

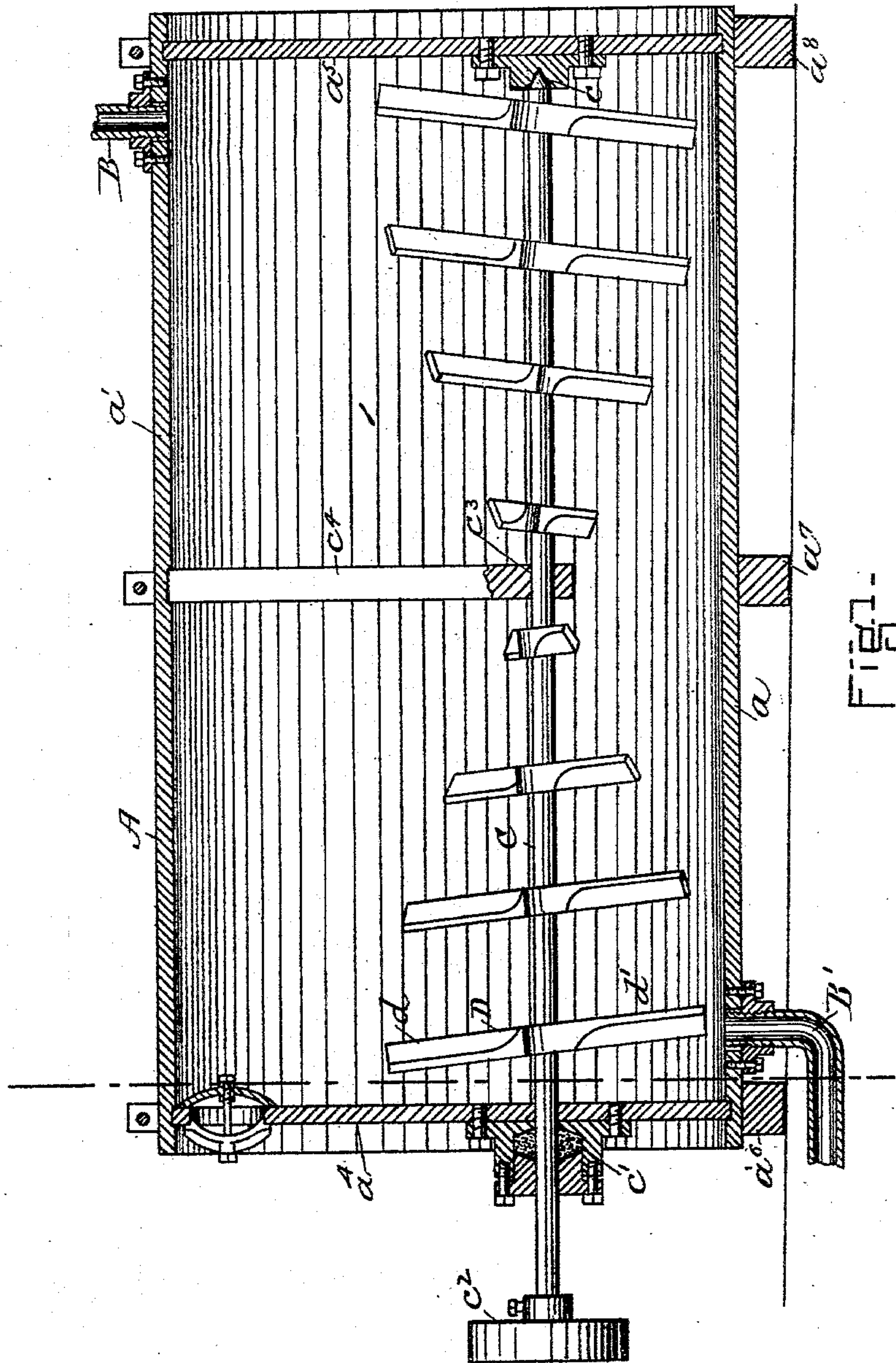
(No Model.)

2 Sheets—Sheet 1.

E. L. SAVAGE.  
STUFF CHEST FOR PAPER MILLS.

No. 515,941.

Patented Mar. 6, 1894.



WITNESSES.

J. W. Dolan  
M. M. Fraynes

INVENTOR.

Ernest L. Savage  
by his atty  
Clarke & Raymond

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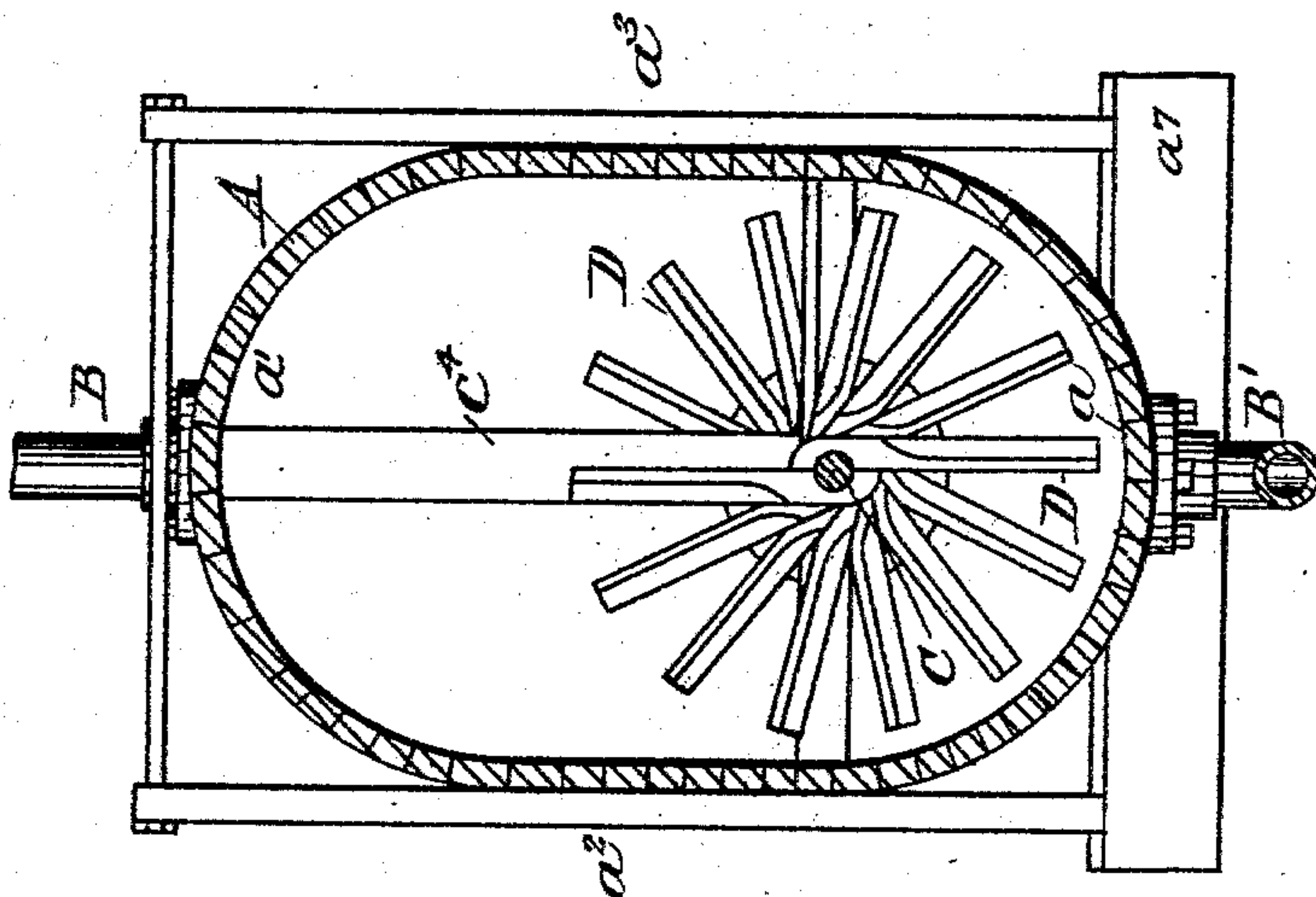


Fig. 3.

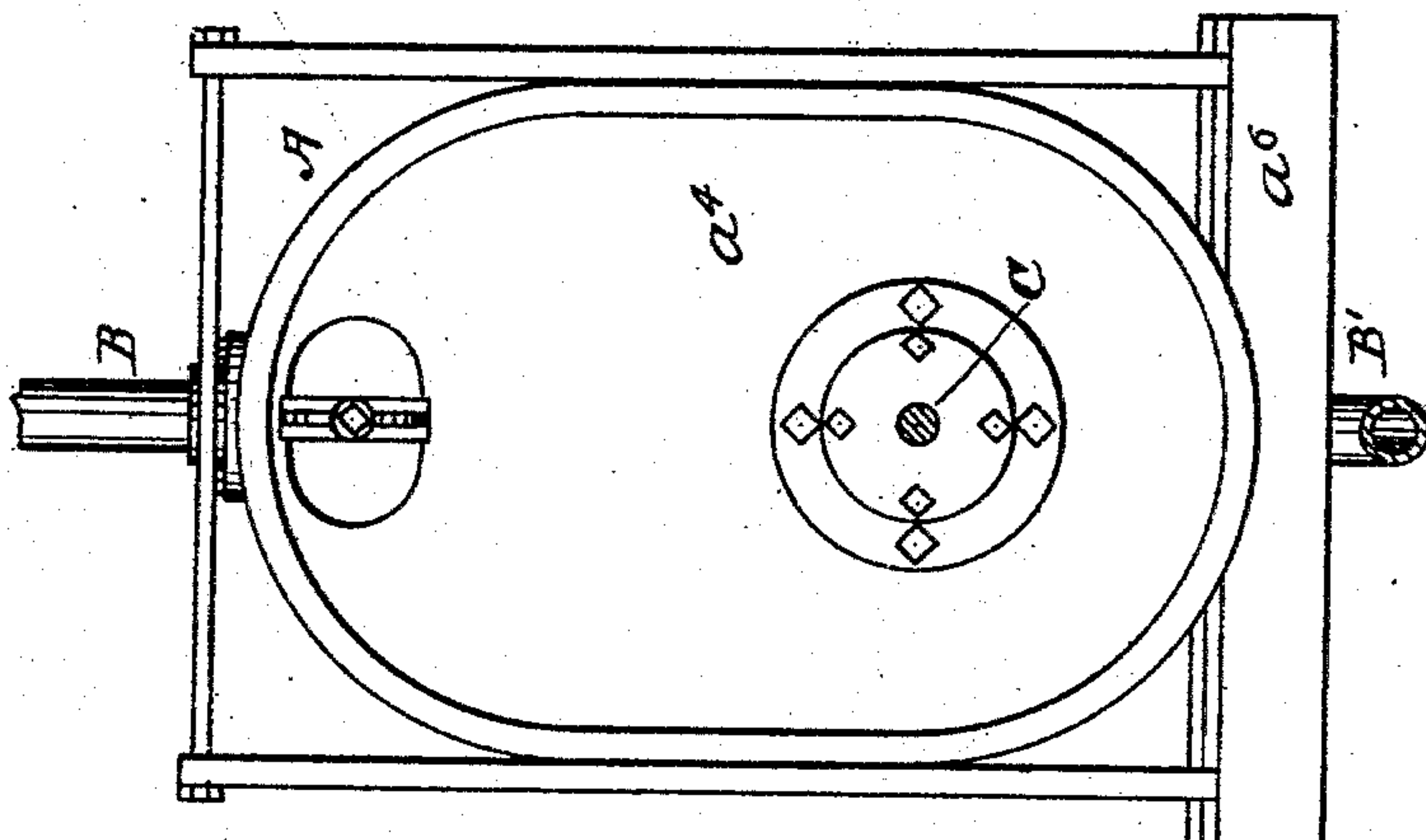


Fig. 2.

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# UNITED STATES PATENT OFFICE.

ERNEST L. SAVAGE, OF WALPOLE, MASSACHUSETTS.

## STUFF-CHEST FOR PAPER-MILLS.

SPECIFICATION forming part of Letters Patent No. 515,941, dated March 6, 1894.

Application filed July 13, 1891. Serial No. 399,319. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST L. SAVAGE, a citizen of the United States, residing at East Walpole, in the county of Norfolk and State of Massachusetts, have invented a new and useful Improvement in Stuff-Chests for Paper-Mills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in explaining its nature.

In the manufacture of paper it is desirable that the pulp when introduced or fed to the small engine of the machine be of the same consistency throughout and that the consistency be as uniform as possible, as upon this depends very largely the quality of the product or paper. The only place in the machine where the pulp can be brought to the desired consistency and uniformity is in the stuff chest; and while with the stuff chests as now used this result has in the main been reached yet it is far from certain. This is largely owing to the construction of the stuff chest and agitator, the chest being in the form of an upright tank, and the agitator being mounted upon a vertical shaft and not being constructed to cause a perfect circulation of the material in the tank, and it is no uncommon thing for the pulp to separate from the water, the pulp rising to the top, and the consistency, of course, being much thicker at the top than at the bottom. The coloring matter is generally added to the pulp in these tanks and the pulp is frequently unevenly colored because of the imperfect working of the agitator and chest. There are also other disadvantages arising from the use of the common form of stuff chest in that grease and other matters are liable to flow into it from the bearings of the vertical shaft and injure the pulp. The fact that a vertical shaft is used necessitates a bearing over the pulp and generally the employment of a bevel gear which makes scale and dirt and which also consumes power, and the construction requires that there be considerable vertical space for it, and on account of the place in which stuff chests are generally put in a paper mill, namely, the basement, it is desirable that a construction be employed that shall not take too much vertical room.

My invention is designed to obviate the

difficulties above mentioned, and to this end it consists in the construction, combinations and arrangements of parts as set forth in the claims at the end of this specification.

My improved stuff-chest and agitator comprises a closed horizontal shell or case the bottom surface of which is curved regularly from side to side, the sides of which are preferably straight, and the upper or top of which is preferably curved outwardly. This shell or case is mounted upon pillow blocks and is somewhat inclined toward its discharging end, and in the case there is arranged an agitator which is mounted upon a horizontal shaft, one end of which extends through a head of the case, and upon the shaft there are mounted agitating blades preferably set angularly to the shaft and out of line regularly with each other, the blades thus bearing an angle to the path in which they are turned, and the shaft and blades being of such length and location that the ends of the blades very nearly touch the lower surface of the case or chest as they are revolved. The case is provided with a supply pipe which enters preferably through its top and by means of which it is loaded with pulp, a discharge pipe which is connected with the bottom of the case at its lowest level, and a manhole which is closed by a cover. The case is made tight in order that there may be no waste of pulp. It is made slightly inclined in order that all the pulp may run to the discharge end and so that the chest may be entirely emptied of a charge of pulp. The beating or agitating blades are made preferably of the shape described and are mounted on the shaft in manner specified for the purpose of accomplishing two objects—to obtain an up and down beating action, that is, an action that shall cause a vertical movement of the pulp and water, and for the purpose of giving an endwise movement to the pulp—as it is necessary that these two movements be given the mass of pulp simultaneously to secure a perfectly uniform consistency.

Referring to the drawings—Figure 1 is a longitudinal vertical section of my improved stuff chest. Fig. 2 is a view in front elevation thereof, and Fig. 3 is a view in vertical section upon the dotted line of Fig. 1.

A represents the case or shell of the chest,



5  $a$  its curved bottom,  $a'$  its curved top,  $a^2 a^3$  the straight vertical sides, and  $a^4 a^5$  the ends or heads. The shell is mounted upon the pillow blocks  $a^6 a^7 a^8$  slightly hollow upon their under surface to receive the rounded bottom of the chest and graded as to thickness so that the front end is slightly lower than the rear end, that is, the chest is slightly inclined downward toward its discharge end.

10 B represents the supply pipe and B' the discharge pipe which connects with the lowest level of the chest.

C is the agitator shaft, its end bearing  $c$  is bolted to the head  $a^5$ , it passes through a hole in the head  $a^4$  and a stuff box  $c'$  thereon and carries the driving pulley  $c^2$ . It may have a central bearing  $c^3$  in the braced hanger  $c^4$  extending downward from the top. Upon the shaft are mounted the blades D, these preferably extend a uniform distance from the shaft, the shaft passing through their centers, and they are set at a slight inclination to the shaft, that is so that one end of each beater is behind the other end; this causes

25 each of the sections  $d d'$  of each beater to turn in different paths and to reach different portions of the mass in one complete revolution. The beaters D are also out of line with each other upon the shaft, being preferably arranged in relation to each other as represented in Fig. 3; they are also preferably placed upon the shaft so that their joint action is practically continuous upon the pulp from one end to the other, that is, the advanced end of

35 one blade describes a path which is just behind the path described by the rear end of the next blade. The blades are flat upon two surfaces and quite thin and the flat surfaces of the section  $d$  of the blade are at a right angle to the flat surfaces of the section  $d'$ , and the flat surfaces of both blades are at an angle to the path of rotation of the entire blade. The blades are so placed and are of a length sufficient to cause their ends to very nearly come

45 in contact with the curved bottom  $a$  of the chest, but the chest is made preferably considerably higher than the agitator, or in other words the agitator is in the lower part of the chest. The effect of this construction is to

50 cause the pulp to be subjected to a number of divers agitating influences which not only break it up and fully incorporate and mix it vertically but also horizontally, so that the

mass is made homogeneous or of the same density throughout, and when color is introduced into the chest it is immediately mixed with the mass thoroughly from top to bottom and end to end.

Having thus fully described my invention, I claim and desire to secure by Letters Patent of the United States—

1. A stuff chest for paper mills comprising a longitudinal case permanently closed at its top and having an interior concave bottom, said chest being slightly inclined, relative to a horizontal plane, from one end to the other and being provided at its upper portion with an inlet pipe and at or near its lowermost end, at its bottom, with an outlet or discharge pipe, combined with a rotary agitator arranged in the lower part of said chest and comprising a series of blades mounted on a shaft extending lengthwise of said chest.

2. A stuff chest for paper mills comprising a case or shell placed horizontally lengthwise and provided with a rotary shaft arranged longitudinally of said case and provided with a series of blades which are slightly inclined or oblique relative to the axis of said shaft.

3. A stuff chest for paper mills comprising a case or shell placed horizontally lengthwise and provided with a rotary shaft arranged longitudinally of said case and provided with a series of blades which are slightly inclined or oblique relative to the axis of said shaft and spirally arranged relative to each other around said shaft.

4. A stuff chest for paper mills comprising a horizontal closed case or shell one end of which is slightly higher than the other, having a concave bottom, vertical sides and a rounded top; an inlet to said chest; a discharge outlet or pipe leading from or near the lowest part of said chest; an agitator contained in the lower part of said chest comprising a shaft C mounted in the heads of the chest as described and extending through one end thereof, and the beaters or blades D mounted upon said shaft to bear an angular relation thereto, spirally arranged in relation to each other and inclined to the paths in which they rotate, as and for the purposes described.

ERNEST L. SAVAGE.

In presence of—

F. F. RAYMOND, 2d,

J. M. DOLAN.