve being interlocked with the scallops of the contiguous sleeves, blades radiating from the sleeves and means for holding the sleeves in interlocked engagement.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CHARLES JAMES WATTS.

Witnesses:

HENRY FAIRBROTHER,
JNO. ALDRIDGE.