

3 Sheets—Sheet 1.

## COTTON CLEANER AND CONDENSER.

No. 304,527.

Patented Sept. 2, 1884.

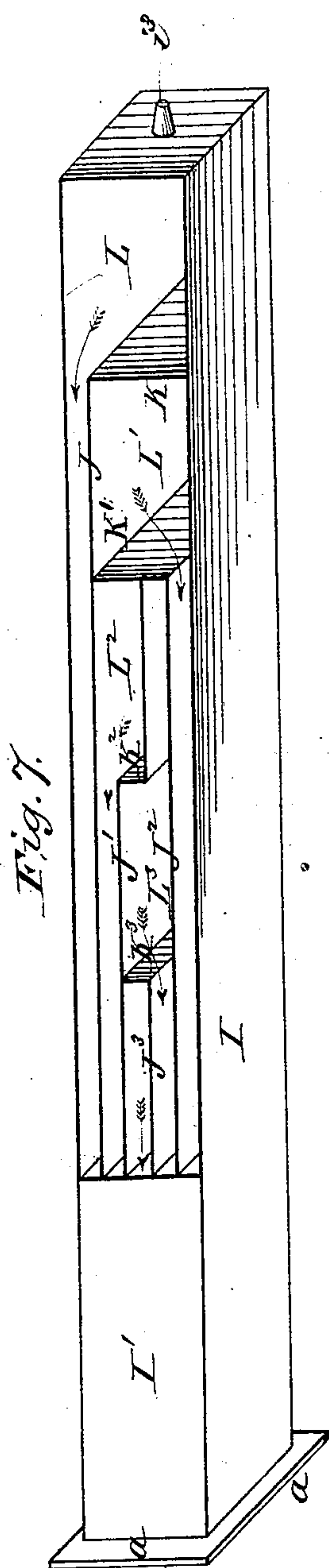
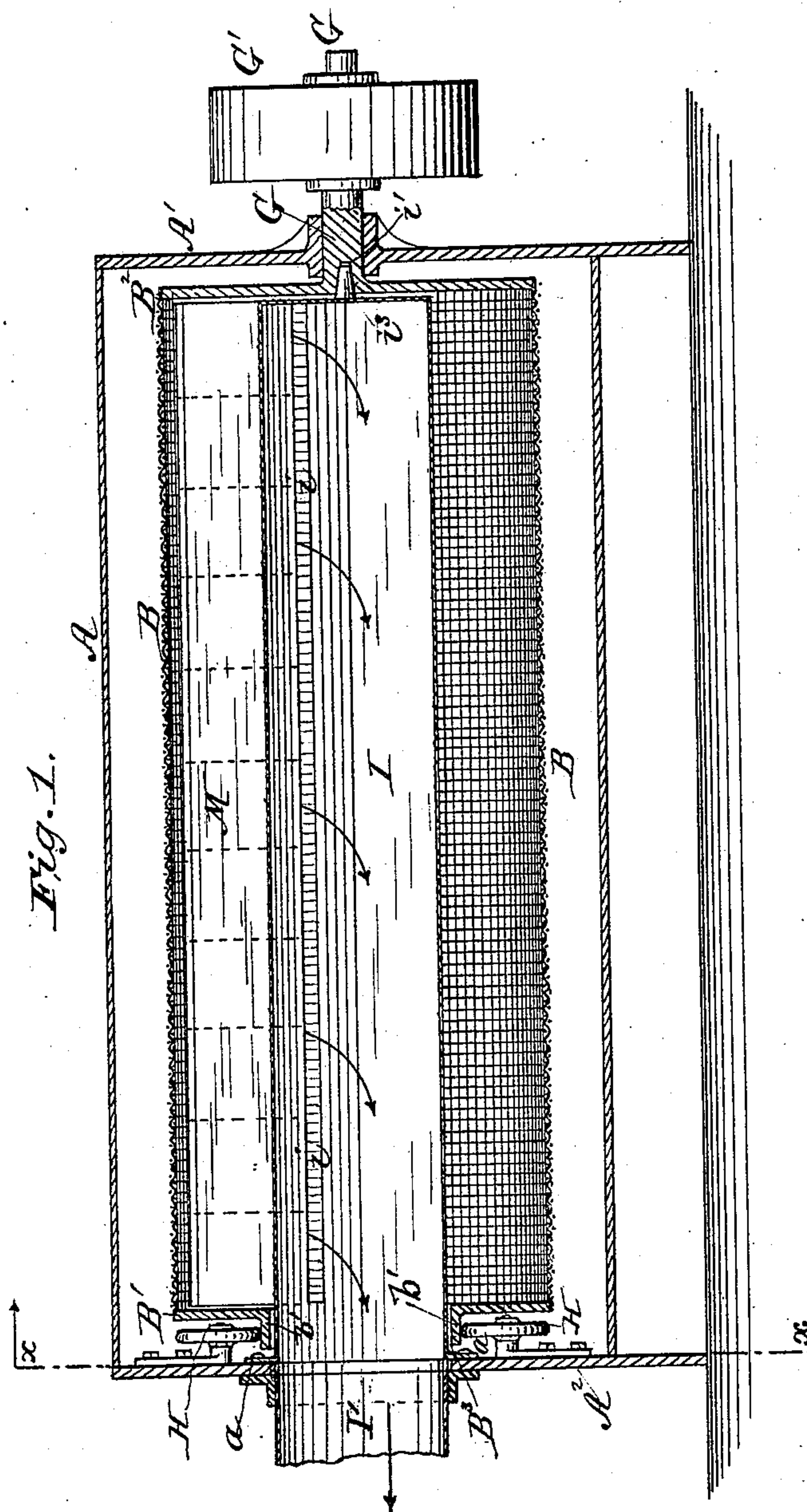


Fig. 7.



*Fig. 1.*

T. C. Brecht.  
Leticia Norris.

*Inventor:*  
*William Tarrell,*  
*by John A. Johnson*  
*Attorneys*

(No Model.)

3 Sheets—Sheet 2.

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Fig. 5.

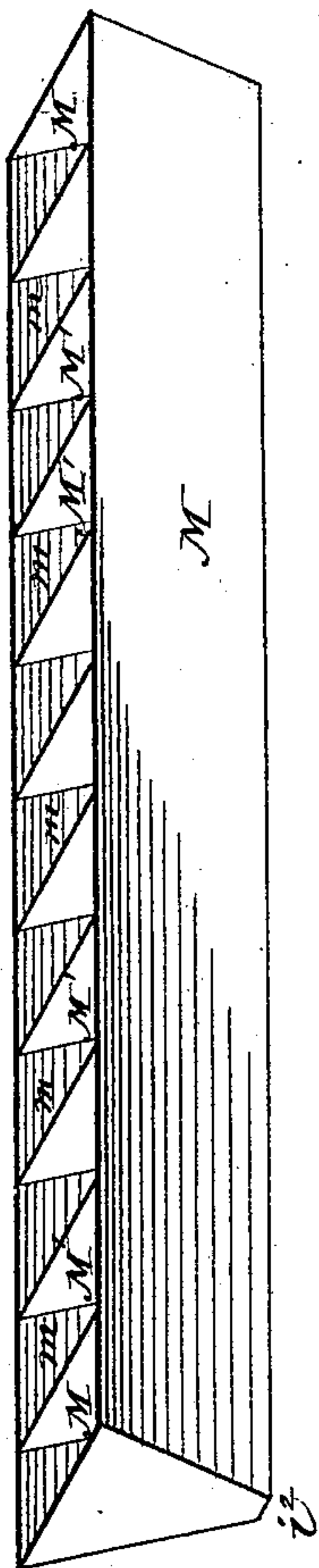
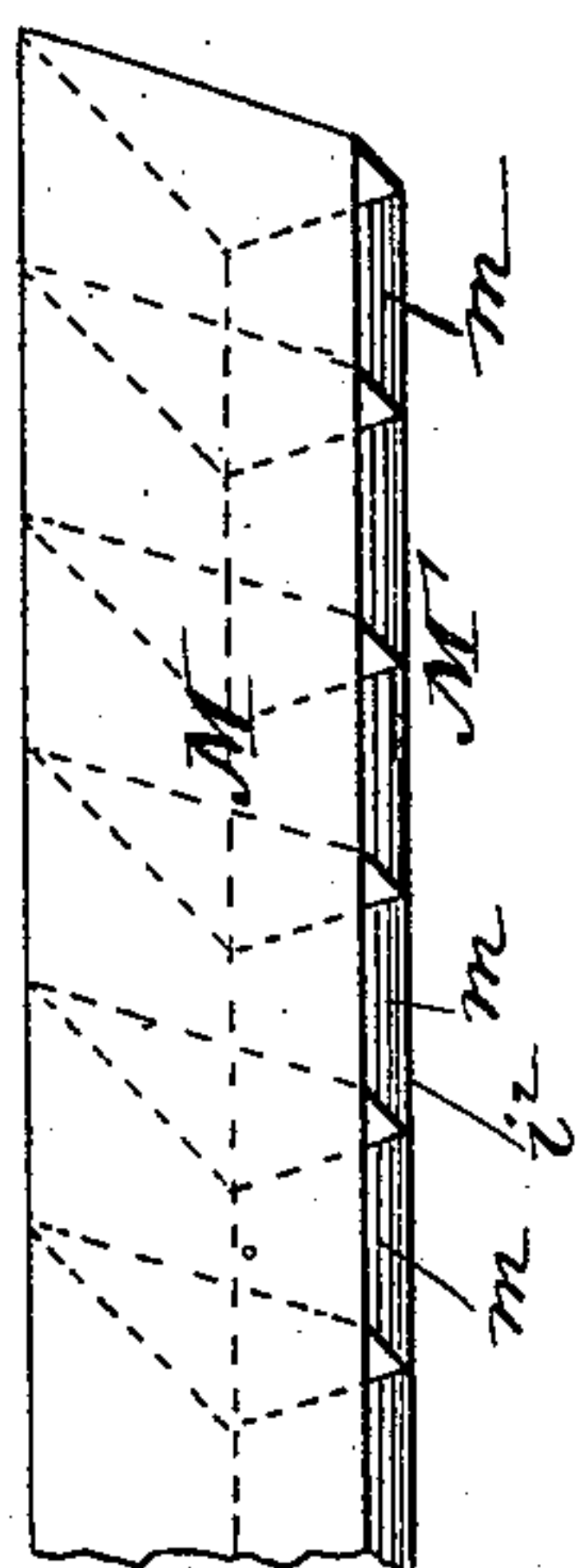


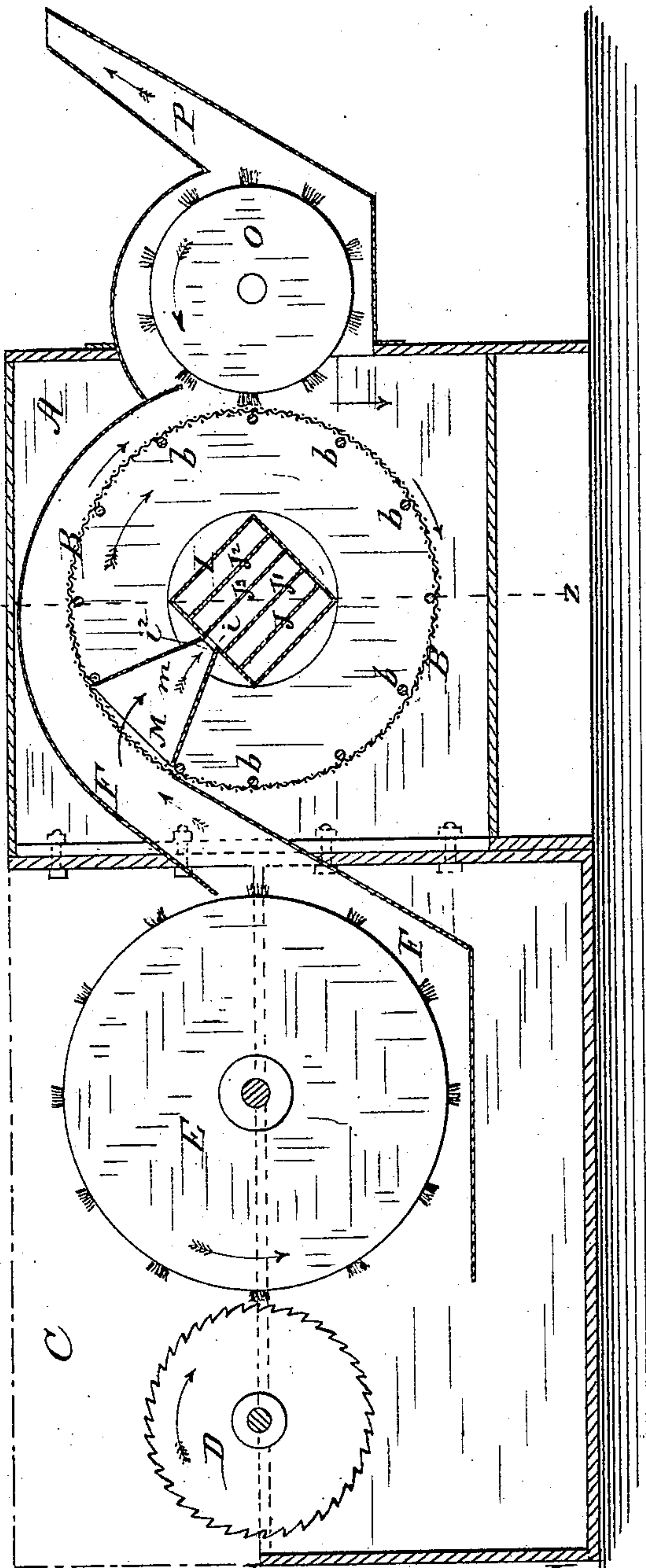
Fig. 6.



Witnesses:

J. B. Brecht,  
Lutie Horrie.

Fig. 2.



Inventor:

William Jarrell,  
by Johnson & Johnson  
Attorneys.



(No Model.)

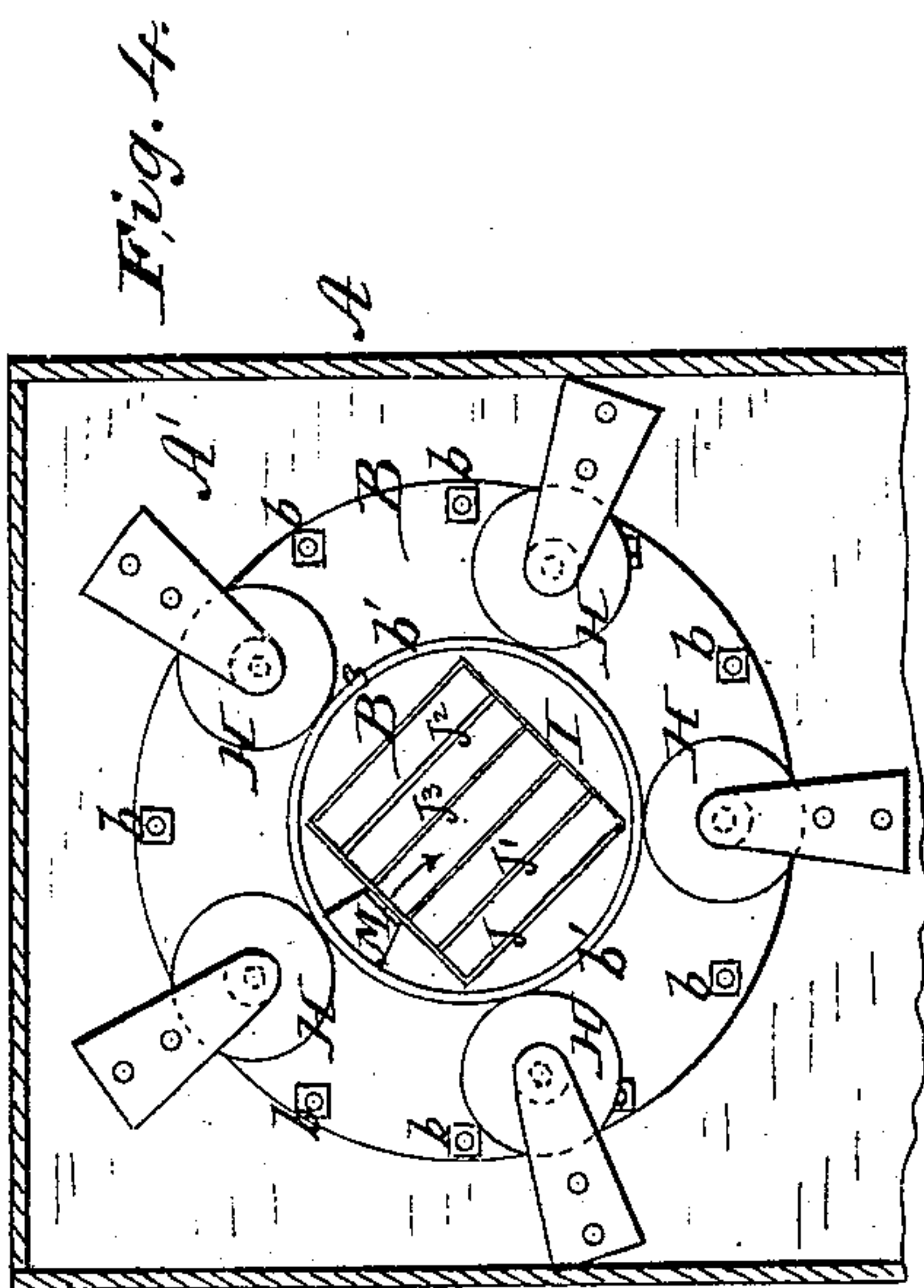
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W. JARRELL.

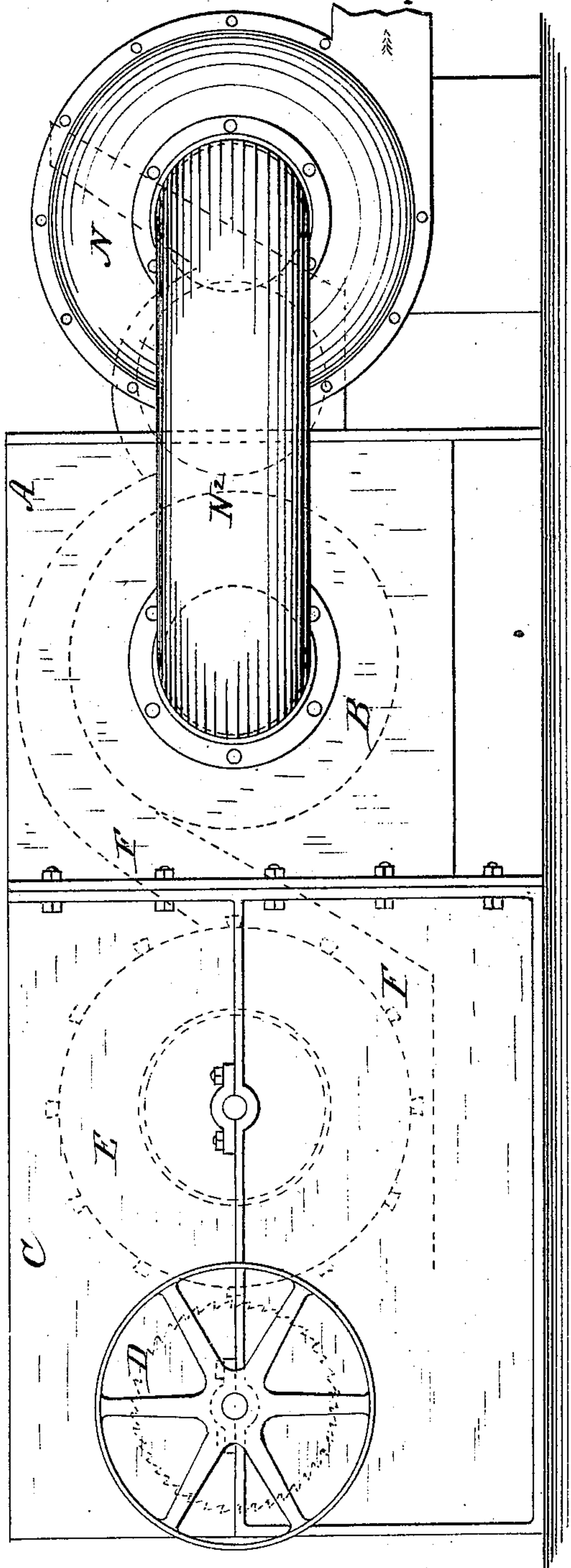
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*Fig. 3.*



Witnesses:  
*J. C. Brecht,*  
*Leticia Torrie.*

*Inventor:*  
*William Jarrell,*  
*by Johnson & Johnson*  
*Attorneys.*



# UNITED STATES PATENT OFFICE.

WILLIAM JARRELL, OF HUMBOLDT, TENNESSEE.

## COTTON CLEANER AND CONDENSER.

SPECIFICATION forming part of Letters Patent No. 304,527, dated September 2, 1884.

Application filed January 21, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM JARRELL, a citizen of the United States, residing at Humboldt, in the county of Gibson and State of Tennessee, have invented new and useful Improvements in Cotton Cleaners and Condensers, of which the following is a specification.

My invention relates to machines designed for cleaning the dust, dirt, and other light impurities contained in raw cotton after the same has been acted upon by the gin saws and brushes, the cotton being conducted from the ginning-machine upon a revolving cylindrical screen, centrally through which screen a blast of air is caused to flow, creating a suction through the meshes of the screen, that separates the dirt, dust, &c., from the cotton and conveys it away.

The object of my invention is to effect a thorough cleaning and condensation of the cotton as it leaves the gin, and for this purpose I have devised a construction whereby the suction-blast is concentrated upon the revolving dust-separating screen at the point where it joins the bottom of the passage from the ginning machinery, in such manner as to cause an equable or uniform flow of air through the meshes of the dust-separating cylinder, and to cause the air to flow through the cylinder with the same force at all points in the length of the same.

A primary feature of my invention consists in the combination, in a machine for cleaning cotton, with the usual ginning apparatus, of a revolving screen, upon which the cotton is condensed, with a suitable suction device, an air and dust conduit or tube mounted centrally and longitudinally within said screen, having a fixed relation thereto, and a suitable brush arranged to remove the cotton from the screen as it is cleaned by the action of the air passing through the same.

My invention also embraces matters of construction and of combinations, all of which I will now proceed to describe in connection with the annexed drawings, preparatory to a specific designation of the things claimed as my invention.

Referring to the drawings, Figure 1 represents a central longitudinal sectional elevation of the revolving dust-separating screen on the

line *z z* of Fig. 2; Fig. 2, a transverse sectional elevation of the revolving dust-separating screen, showing its connection and communication with the gin-saw chamber; Fig. 3, a side elevation of a cotton-cleaning machine constructed according to my invention, showing the pipe which connects the dust-separating cylinder with the fan-case. Fig. 4 is an end view of the cylindrical screen, showing the rollers for supporting one end of the same, the view being taken on the line *x x* of Fig. 1, looking at the outer side of the open flanged end of the screen. Figs. 5 and 6 are detached enlarged views of the hopper for conducting the air to the exhaust-pipe; and Fig. 7 represents a detached view of the air-exhaust pipe, showing the internal construction of the same or the partitions arranged to deflect the air therein, the top of this pipe or tube being removed to show the draft-equalizing partitions.

Within a suitable closed case, A, is mounted a cylindrical screen, B. This cylindrical screen B within its case A is placed and secured near the usual cotton-gin, C, having the saws D and wipers or brushes E, and is connected therewith by a close tube or conduit, F. The screen B is composed of two cylindrical heads, B' B<sup>2</sup>, Fig. 1, held together by longitudinal rods or bolts *b*, Figs. 2 and 4, and an interposed covering of fine hair or metal mesh-work or screening, B. One head, B', of this cylindrical screen has a central opening formed through it, as at B<sup>3</sup>, Figs. 1 and 4, and a projecting flange, *b'*, for the purpose as will hereinafter appear, and the opposite head, B<sup>2</sup>, has a short shaft, G, passing through a journal-box formed in the end of the case A. Upon the end of this shaft G is a pulley, G', by which the screen is revolved. The other end of the screen is held in position by a series of friction-rollers, H, secured to the inside of the head A<sup>2</sup> of the case A.

Centrally through the screen B is secured an air-conduit, I, Fig. 7, which is supported at one end by a center-pin, *i*<sup>3</sup>, which enters a socket, *i'*, formed in the center of the driving-shaft G of the screen, and at the other end by being secured to the head A<sup>2</sup> of the case A, as at *a*. This conduit or air-exhaust pipe I is made with a series of partitions or divisions, J J' J<sup>2</sup> J<sup>3</sup>, extending longitudinally of the



tube, and a series of transverse vertically-arranged partitions,  $K K' K^2 K^3$ , which connect with the ones  $J J' J^2 J^3$ , respectively, and thereby form separate compartments, as seen at  $L L' L^2 L^3$ , all of which compartments communicate with one common tube or delivery end,  $I'$ , as shown. Situated directly upon the top of this conduit  $I$ , and secured thereto, is an air-hopper,  $M$ , having flaring sides and a series of transverse partitions or division-plates,  $M'$ , as seen in Figs. 6 and 7, whereby the said hopper is divided up into a number of distinct compartments or spaces,  $m$ . The top or mouth of this hopper is placed close beneath the wire-gauze or meshing  $B$  of the cylindrical screen, and its delivery or lower end occupies the open top portion of the tube  $I$ , the hopper  $M$  and tube  $I$  being arranged with relation to each other, so that the air is received into the top or broad mouth of the hopper through the meshes of the screen, and is delivered into the several compartments  $L L' L^2 L^3$  of the tube  $I$ .

$N$  is a suction-fan arranged at the open end of the tube  $I$ , for creating a suction-blast through the cylinder, and  $O$  is a brush-cylinder arranged just beyond the screen  $B$ , and in such manner as to strip the cotton from the screen as the said screen, with the cotton adhering thereto, is revolved past the same, the revolutions of the screen  $B$  being in an opposite direction from that of the brush  $O$ , so that the removal of the cotton from the screen is assured. From this wheel  $O$  the cotton is then conducted through chute  $P$  to the lint-room.

The operation of the machine is as follows: The cotton, as it is picked from the field, is fed to the gin-saws  $D$ , which separate the seed therefrom. The brushes  $E$  then take the cotton from the saws and deliver it to the channel or tube  $F$ , up and around which it is caused to flow by reason of the influence of the suction-fan, which is kept revolving at a high rate of speed, and enters the chamber  $A$ . The air-blast or suction being from the outside toward the center of the screen and through the meshes thereof, the cotton is caused, in its endeavor to follow the air-current, to impact itself around and upon all portions of the screen  $B$ , to which a revolving motion had been imparted, so as to receive the cotton evenly on all portions thereof. The cotton is thus thinly spread upon the cylindrical screen, which, as it revolves, brings all portions of the surface of the screen over the mouth of the hopper  $M$ , which is the only escape or means provided for the air from the outside of the screen through the center of the same, and then away from the machine. The meshes of the screen hold the cotton, and as the screen revolves the suction of air through the cotton causes the separation of all dust, dirt, &c., therefrom, which is conveyed through the pipe  $I$  out of the machine. The cleaned cotton is then, by the action of the brushes on cylinder  $O$ , wiped or separated from the screen and conveyed by the pipe  $P$  to the lint-room.

The object of forming the hopper  $M$  with the transverse partition  $M'$  and the air-tube  $I$  with the several compartments, as herein described, and illustrated in Figs. 5, 6, and 7, is to uniformly distribute the entrance of air to the tube  $I$ . The compartments of the air conduit or tube shown in Fig. 7, nearest its open end, which communicates with the fan, are smaller than those farther remote from its open end, and all the compartments of this air conduit or tube  $I$  conduct to one common outlet, so that the farthest opening,  $L$ , will receive as much air or be under the same degree of suction as the nearest opening,  $L^3$ . The shape of the several compartments formed in the tube also add to the desired result—that of equally distributing the air-suction throughout the entire length of the screen. The top of the dust-conduit  $I$  has a narrow longitudinal slot,  $i$ , and the bottom opening,  $i^2$ , of the hopper  $M$  sets over the opening  $i$  and forms a close joining therewith, as shown in Fig. 2, while the top of the hopper is open, and extends the length of the screen close to its inner side, but not touching it.

In Fig. 2 the bottom of the cotton and dust conveying tube  $F$  is shown as terminating at that side of the casing nearest to the gin-brush, so that the hopper on the inner side of the cylinder-screen practically forms a continuation of the tube  $F$  on the outside of said screen, while the outer side of the tube  $F$  extends over the screen and joins the case of the doffing-brush.

In Fig. 1 the air-conduit is shown as receiving air and dust from the hopper  $M$  through the long narrow opening  $i$ , and delivering it at the open end  $L'$ ; and it will be understood that this long narrow opening extends along the top of the air conduit or tube and joins the open bottom of the hopper, the top of said air conduit or tube being closed except at its communication with the hopper, as shown in Fig. 2. The dust passes from the open end of the air conduit or tube into the fan-case, and is delivered away from the gin. The connection of the fan-case  $N$  with this central fixed air-conduit is by the pipe  $N'$ , (shown in Fig. 3,) or in any suitable way.

Referring to the hopper  $M$  as forming a continuation of the case-passage  $F$  within the revolving screen, it will be seen that in Fig. 2 the bottom of said case-passage rises and joins the circumference of the cylinder on a tangent. At this point it also joins the nearest side of the hopper  $M$ , which extends downward therefrom and joins one side of the opening  $i$  in the top of the central air-conduit, and in this way the hopper forms a continuation of the bottom of the case-passage  $F$ , and the suction from the gin is through the revolving screen at this point, as indicated by the arrows.

Referring to the shape of the compartments in the air-conduit  $I$ , the parallel and cross divisions form narrow compartments lengthwise of the tube, of unequal length, and com-



communicating wider compartments  $L$   $L'$   $L^2$  at intervals in the length of the tube  $I$ , and this construction serves to equalize the suction of the air and dust into the tube  $I$  all along the bottom of the hopper, and hence all along the screen at the mouth of the hopper. This construction gives greater force to the suction at the mouth of the hopper  $M$ , and the divisions of the hopper and the disposition of the compartments co-operate to make the suction through the screen uniform throughout its length.

I claim—

1. The combination, with suitable cotton-ginning machinery, of the closed case  $A$ , a cylindrical revolving screen, suitable means to revolve it, a suitable air-suction tube centrally arranged within said screen, and suitable means connected with said tube to draw air and dust through the meshes of the screen and conduct the same from the machine, for the purpose specified.

2. The combination, in a machine for cleaning cotton, with the usual ginning apparatus or machinery, of an air-suction device, a revolving screen, an air-conduit arranged centrally within said screen, through which the air and dust are conducted, and a brush arranged to remove the cotton from the screen as it is cleaned, substantially as described.

3. In a machine for cleaning cotton, the combination, with a revolving screen upon which the cotton is condensed, of an air and dust conducting tube mounted centrally within said screen, having a fixed relation thereto, and divided into separate and distinct suction-channels, and a suitable fixed mouth or hopper adapted to effect the communication of the central dust-conduit with the gin-chamber through the screen, substantially as set forth.

4. In a machine for cleaning cotton, the combination, with the cylindrical revolving screen and the closed case, of the fixed hopper  $M$ , having partitions  $M'$ , forming separate compartments  $m$ , the fixed central tube or conduit,  $I$ , having separate compartments  $L$   $L'$   $L^2$   $L^3$ , and a single outlet common to all, said hopper and tube being arranged within the cylindrical screen, and means for drawing air and dust from the case  $A$  through the revolving screen and the fixed central tube and conducting it from the machine, substantially as described.

5. In a machine for cleaning cotton, the closed case  $A$ , having an opening at one end, the revolving cylindrical screen  $B$ , having an open flanged head,  $B'$   $b'$ , and the friction-rollers  $H$ , supporting the open flanged end of said screen, combined with the non-revolving central air and dust conduit,  $I$ , having its open end secured to the open end of the case and its closed end mounted on a pivot in the head or shaft of the screen, and suitable means for drawing air and dust from the case into

and through the said non-revolving central conduit, substantially as herein set forth.

6. The central dust-conduit having separate and distinct suction-channels, formed and arranged as described, combined with a hopper mounted upon one side of said dust-conduit, the revolving screen-cylinder, and the tube  $F$ , the latter arranged outside of said screen, and the former within the screen, substantially as shown and described.

7. The fixed central dust-conduit,  $I$ , the revolving screen-cylinder  $B$ , the inclosing-case  $A$ , and the mouth or hopper, constructed and arranged substantially as shown and described, combined with the revolving brush-cylinder  $O$ , for the purpose specified.

8. The combination, with the revolving cleaning-screen  $B$  and an inclosing-case therefor, of a fixed central dust-conduit,  $I$ , divided into separate and distinct suction-channels, and a mouth or hopper,  $M$ , divided into separate open spaces  $m$ , communicating with the central dust-conduit, and the channel or tube  $F$ , substantially as described, for the purpose specified.

9. The revolving cylindrical screen  $B$ , mounted at its closed end upon the driving-shaft  $G$ , and at its open end upon the rolls  $H$ , combined with an inclosing-case therefor, and a central fixed dust-conduit,  $I$ , a mouth or hopper,  $M$ , flaring from said dust-conduit in close proximity with the inner wall of the screen, and having one of its sides forming a continuation of the bottom of the tube  $F$ , whereby the dust is drawn from said tube into the fixed central conduit.

10. The combination, with the revolving screen  $B$ , having a closed end provided with socket  $i'$ , and an open end, of the central non-revolving air-conduit,  $I$ , having a closed end provided with center-pin  $i^3$ , and an open end provided with the flange  $a$ , and the case  $A$ , the open end of the air-conduit passing through the open end of the revolving screen, substantially as herein set forth.

11. The combination, with suitable cotton-ginning machinery, of the closed case  $A$ , a cylindrical screen, suitable means to revolve it, an air conduit or tube centrally arranged through said screen, a mouth or hopper connected with said tube, suitable means arranged within said air-conduit and hopper to equalize the suction throughout the length of the screen, and suitable means connected with said central tube to draw air and dust through the meshes of the screen, substantially as specified.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM JARRELL.

Witnesses:

M. H. JOHNSON,

JAMES A. HAMILTON.