

No. 668,512.

Patented Feb. 19, 1901.

A. FREITAG.
CENTRIFUGAL MACHINE.
(Application filed May 15, 1899.)

(No Model.)

4 Sheets—Sheet 1.

Fig. 1.

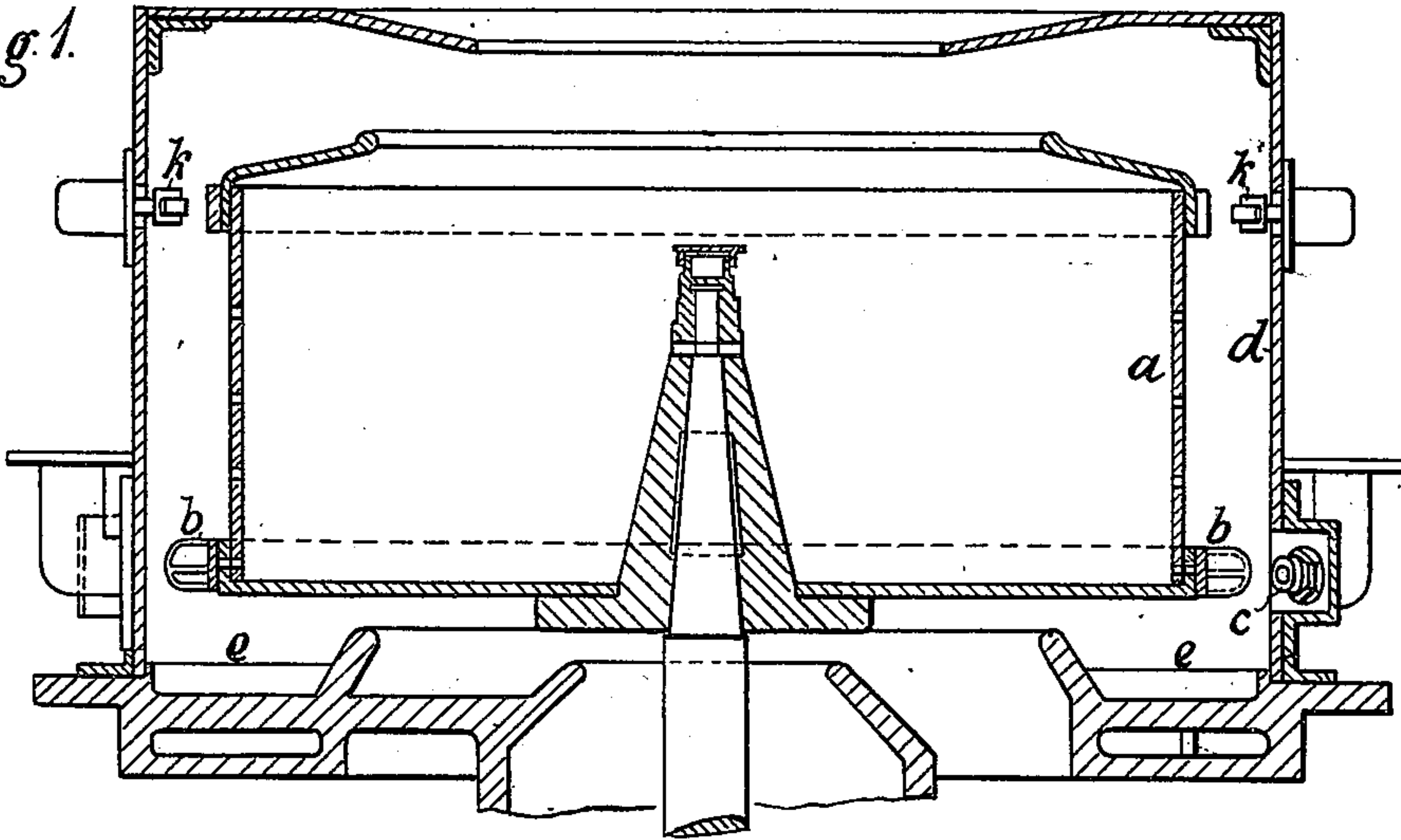
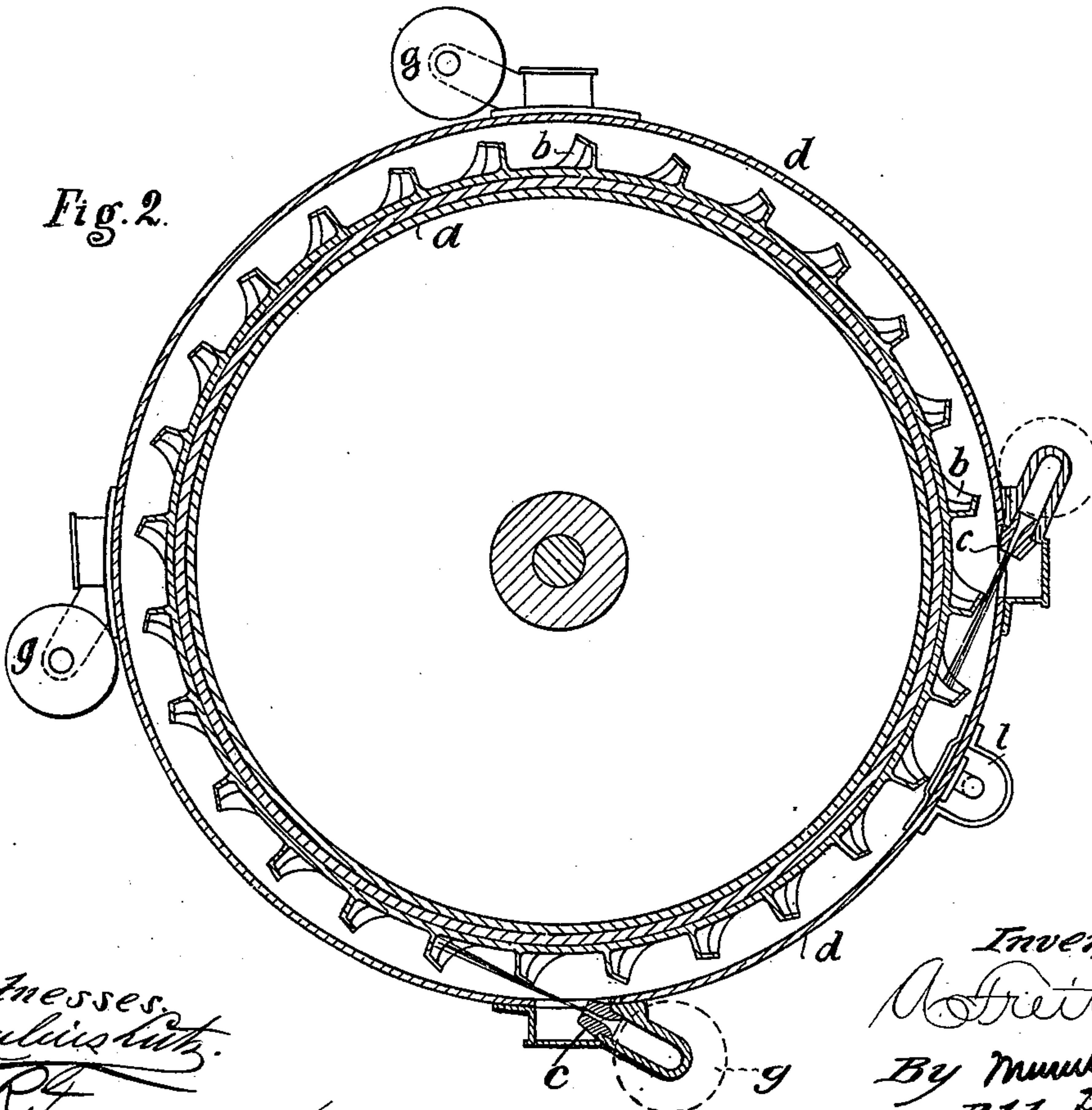


Fig. 2.



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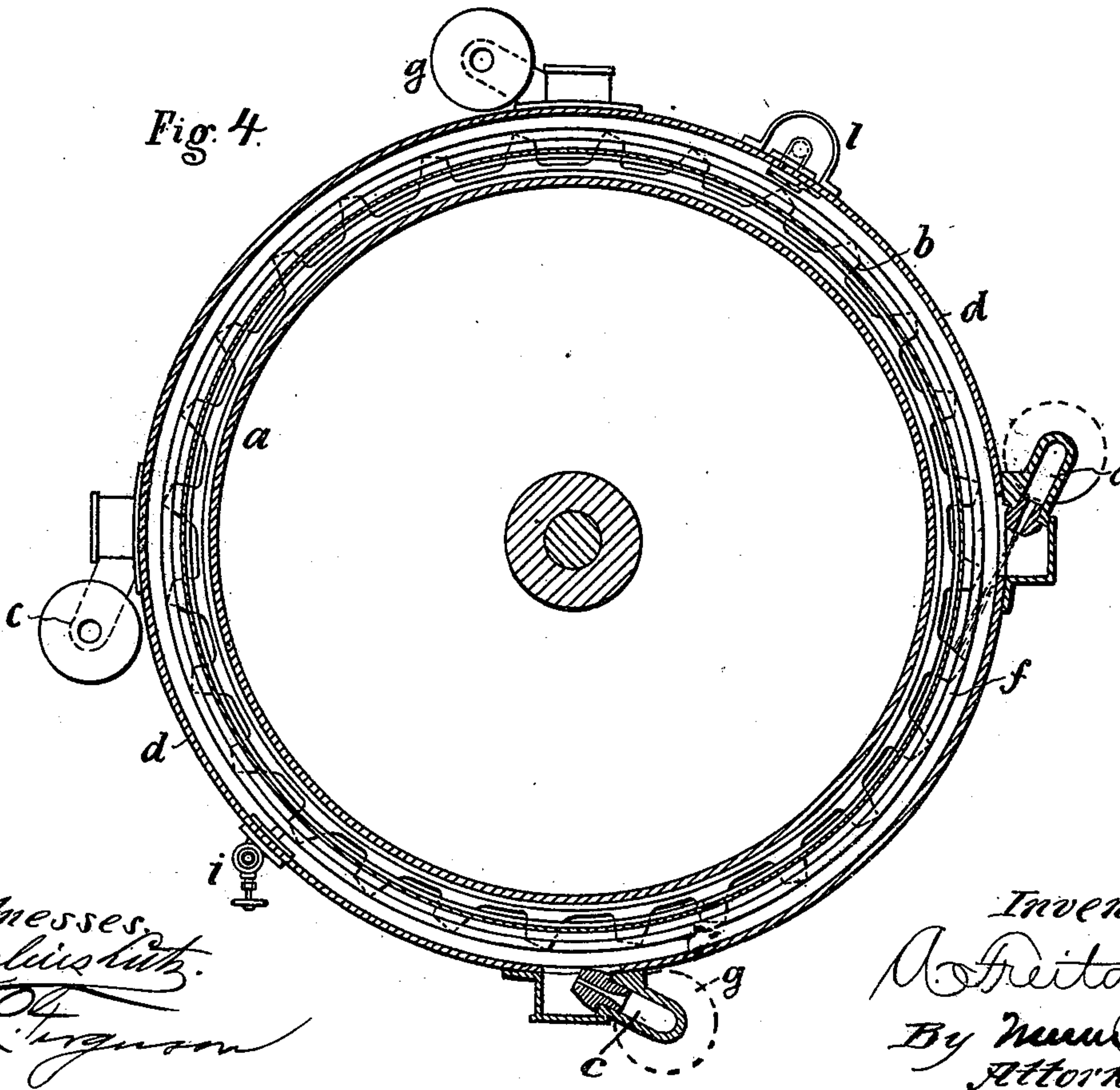
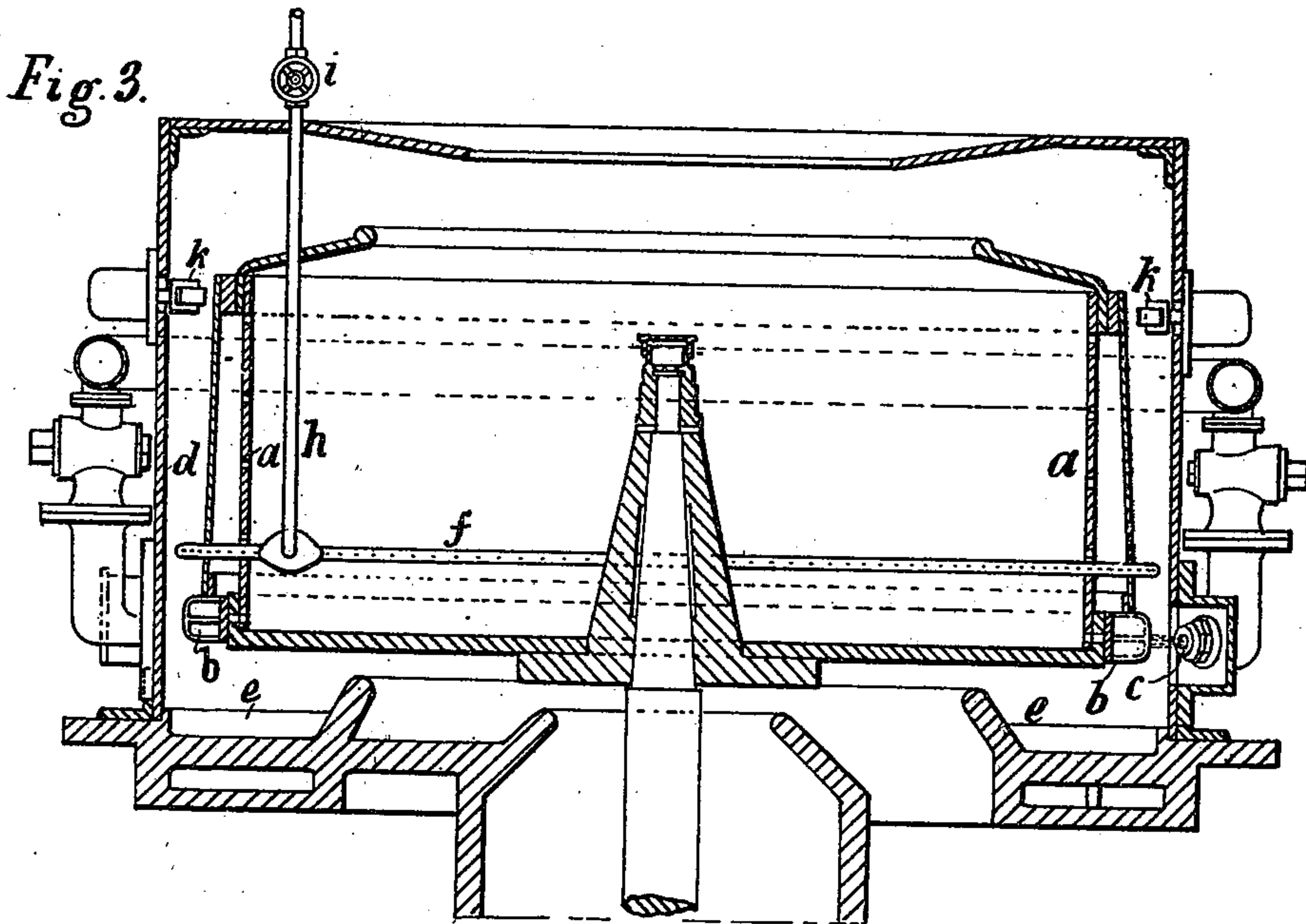
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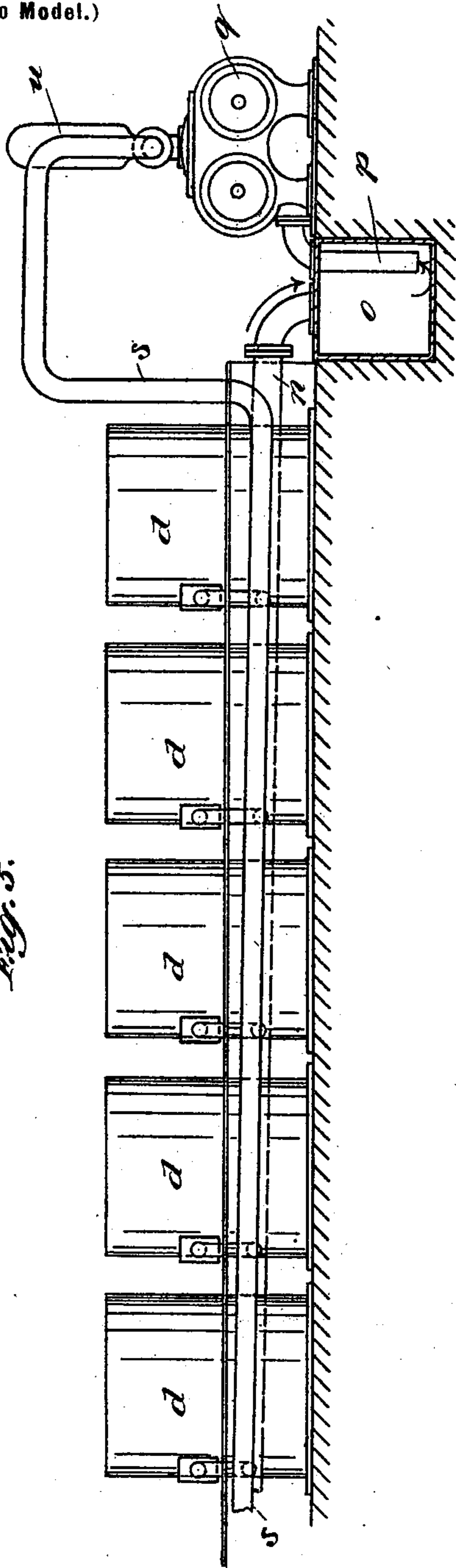


Fig. 5.

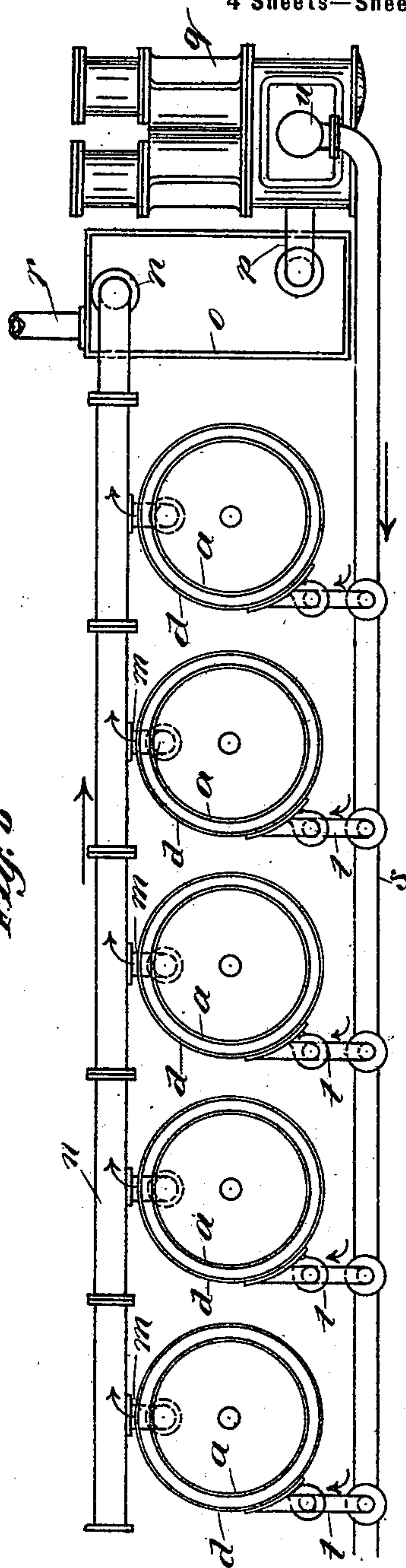


Fig. 6.

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Fig. 7.

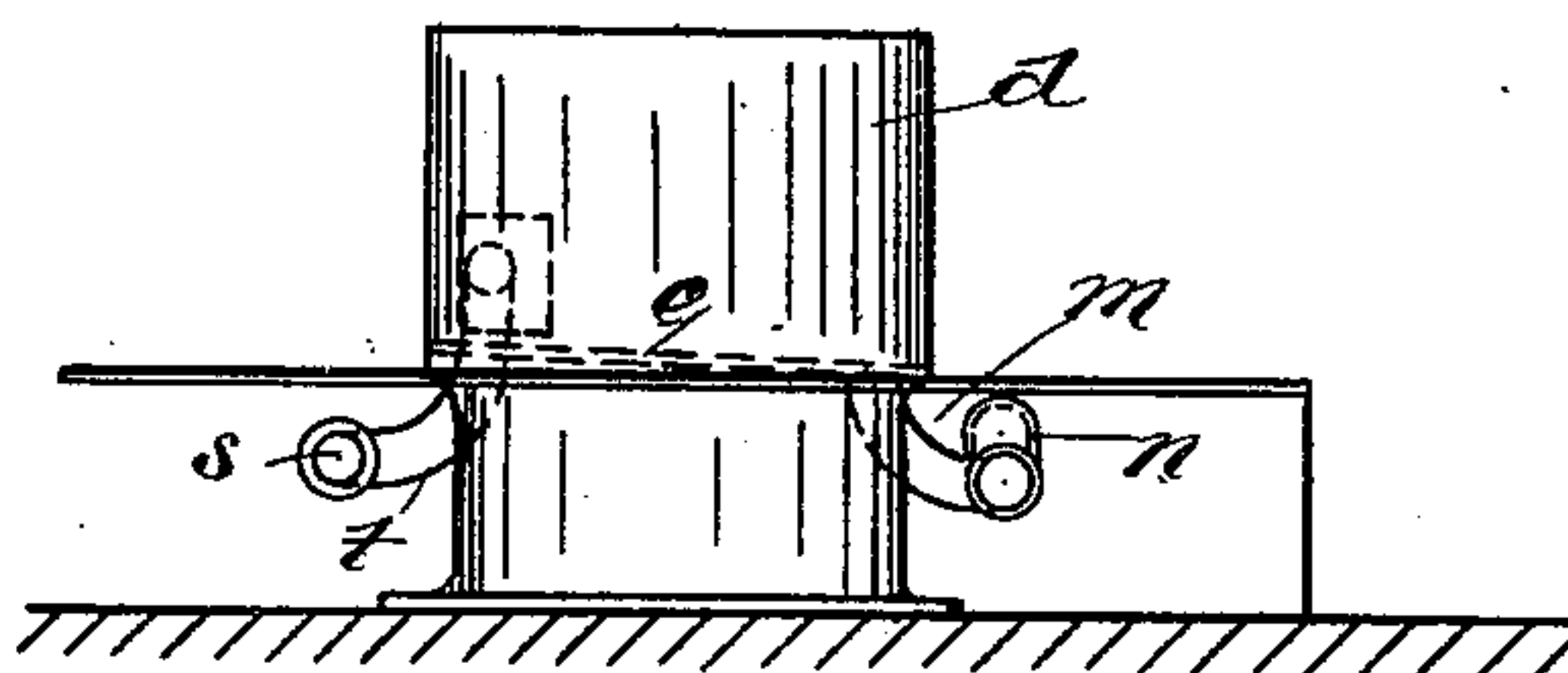
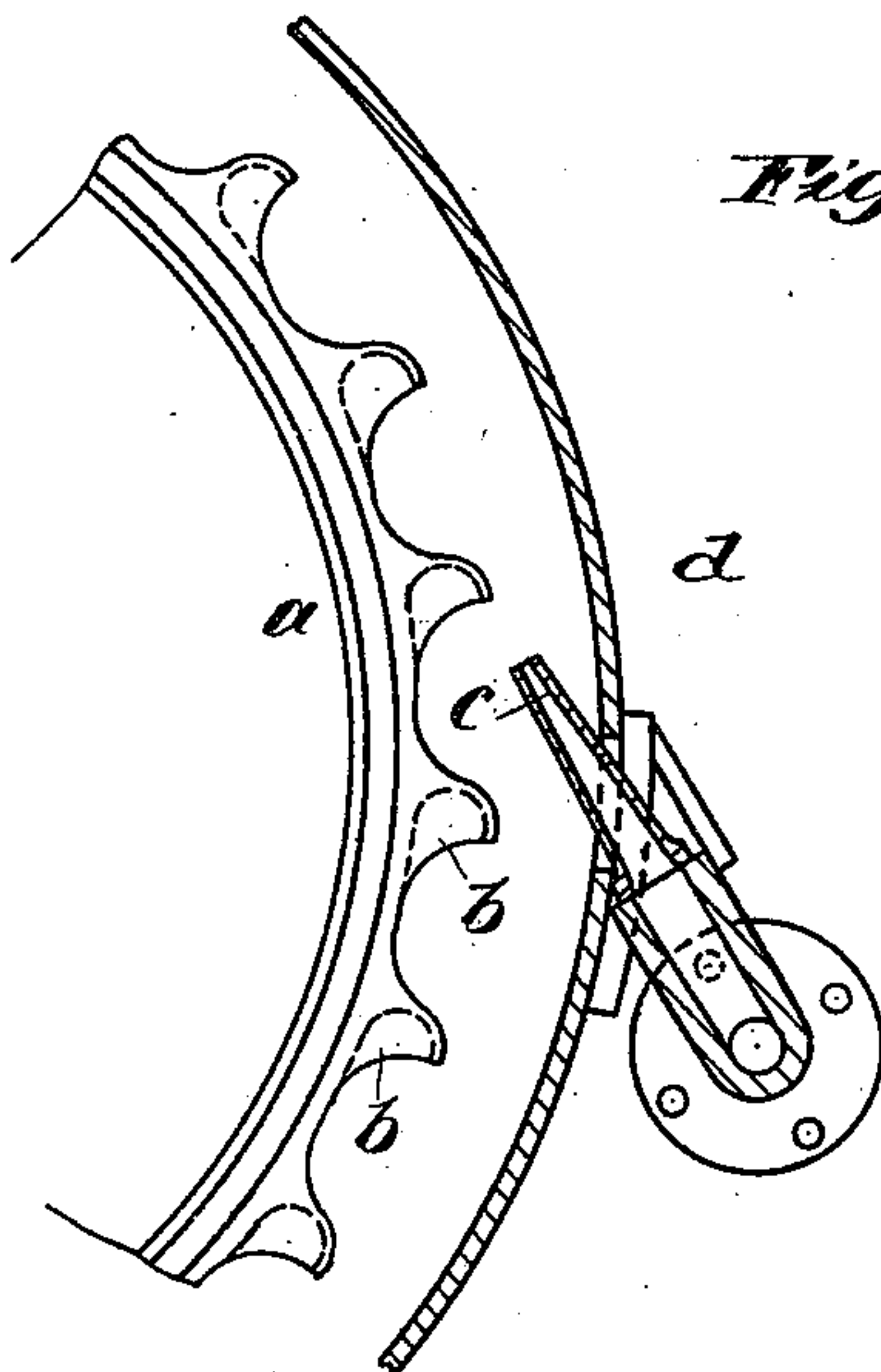


Fig. 8.



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UNITED STATES PATENT OFFICE.

ANDREAS FREITAG, OF AMSTERDAM, NETHERLANDS.

CENTRIFUGAL MACHINE.

SPECIFICATION forming part of Letters Patent No. 668,512, dated February 19, 1901.

Application filed May 15, 1899. Serial No. 716,851. (No model.)

To all whom it may concern:

Be it known that I, ANDREAS FREITAG, a subject of the Queen of the Netherlands, residing at Amsterdam, in the Kingdom of the Netherlands, have invented certain new and useful Improvements in Centrifugal Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in the driving apparatus of centrifugal machines such as used for separating liquids or solids of different specific weights. The usual way of driving centrifugal separators is by means of a belt and pulley. Water-turbines and electric motors have, however, been applied directly to the shafts of separators, thereby enabling the separators to be arranged in sets in almost any desired relative position to each other, while with a driving-belt it is clear that the machines must be arranged in rows and also cause considerable space to be required. On the other hand, driving centrifugal separators by electricity or by turbines is not readily applicable to existing machines, as in most cases the cost of the change is too considerable. The object of my present invention is to secure the same advantages of an individual driving of each separator at a comparatively small cost.

The invention will be fully described hereinafter and the features of novelty pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a vertical section of a centrifugal separator with my improvements applied thereto. Fig. 2 is a sectional plan view. Fig. 3 is a sectional elevation of another form of construction, and Fig. 4 is a sectional plan of the same. Fig. 5 is a side view showing several of the separator-bowls as assembled. Fig. 6 is a plan view thereof. Fig. 7 is an end view, and Fig. 8 is a section of part of a bowl and an injector.

a is the drum or bowl of the centrifugal machine, which is rotatably mounted and is

adapted to contain the substance to be treated. This bowl a carries a series of buckets or blades b , which may be located at the periphery, as shown, or upon the bottom. The bowl is inclosed in a casing d , in which are secured tangentially at various points discharge-nozzles c and g . These nozzles are connected with a suitable pipe which is connected with the delivery-port of a pump the suction-pipe of which is arranged to withdraw from a suitable receptacle the matter discharged over the top of the bowl a and collecting in the groove e . In order to secure jets of considerable force and uniformity, I may interpose between the pump and the nozzles c and g a wind chest or accumulator. The pressure in this device would be kept at, say, ten atmospheres.

It will be obvious that the liquid discharged against the buckets or blades b will collect in the channel or groove e , so that the liquid discharged from the bowl a will mix with the liquid coming from the nozzles c and g . As a rule I employ as a liquid to be discharged from the nozzles the matter ejected from the separator-bowl a to be driven; but liquid from other separator-bowls may also be employed. This matter is well adapted to exert considerable energy by impact. I therefore secure a higher efficiency and a quicker starting of the drum or bowl a than with an electrical driving mechanism or with a water-turbine or with a driving-belt.

As shown in Figs. 3 and 4, I provide an annular pipe f , surrounding the bowl a , so as to heat the matter ejected from the bowl and to keep it in a fluid condition. h indicates a pipe for the supply of a heating medium, such as steam, and i a hand-valve to control the admission of steam. The construction of the centrifugal machine in itself is of course immaterial, and it will be understood that the same may be fitted with any of the usual or approved accessories, such as an outlet l to withdraw samples and a brake k to stop the rotation of the bowl a . It will of course be understood that suitable valves are provided for each of the nozzles c and g , so that after the bowl has acquired the proper speed of rotation only one of the nozzles will be kept active to maintain such speed, and

when it is desired to stop the motion the supply of liquid under pressure will be interrupted entirely.

By the arrangement hereinbefore described I secure the same advantages that are obtained when using electricity or a water-turbine as a driving medium, while the expense is much less. It will be understood that the details of the invention may be varied without departing from the essential features thereof as defined in the claims.

As before described, the liquid discharging from the bowl *a* by passing through the holes in the rotated drum will mix in the channel *e* with the liquid coming from the nozzles *c* and *g* or discharging from the buckets or blades *b*. Now it will be seen from Figs. 5 to 7 that short pipes *m* enter channels *e* of the plurality of bowls *a* and are connected with a collecting-pipe *n* entering a receptacle *o*, as indicated by arrows.

r is an overflow-pipe for the receptacle. A suction-pipe *p* is connected with a pump *q*, which may be of any approved construction. It is connected with a main discharge or pressure-pipe *s*, and the latter is connected with the nozzles *c* and *g* for the several bowls *a* by means of short pipes *t*. The channel *e* is somewhat inclined toward the pipes *m*, connected with the collecting-pipe *n*, so that the liquid will pass more quickly into the pipe *n*. Between the pump *q* and the pipe *s* a windchest *u* is arranged, pressure in which may be kept at about ten atmospheres.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A centrifugal machine, comprising a rotatable bowl carrying buckets, stationary nozzles adapted to discharge liquid against said buckets, a trough arranged to collect the matter ejected from the bowl, and a pump for sucking in the matter collected in said trough and discharging said matter through the said nozzles, substantially as specified.

2. A centrifugal machine, comprising a ro-

tatable body provided with a series of buckets, stationary nozzles arranged to discharge liquid against said buckets, a trough arranged to receive and collect both the matter ejected from the bowl and the liquid issuing from the nozzles, and a device for passing the liquid collected in said trough or channel to the nozzles under pressure, substantially as specified.

3. In a centrifugal machine or separator, a rotary bowl having a perforated wall, buckets on the periphery of the bowl, a casing surrounding the bowl and having a trough in its bottom, nozzles carried by the casing, a receptacle, a pipe leading from the trough to the receptacle, and a pump connected with the nozzles and receptacle, substantially as described.

4. A centrifugal machine, comprising a revoluble bowl provided with buckets, a casing in which the bowl is mounted and upon the bottom of which the matter ejected from the bowl collects, a nozzle on the casing and adapted to discharge on the buckets of the bowl, a receptacle connected with the bottom of the bowl, and a pump connected with the nozzle and the receptacle, whereby provision is made for utilizing the matter ejected from the bowl to propel the said bowl, as set forth.

5. A centrifugal machine, comprising a casing having a trough in its bottom, a revoluble bowl provided with buckets and mounted in the casing so as to form an unobstructed passage between it and the said casing to permit the matter ejected therefrom to flow to the trough, nozzles on the casing and adapted to discharge on the buckets, a receptacle connected with the trough of the casing, and a pump connected with the nozzles and the receptacle, substantially as described.

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

ANDREAS FREITAG.

Witnesses:

CASPARUS MULLER,
FRANS BOSCH.