

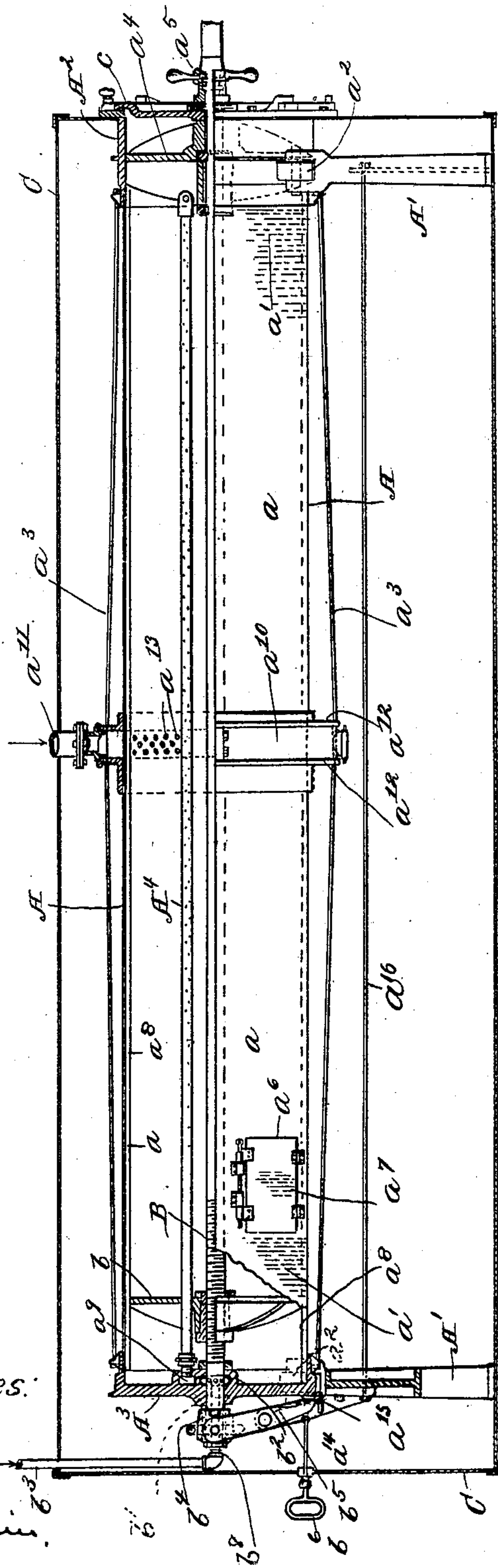
A. G. HUPFEL.  
 COMBINED HOP PRESS AND FILTER.  
 APPLICATION FILED DEC. 9, 1907.

903,574.

Patented Nov. 10, 1908.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:  
 J. C. Turner  
 Geo. F. O'Brien

Inventor:  
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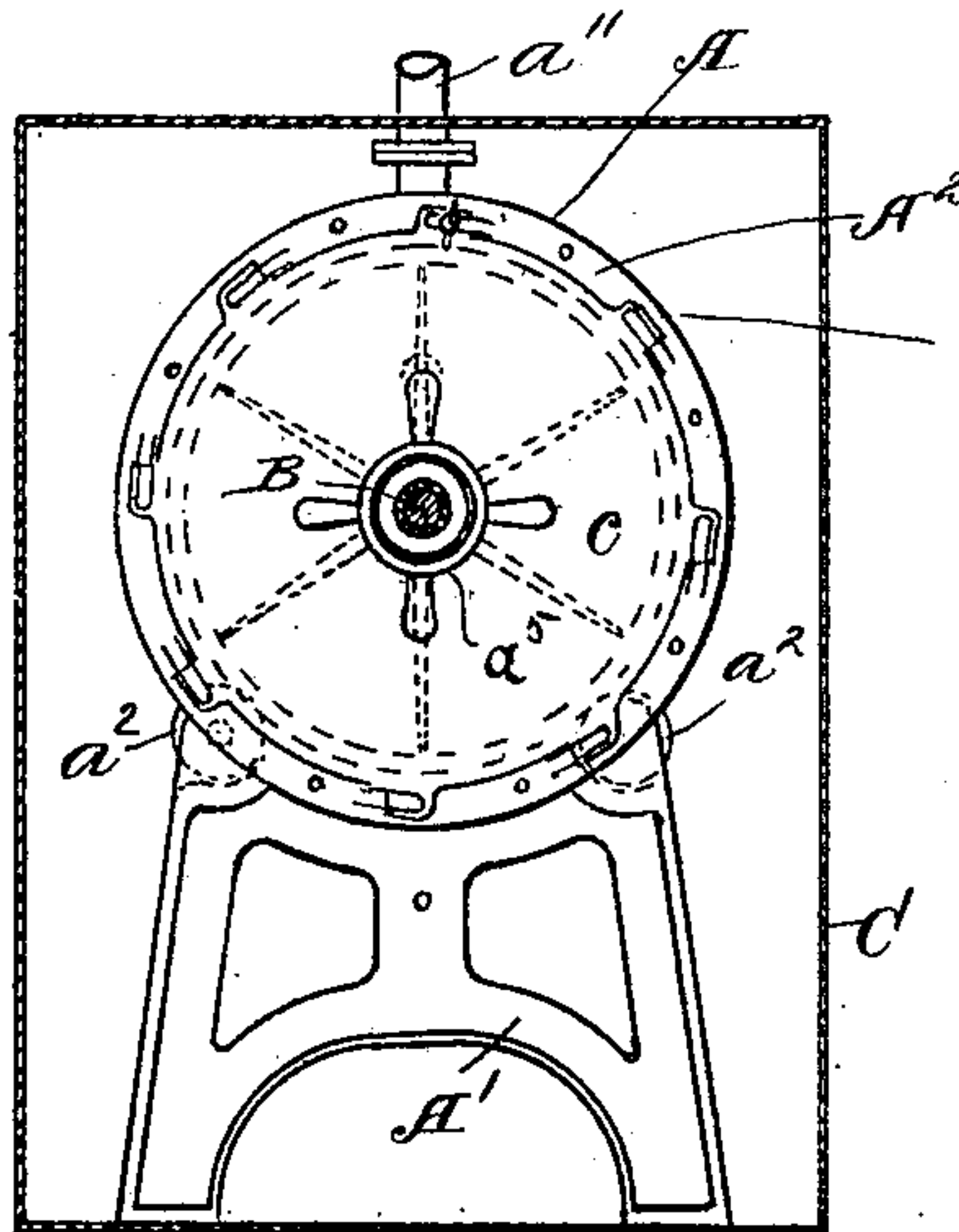
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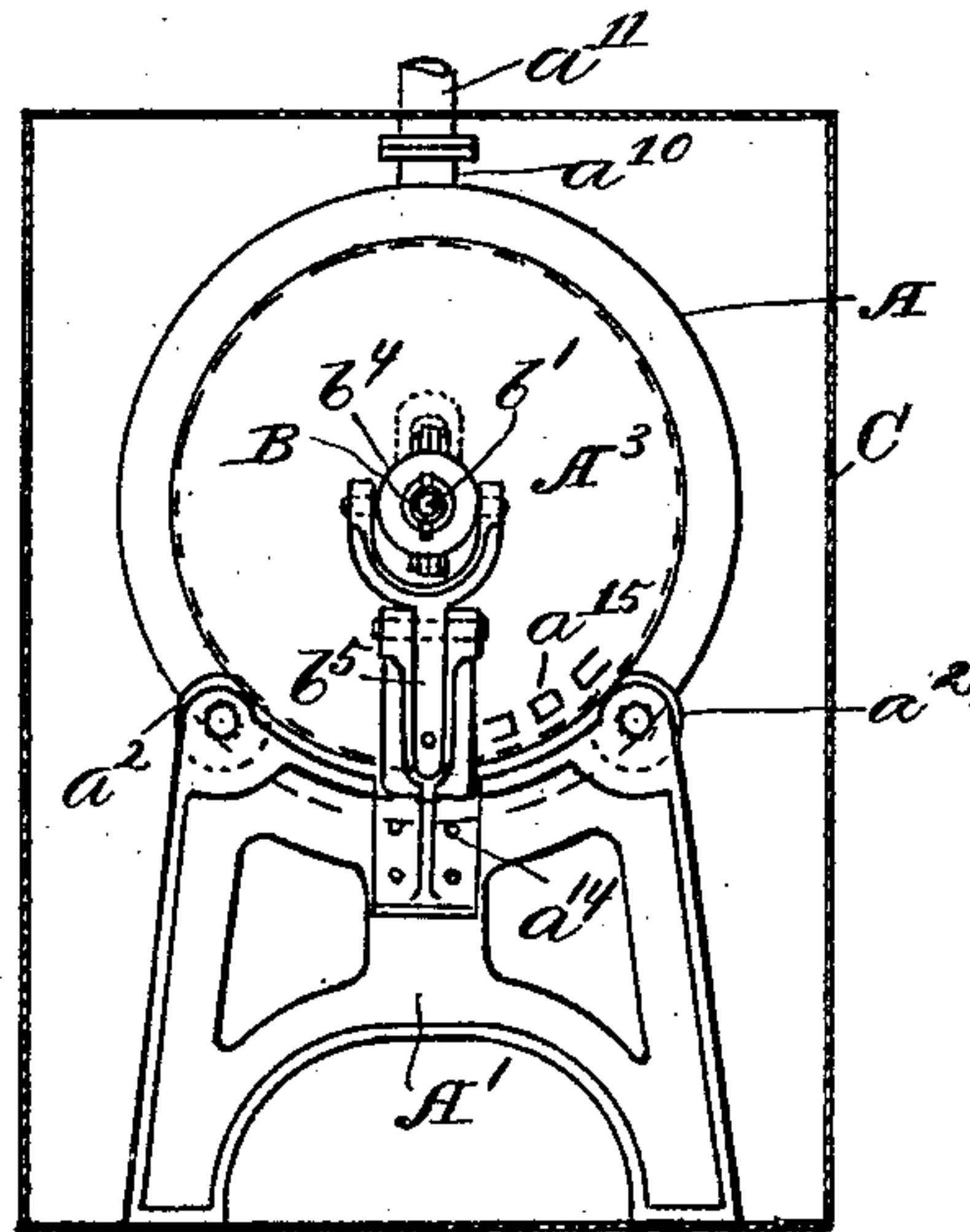
Patented Nov. 10, 1908.

2 SHEETS—SHEET 2.

*Fig. 2*



*Fig. 3*



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# UNITED STATES PATENT OFFICE.

ADOLPH G. HUPFEL, OF NEW YORK, N. Y.

## COMBINED HOP PRESS AND FILTER.

No. 903,574.

Specification of Letters Patent.

Patented Nov. 10, 1908.

Application filed December 9, 1907. Serial No. 405,683.

*To all whom it may concern:*

Be it known that I, ADOLPH G. HUPFEL, citizen of the United States, resident of New York, county of New York, and State of New York, have invented a new and useful Improvement in a Combined Hop Press and Filter, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention relates to apparatus for the extraction of a liquid from an intermingled mass of solid material, and especially to a combined press and filter adapted for use in the process of brewing for the purpose of screening the hops from the wort as it comes from the kettle, washing the extract out of the hop leaves, and then compressing the hops to take out all of the liquor still remaining.

The object of the invention is to produce a device that will be adapted to accomplish the above operations with a minimum of labor, at the same time more completely removing the extract from the hops and that with the use of less wash or sparge water than required by present processes, thereby leaving the wort of a higher gravity.

To the accomplishment of the above and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings: Figure 1 represents partly in section and partly in side elevation a combined press and filter embodying my several improvements; Fig. 2 is a rear end elevation of the press and filter proper, a tank wherein such press is located being shown in section; and Fig. 3 is a similar view of the front end of the apparatus.

Having regard, then, to the several figures of the drawings, the press will be seen to consist primarily of an elongated cylindrical drum A, the cylindrical walls  $a$  which are preferably made of copper perforated with holes  $a'$ , that, in the apparatus illustrated, are in the form of slots. For the particular use in hand such slots, for example, would be made one-thirty-second by one-quarter

inch in size. This drum A is longitudinally disposed, being mounted at either end upon supports A' inter-braced by one or more rods  $a^{10}$  and provided with roller bearings  $a^2$  in order to render the rotation of the drum possible when desired. Suitable stay-rods  $a^3$  connect the end frames of the drum and impart the necessary rigidity to the latter to prevent sagging of the portions intermediate between the end supports A'. Of such frames, the rear one A<sup>2</sup> is simply an annular casting or spider in which is fitted the bearing for shaft and a removable gate or head  $a^4$ , held in place by a breech lock  $a^5$  when press is in use. The head and breech lock are removable endwise when it is desired to discharge the compressed hops out the end of the press or gain access to the interior. Such lock also serves to assist in securing in place a door  $c$  in an inclosing tank C to which reference will be made later, at the same time acting as a stuffing box. Access may also be had to the interior of the drum through a man-hole  $a^6$  closed by a door  $a^7$  hinged in the manner clearly shown in Fig. 1. The forward end frame A<sup>3</sup> of the drum, in distinction from the rear end just described, forms a solid and permanent closure of the corresponding drum end.

Extending centrally the entire length of the drum is a solid shaft B that is rotatably mounted in end frames A<sup>2</sup> A<sup>3</sup> and projects without the former far enough to be connected with suitable driving means (not shown). The portion of the shaft lying within the drum B is threaded, and mounted thereon is a movable head  $b$  which is held against rotation with respect to the drum by two guides  $a^8$  on the inner side of the drum. At the front end of the apparatus, such shaft B extends likewise outside the head a short distance, such extending portion being formed with a bore  $b'$  extending within the corresponding fixed head A<sup>3</sup> of the drum and there communicating by means of openings  $b^2$  with a chamber  $a^9$  in such head. It will of course be understood that suitable stuffing glands will be employed in connection with the several bearings thus had by the shaft in the end frame or head A<sup>3</sup>. Connected in turn with such chamber  $a^9$  is a sparging pipe or tube A<sup>4</sup>, fixedly supported at its forward end in the head A<sup>3</sup> of the drum, and at its rear end by one of the arms of head A<sup>2</sup>. This tube is perforated so that water supplied to the



bore  $b'$  in the hollow end of the shaft from a pipe  $b^3$ , which latter is connected to such end by means of a revolving joint  $b^8$ , may enter the tube by way of the chamber  $a^9$  in the fixed head of the drum and thence be distributed throughout the entire length of the drum. Movable head  $b$  is of course provided with a suitable opening for the reception of the sparging pipe.

To supply to the drum the material to be operated upon, in the case in hand the mixture of hops and wort as it comes from the kettle, a sleeve or gland  $a^{10}$  is so mounted upon the drum intermediately between its ends as to permit free rotation of the drum within the sleeve, such material being fed to the sleeve by a pipe  $a^{11}$ . This sleeve  $a^{10}$  is preferably secured to the drum by means of two spaced parallel flanges or guides  $a^{12}$  encircling the latter, and from the annular chamber thus formed the material is admitted to the drum interior through openings  $a^{13}$  in the portion of its walls lying between said flanges.

Rotation of central shaft B is adapted to be optionally utilized to rotate the drum or to actuate movable head  $b$  to compress the material within the drum, by means of a clutch device at the front end of the apparatus. This device consists simply of a jaw clutch  $b^4$  slidably mounted on the front end of the shaft by means of which the drum is adapted to be fixedly secured thereto when it is desired to rotate the same. A lever  $b^5$  fulcrumed between its ends in a bracket  $a^{14}$  projecting from support  $A'$ , is connected at one end to thus operate the clutch. When such clutch is thrown out of commission the other arm of the lever is adapted simultaneously to engage a lug  $a^{15}$  on the fixed head of the drum and thereby hold the latter against rotation. Operation of lever  $b^5$  is had by means of a handle  $b^6$  projecting without the end wall of tank C. The latter, as has been indicated is designed to inclose the whole apparatus and may be of any desired shape, a convenient form being rectangular as shown.

Having thus described the construction of my improved press and filter, the operation thereof may be briefly set forth. The mode of procedure will be to allow the wort to run in through the central pipe  $a^{11}$ , such wort together with the hops being distributed through the length of the drum A by slowly rotating the latter. An additional effect of such rotation, owing to the perforated character of the drum's walls, will be to drain off the greater portion of the wort from the hop leaves. After the wort has been drained off the hops, and the hops sparged, the clutch on the front end is withdrawn from engagement with the drum thereby at the same time locking the drum against rotation, whereupon the continued

rotation of the shaft will be effective to draw the movable head within the drum lengthwise of the latter, thereby collecting and compressing the mass of hops within the drum to any desired degree of dryness. The breech lock is then opened, the tank door unbolted, and the screw allowed to rotate, thereby forcing the hops with the loose head out of the end of the drum. It is quite possible with my apparatus, as shown, to carry on such compression to a degree that will leave the material in question in a practically dry and combustible state, thus facilitating the disposal of what is otherwise an inconvenient form of refuse.

The superiority in operation of the above described apparatus for the purpose in hand over the prevailing method of screening the hops from the wort as it comes from the kettle by means of the usual large flat false bottom screen and then washing the extract out of the leaves by a copious application of water, should be sufficiently evident without further comment. In the first place the amount of labor required to remove the hops is very much less; secondly, the cost of disposal after being compressed is less; and thirdly, as has been indicated, all the extract can be removed from the hops by pressing, and, since little or no sparge water is required to remove the last extract from the leaves (as per the old method) the wort is left at a considerably higher gravity. Consequently, it is unnecessary to increase the boiling, in order to evaporate the amount of water equivalent to the amount of sparge water, which would have been added by the old system. Thus, the final gravity remains practically as turned out at the kettle.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In apparatus of the class described, the combination of a rotatable receptacle having perforated walls, a movable head fitted therein, connections for supplying to said receptacle the material to be operated upon, means for rotating said receptacle, and means adapted to actuate said head to compress such material when desired.

2. In a combined press and filter, the combination of a rotatable receptacle having perforated walls, a movable head fitted therein, connections for supplying to said receptacle the material to be operated upon, and means adapted optionally to rotate said receptacle or to actuate said head to compress such material.

3. In a combined press and filter, the com-



5 combination of a rotatable, longitudinally disposed drum, a movable head fitted therein, connections for supplying to said drum the material to be operated upon, and means adapted optionally to rotate said drum or to actuate said head to compress such material.

10 4. In a combined press and filter, the combination of a rotatable, longitudinally disposed drum; a movable head therein; connections for supplying to said drum the material to be operated upon, such connections including a sleeve mounted upon said drum through which the material may enter during the rotation of said drum; and means adapted optionally to rotate said drum or to actuate said head to compress such material.

15 5. In a combined press and filter, the combination of a rotatable, longitudinally disposed drum; a movable head therein; connections for supplying to said drum the material to be operated upon, such connections including a pair of parallel flanges encircling said drum, a sleeve mounted upon said flanges, the portion of the drum between said flanges having openings for the admission of the material thereto, and a supply pipe connected with said sleeve; and means adapted optionally to rotate said drum or to actuate said head to compress such material.

20 6. In a combined press and filter, the combination of a rotatable receptacle; connections for supplying to said receptacle the material to be operated upon; a shaft extending through said receptacle and rotatable with respect thereto; and a head threaded upon said shaft and longitudinally but not otherwise movable with respect to said receptacle.

25 7. In a combined press and filter, the combination of a rotatable receptacle; connections for supplying to said receptacle the material to be operated upon; a shaft extending through said receptacle and rotatable with respect thereto; a head threaded upon said shaft and longitudinally but not otherwise movable with respect to said receptacle; and means adapted to connect said receptacle with said shaft, whereby said drum may be caused to rotate therewith.

30 8. In a combined press and filter, the combination of a rotatable receptacle; connections for supplying to said receptacle the material to be operated upon; a shaft extending through said receptacle and rotatable with respect thereto; a head threaded upon said shaft and longitudinally but not otherwise movable with respect to said receptacle; and means adapted to engage said receptacle to hold the same against rotation.

35 9. In a combined press and filter, the combination of a rotatable receptacle; connections for supplying to said receptacle the material to be operated upon; a shaft extending through said receptacle and rotatable with respect thereto; a head threaded

upon said shaft and longitudinally but not otherwise movable with respect to said receptacle; means adapted to connect said receptacle with said shaft, whereby said receptacle may be caused to rotate therewith; and means adapted to engage said receptacle to hold the same against rotation. 70

10. In a combined press and filter, the combination of a rotatable receptacle; connections for supplying to said receptacle the material to be operated upon; a shaft extending through said receptacle and rotatable with respect thereto; a head threaded upon said shaft and longitudinally but not otherwise movable with respect to said receptacle; and means adapted optionally to fixedly secure said drum to said shaft, whereby said drum may be caused to rotate therewith, or to retain said drum against rotation. 75 80

11. In a combined press and filter, the combination of a rotatable receptacle; connections for supplying to said receptacle the material to be operated upon; a shaft extending through said receptacle and rotatable with respect thereto; a head threaded upon said shaft and longitudinally but not otherwise movable with respect to said receptacle; a clutch adapted to non-rotatably secure said receptacle to said shaft; locking means adapted to retain said receptacle against rotation; and means adapted to simultaneously render said clutch operative and said locking means inoperative, and vice versa. 85 90 95

12. In a combined press and filter, the combination of a rotatable, longitudinally disposed drum; connections for supplying to said drum the material to be operated upon; a central shaft extending the length of the drum and rotatable with respect thereto; a head threaded upon said shaft and held against rotation with respect to said drum; a clutch adapted to non-rotatably secure said drum to said shaft; locking means adapted to retain said drum against rotation; and means adapted to simultaneously render said clutch operative and said locking means inoperative, and vice versa. 100 105 110

13. In a combined press and filter, the combination of a rotatable, longitudinally disposed drum; connections for supplying to said drum the material to be operated upon; a central shaft extending the length of the drum and rotatable with respect thereto; a head threaded upon said shaft and held against rotation with respect to said drum; a clutch adapted to non-rotatably secure said drum to said shaft; and a lever fulcrumed between its ends and having one end connected with said clutch, the other end being adapted to engage said drum to retain the same against rotation when said clutch is rendered inoperative. 115 120 125

14. In a combined press and filter, the combination of a rotatable, longitudinally 130



disposed drum; connections for supplying to said drum the material to be operated upon, such connections including a sleeve mounted upon said drum through which the material  
 5 may enter during the rotation of said drum; a central shaft extending the length of the drum and rotatable with respect thereto; a head threaded upon said shaft and held against rotation with respect to said drum;  
 10 a clutch adapted to non-rotatably secure said drum to said shaft; locking means adapted to retain said drum against rotation; and means adapted to simultaneously render said clutch operative and said locking means in-  
 15 operative, and vice versa.

15. In a combined press and filter, the combination of a rotatable, longitudinally disposed drum; connections for supplying to said drum the material to be operated upon,  
 20 such connections including a pair of parallel flanges encircling said drum, a sleeve mounted upon said flanges, the portion of the drum between said flanges having openings for the admission of the material thereto,  
 25 and a supply pipe connected with said sleeve; a central shaft extending the length of the drum and rotatable with respect thereto; a head threaded upon said shaft and held against rotation with respect to  
 30 said drum, a clutch adapted to non-rotatably secure said drum to said shaft; a lever fulcrumed between its ends and having one end connected with said clutch, the other end being adapted to engage said drum to retain  
 35 the same against rotation when said clutch is rendered inoperative; and means for positioning said lever.

16. In apparatus of the class described, the combination with a rotatable receptacle, of  
 40 means for supplying to said receptacle the material to be operated upon pending rotation of said receptacle, said means being connected with said receptacle intermediately between the ends of the same.

45 17. In apparatus of the class described, the combination with a rotatable receptacle, of means connected with said receptacle at points in its surface removed from its axis of rotation and adapted to supply thereto pend-  
 50 ing rotation, the material to be operated upon.

18. In apparatus of the class described, the combination with a rotatable receptacle, of  
 55 connections for supplying to said receptacle the material to be operated upon pending rotation of said receptacle, said connections including a pair of parallel flanges encircling said receptacle, a sleeve mounted upon said flanges, the portion of the receptacle be-  
 60 tween said flanges having openings for the admission of the material thereto, and a supply pipe connected with said sleeve.

19. In a combined press and filter, the combination of a rotatable receptacle; connec-  
 65 tions for supplying to said receptacle the ma-

terial to be operated upon pending rotation of said receptacle; a sparging pipe extending the length of said receptacle; and connec-  
 70 tions for supplying liquid to said pipe likewise pending rotation of said receptacle.

20. In a combined press and filter, the combination of a rotatable receptacle; connections for supplying to said receptacle pending  
 75 rotation of the same the material to be operated upon; a central shaft extending the length of the receptacle and rotatable with respect thereto, said shaft being hollow at one end and the corresponding end of said receptacle being formed with a chamber hav-  
 80 ing communication with such hollow end; a sparging pipe extending the length of said receptacle and connected with such chamber; and connections for supplying liquid to such hollow end of the shaft pending rotation of  
 85 the latter.

21. In a combined press and filter, the combination of a rotatable, longitudinally disposed drum; connections for supplying to said drum the material to be operated upon  
 90 pending rotation of said drum; a central shaft extending the length of the drum and rotatable with respect thereto, said shaft being hollow at one end and the corresponding end of said drum being formed with a chamber having communication with such  
 95 hollow end; a sparging pipe extending the length of said drum and connected with such chamber; connections for supplying liquid to such hollow end of the shaft pending rota-  
 100 tion of the latter; a clutch adapted to non-rotatably secure said drum to said shaft; locking means adapted to retain said drum against rotation; and means adapted simul-  
 105 taneously to retain said clutch operative and said locking means inoperative, and vice versa.

22. In a combined press and filter, the combination of supports provided with rollers; a longitudinally disposed drum rota-  
 110 tably resting at its ends upon said supports; connections for supplying to said drum the material to be operated upon pending rotation of said drum; a shaft extending through said drum and rotatable with respect thereto;  
 115 one end of said shaft being hollow and the corresponding end of said drum being formed with a chamber having communication with such hollow shaft end; a sparging pipe extending lengthwise of said drum and  
 120 connected with such chamber; external connections for supplying liquid to such hollow shaft end pending rotation of the latter; a head threaded upon said shaft and held against rotation with respect to said drum; a  
 125 clutch adapted to non-rotatably secure said drum to said shaft; locking means adapted to retain said drum against rotation; and means adapted to simultaneously render said clutch operative and said locking means in-  
 130 operative, and vice versa.



23. In a combined press and filter, the combination of supports provided with rollers; a longitudinally disposed drum rotatably resting at its ends upon said supports, 5 connections for supplying to said drum the material to be operated upon pending rotation of said drum, such connections including a pair of parallel flanges encircling said drum intermediate between said ends; a 10 sleeve mounted upon said flanges, the portion of the drum between said flanges having openings for the admission of the material thereto, and a supply pipe connected with said sleeve; a central shaft extending the 15 length of the drum and rotatable with respect thereto, one end of said shaft being hollow and the corresponding end of said drum having a chamber communicating with such hollow shaft end; a sparging pipe extending lengthwise of said drum and connected with such chamber; external connections for supplying liquid to such hollow shaft end pending rotation of the latter; a head threaded upon such shaft and held against rotation with respect to said drum; a 25 clutch adapted to non-rotatably secure said drum to said shaft; and a lever fulcrumed between its ends and having one end connected with said clutch, the other end being adapted to engage said drum to retain the same 30 against rotation when such clutch is rendered inoperative.

Signed by me this 2nd day of December, 1907.

ADOLPH G. HUPFEL.

Attested by—

HERMAN GOETZ,  
L. PFAFF.