

(No Model.)

3 Sheets—Sheet 1.

T. C. CADWGAN.
BEATING ENGINE FOR PAPER STOCK.

No. 539,414.

Patented May 21, 1895.

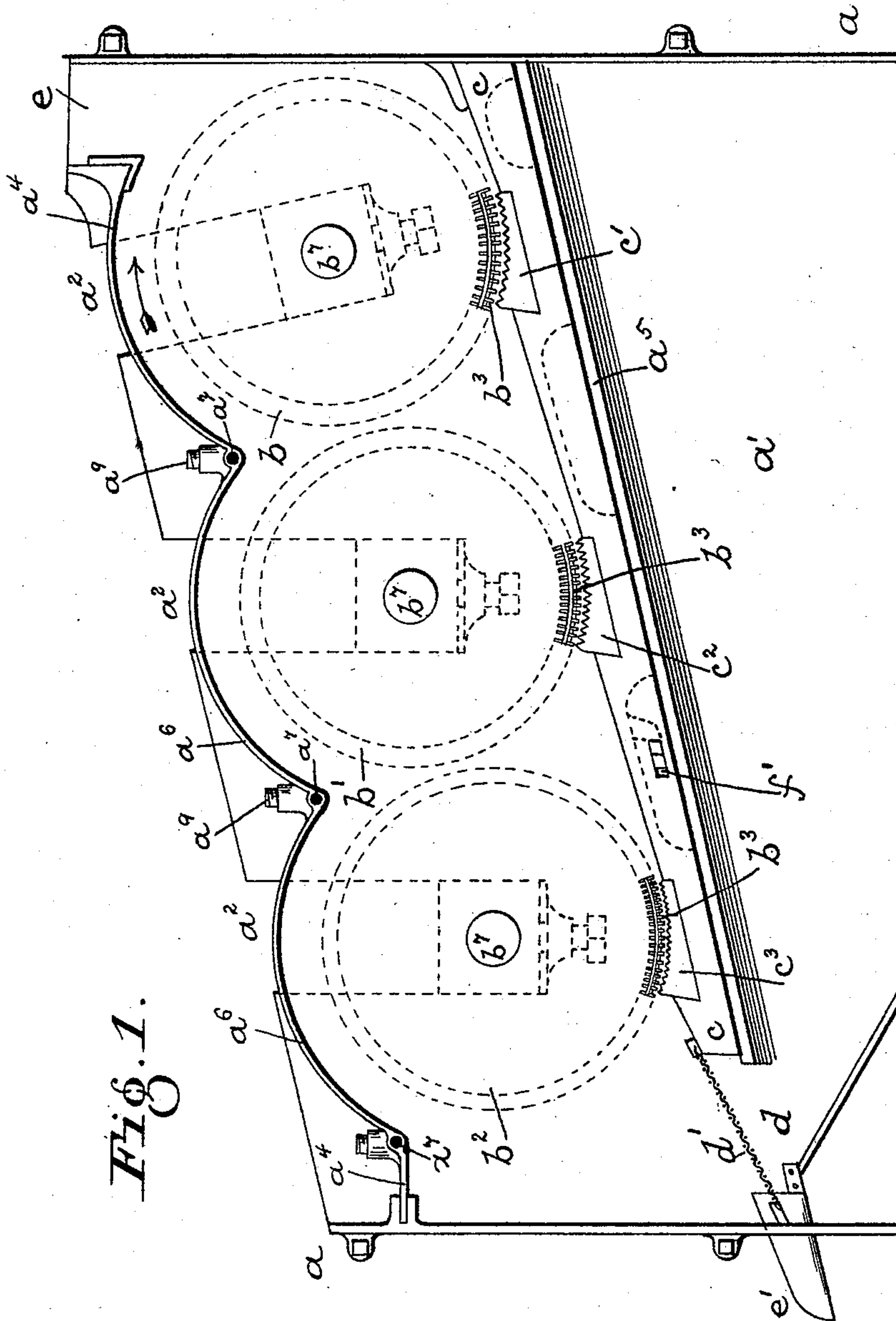


Fig. 1.

WITNESSES:

Frank M. Burnham.
Chas. J. Welch

INVENTOR

Thomas C. Cadwgan

BY

Stanley J. Shepherd

ATTORNEYS:

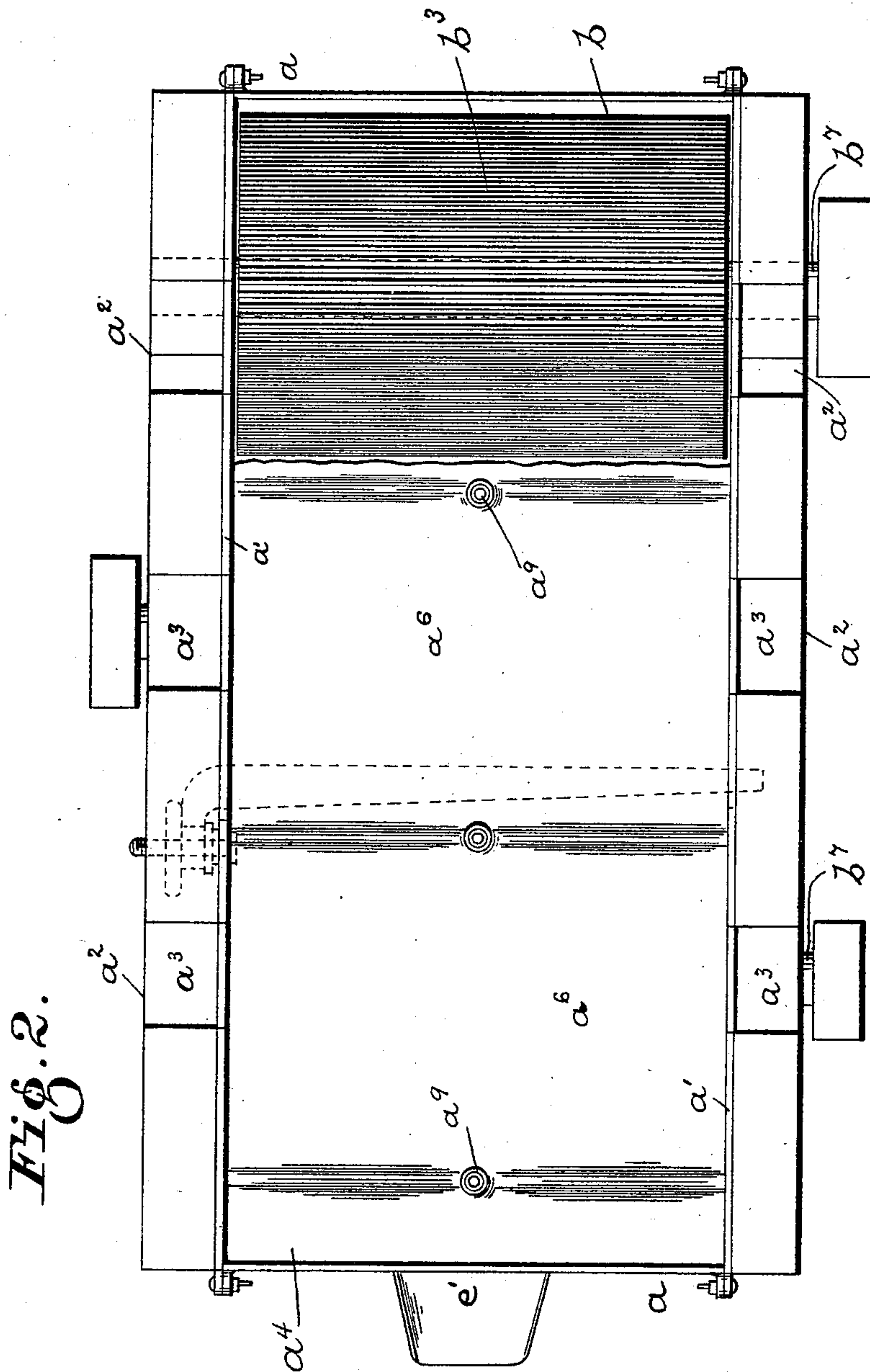
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Frank M. Burnham,
Chas. J. Melch

INVENTOR

Thomas C. Cadwgan
BY *Stacy & Shepherd*
ATTORNEYS.

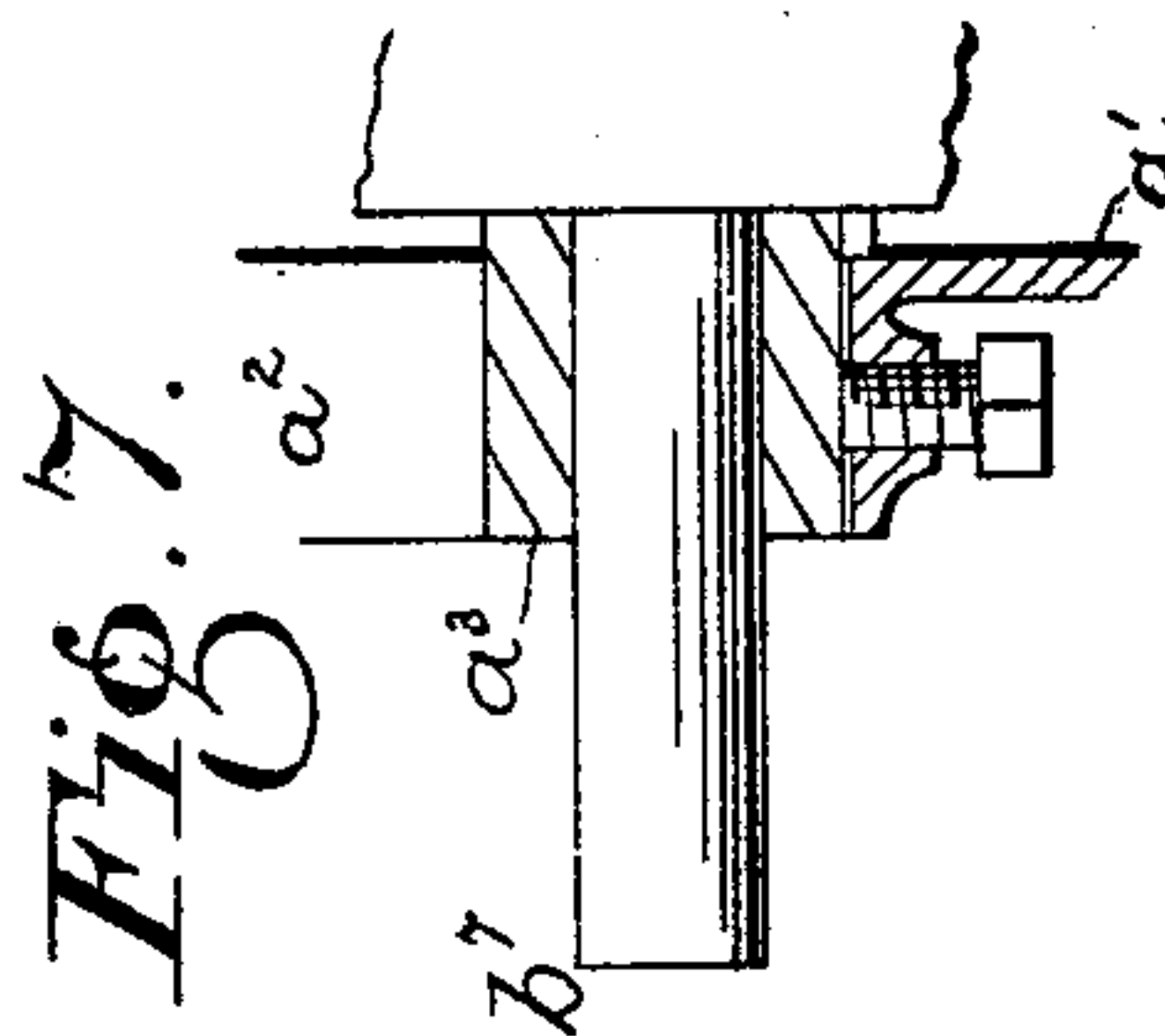
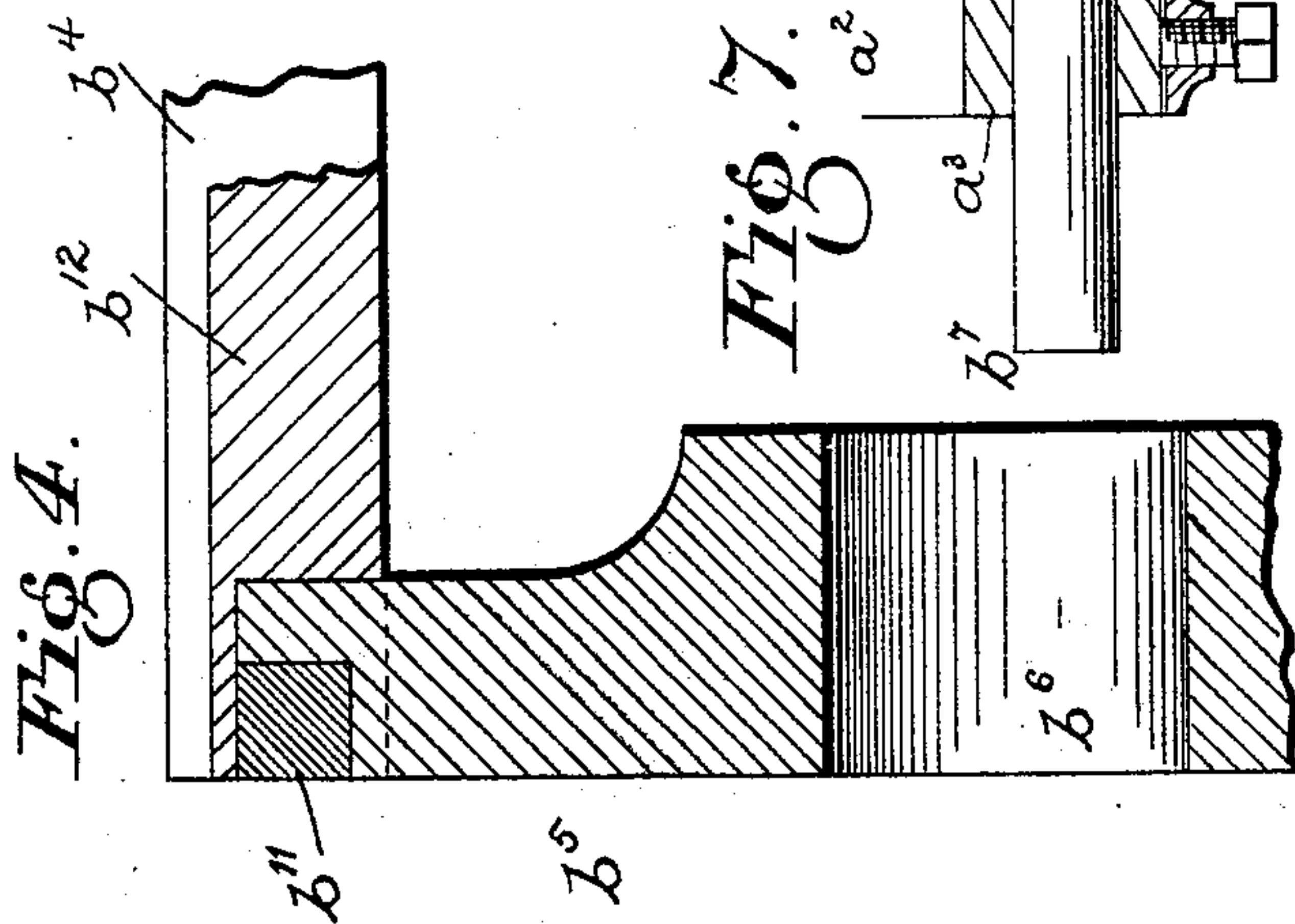
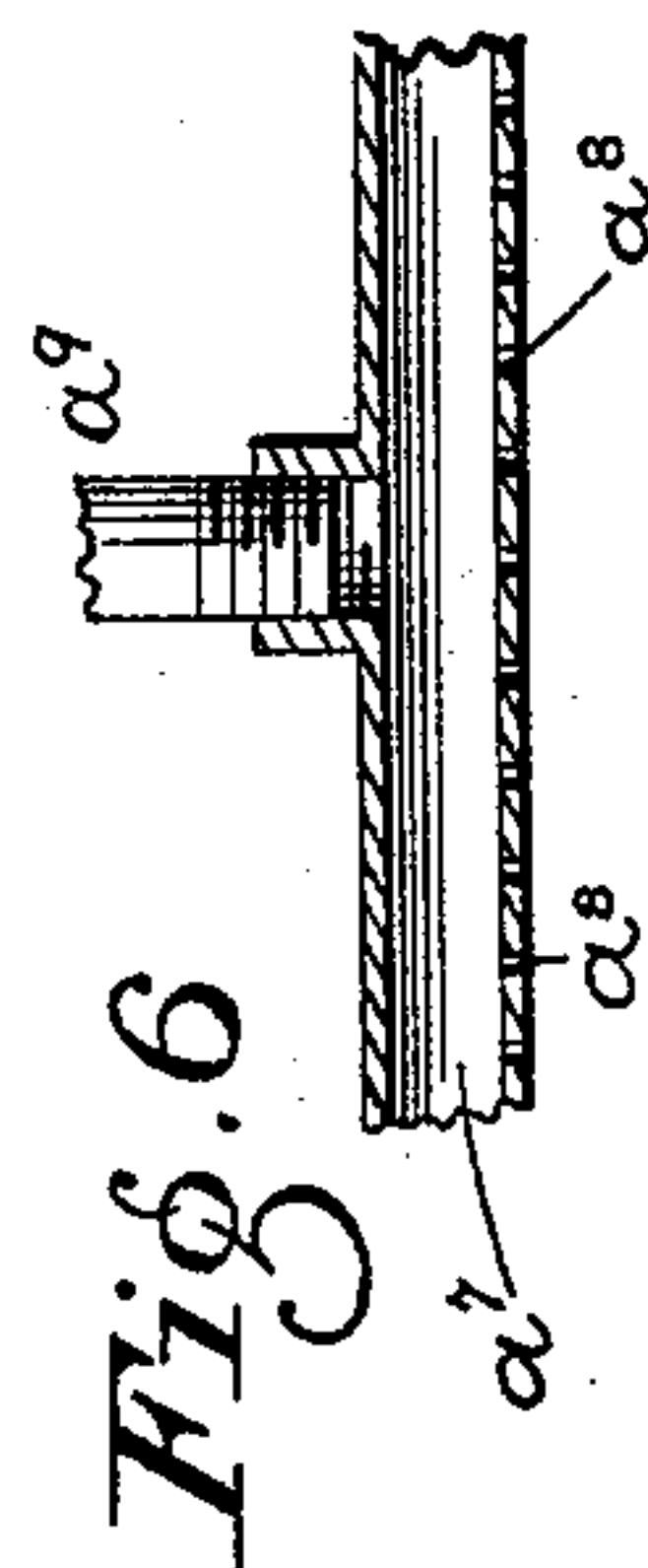
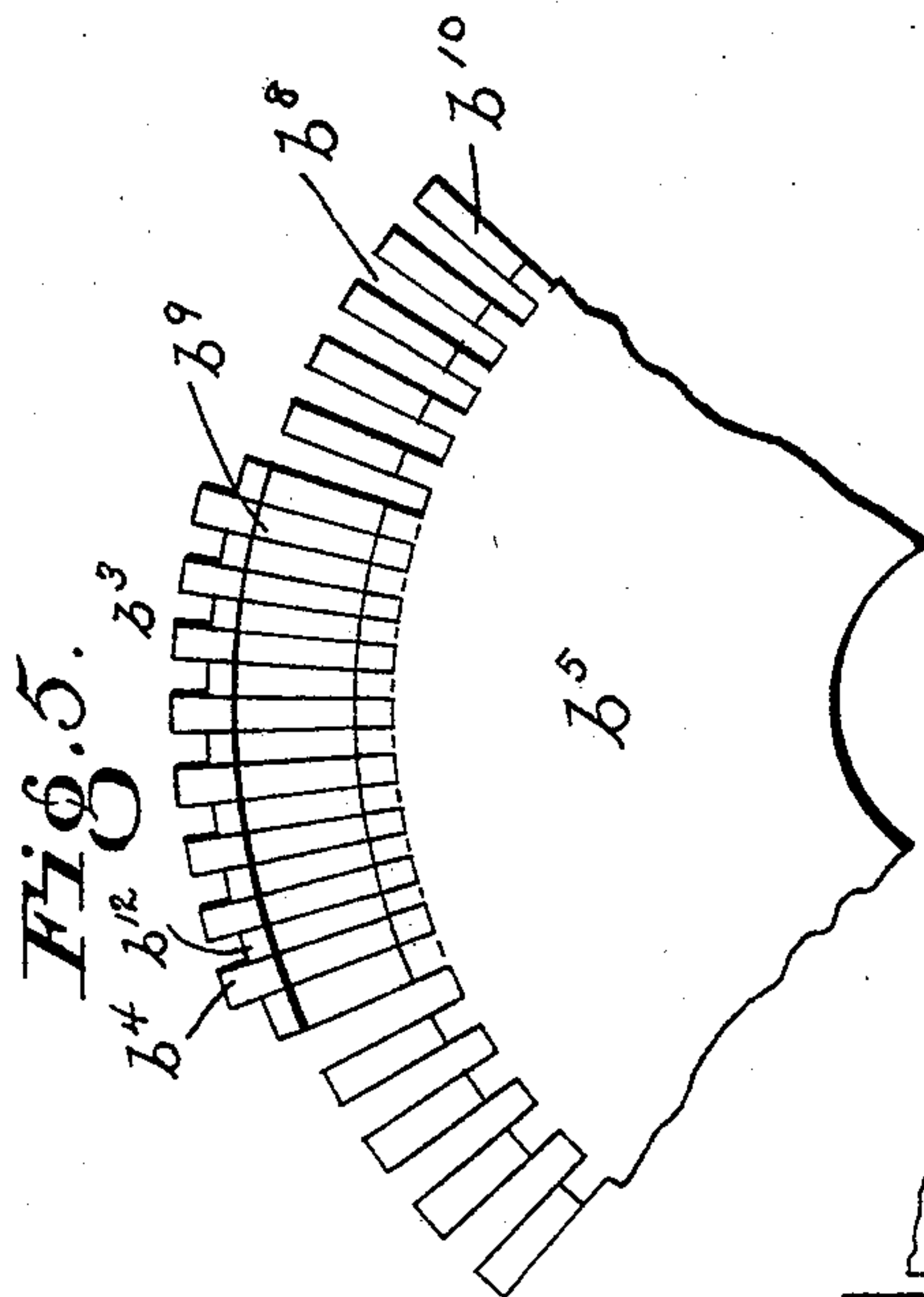
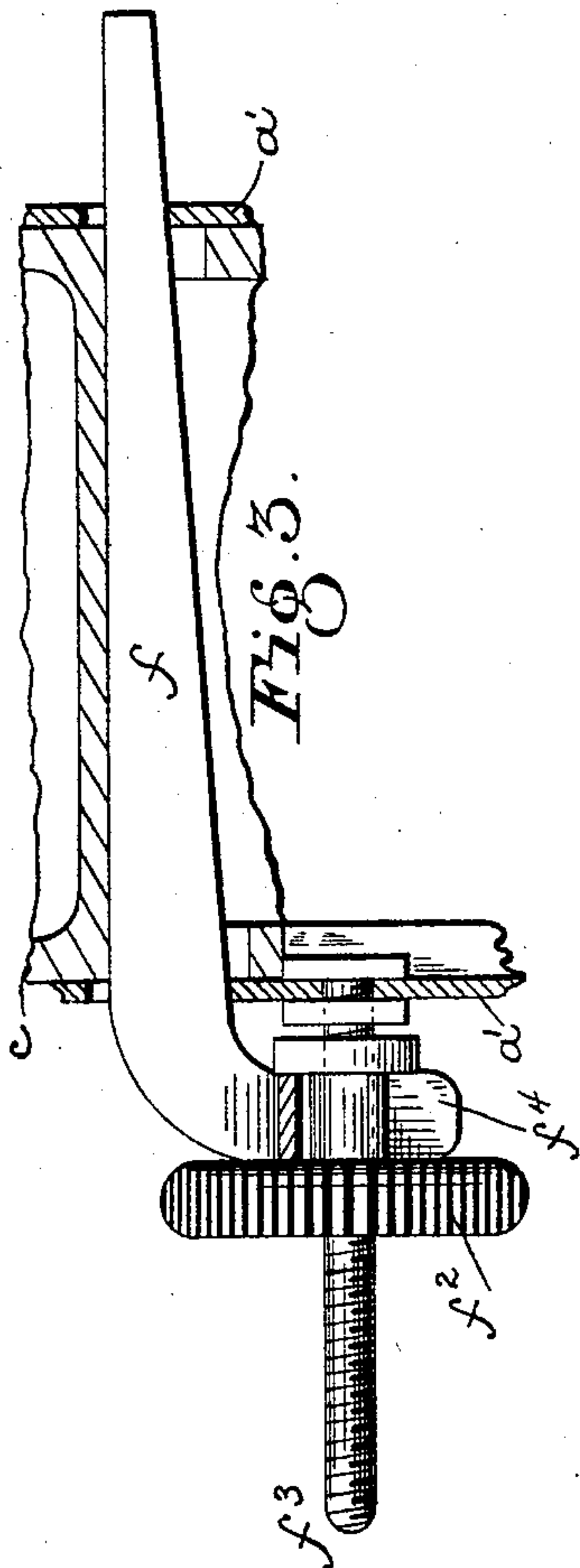
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WITNESSES:

Frank M. Burnham
Chas. J. Melch

INVENTOR

Thomas C. Cadwgan

BY

Shepherd

ATTORNEYS:

UNITED STATES PATENT OFFICE.

THOMAS C. CADWGAN, OF ANDERSON, INDIANA, ASSIGNOR OF ONE-HALF TO
THE O. S. KELLY COMPANY, OF SPRINGFIELD, OHIO.

BEATING-ENGINE FOR PAPER-STOCK.

SPECIFICATION forming part of Letters Patent No. 539,414, dated May 21, 1895.

Application filed November 5, 1894. Serial No. 527,926. (No model.)

To all whom it may concern:

Be it known that I, THOMAS C. CADWGAN, a citizen of the United States, residing at Anderson, in the county of Madison and State of Indiana, have invented certain new and useful Improvements in Beating-Engines for Paper-Stock, of which the following is a specification.

My invention relates to improvements in devices for disintegrating stock for paper making.

The object of my invention is to provide an improved form of device by which the operation of disintegration shall be a practically continuous one, the stock being fed into one end and discharged from the other in a sufficiently disintegrated and reduced condition. I attain these objects by the construction shown in the accompanying drawings, in which—

Figure 1 is an elevation of a machine embodying my invention with one of the side plates removed. Fig. 2 is a plan view of the same, shown partly broken away. Fig. 3 is a detail in section of the adjusting devices. Figs. 4 and 5 are details showing the construction of the beaters or disintegrating-cylinders. Fig. 6 is a detail view of the shower-pipe used in connection therewith. Fig. 7 is a detail view of the cylinder-bearing.

Like parts are represented by similar letters of reference throughout the several views.

In the said drawings, a represent a main casing, which consists of suitable side plates a' having slotted openings a^2 into which are fitted bearing blocks a^3 for supporting the journals of the cylinders b b' b^2 . These cylinders b b' b^2 are inclosed within the outer casing a , a suitable cover a^4 , which fits between the side plates a' a' , being adapted to close the top of said casing. The bottom of said casing consists essentially of a sliding bed plate c , which rests on suitable flanges or ways a^5 , formed on the inside of said side plates a' below the cylinders. The cylinders b b' b^2 are each formed on the outer periphery with a series of ribs b^3 , which operate in conjunction with opposing serrated concave plates c' c^2 c^3 . These concaves are preferably

formed of hard metal, preferably of steel, and are removably seated in the bed plate c .

Each of the cylinders b b' b^2 is preferably constructed on its periphery of a series of flat steel bars or plates b^4 , which are supported at each end, and if desired at suitable intervals, by supporting heads b^5 , having central openings b^6 to fit on supporting shafts b^7 , which form the journals for said rollers. The heads b^5 are provided with peripheral guides b^8 , into which the bars or plates b^4 are seated. Each bar is further provided at each end with a notched opening b^9 , the supporting head b^5 being similarly notched out, as shown at b^{10} . (See Fig. 5.) When the bars are in place on the cylinder a retaining ring b^{11} is driven into the notches thus formed and thus retains all the plates and bars securely in position on the supporting heads so as to form a ribbed or serrated cylinder. The spaces or interstices between the ribs or plates are then filled up, preferably with wooden blocks or strips b^{12} , which are driven firmly between said plates or bars so as to stand at a suitable distance below the outer peripheries of said plates, thus completely closing the outer periphery of the cylinder, but leaving the ribs or plates projecting sufficiently to form a disintegrating surface with the concave plates. Each of the cylinders is similarly formed, but the plates or bars in each succeeding cylinder are placed closer together so as to form a disintegrating surface of finer dress, the concaves being similarly formed.

The bed plate c closes the entire bottom of the outer casing, except at the discharge end thereof, where an opening d , is left over which extends a screen d' , which bridges said opening and extends from the bed plate to the discharge opening e' .

The top or cover a^4 is preferably formed with curved portions a^6 , concentric to the cylinders b b' b^2 , and at the point where these curved surfaces join, and immediately over the space between the cylinders, the cover is provided with a laterally extending opening a^7 , which I term the shower pipe, and which is perforated with a series of openings a^8 throughout its length. A water pipe a^9 communicates

with each of these shower pipes and when in operation showers down on the stock between the respective cylinders so as to wash the stock from one to the other of said cylinders and assist in the disintegration.

Means are provided for adjusting the bed plate *c* longitudinally on the ways or flanges *a*⁵, which are inclined. The concave plates *c'* *c*² *c*³ are also formed higher at one side than at the other to correspond to the inclination of the bed plate. As the bed plate, therefore, is moved up or down on the ways, the distance between the outer periphery of the cylinder and the concaves is adjusted. This adjustment I preferably accomplish by means of a wedge-shaped piece *f*, which extends from side to side of the casing, passing through suitable openings *f'* in the bed plate so as to bear against the same on one side while the opposite side bears against the side plate *a'* of the frame. By moving the wedge in or out through the side plates, the bed plate is moved longitudinally on its ways or flanges. An adjusting nut *f*², operating on a suitable screw-threaded stud *f*³, is provided for moving the wedge shaped piece in and out; said adjusting nut being formed in the nature of a sleeve which fits in a slotted opening *f*⁴ in said wedge-shaped piece, with shoulders on the opposite sides thereof so that as it is turned in either direction on the screw-threaded stud *f*³, the wedge is correspondingly moved.

In operation the stock to be operated on is admitted with a quantity of water through the opening *e* and comes in contact with the first cylinder *b*, and is carried thereby down along the bed plate between the cylinder and the concave; the cylinder being revolved by any suitable means for this purpose. It should be stated here that the cylinders in successive order are revolved at an increased speed so that the stock is fed to the slower and coarser cylinder and passes from thence to the finer and higher speed cylinder, thus forming a gradual reduction of the stock, which is carried from one to the other partly by gravity and partly by the action of the cylinders assisted by the water which is showered in from the shower pipes between the respective cylinders. After passing the last cylinder and between it and its concave, the stock ascends along the screen *d'* to the discharge opening *e'*, where it is separated from the water used in the disintegration and is ready for such other treatment as is necessary.

I have shown in the drawings three cylinders and three concaves. It is obvious that any number may be employed, though this is the preferable construction and generally found to answer the purpose.

It perhaps should be stated that the bearing blocks *a*³, supported in the slotted openings, permit an upward movement of the respective cylinders in the event that any foreign substance should enter between the same and the concaves. If desired springs may be

employed for holding the cylinders to their work, but ordinarily the weight of said cylinders will be found sufficient for this purpose. Means are also provided for adjusting each cylinder independent of the others. This is preferably accomplished by means of set screws *g* arranged in the bottom of each slotted opening and on which the bearing blocks rest. This independent adjustment of the rollers is desirable so that the proper degree of fineness may be secured for each successive operation. It is further useful in the event that a new concave is placed in the bed plate, in which case its roller is adjusted to suit. The adjustment of the bed plate, it will be understood, adjusts all the concaves uniformly, while the set screws serve to adjust each cylinder independent.

It is obvious that the devices herein described may be modified in the various mechanical constructions. I do not therefore limit myself to the exact constructions shown and described, but

I claim as my invention—

1. A beating engine consisting essentially of an outer casing and horizontally-arranged cylinders in series, each formed of ribs or serrations on the periphery thereof, a movable bed plate supported on inclined ways, and supporting concaves adjacent to said cylinders, and means, substantially as described, for moving said bed plate longitudinally on said ways so as to adjust said concaves uniformly with reference to said cylinders, substantially as specified.

2. In a beating engine, a series of horizontally-arranged cylinders each having a serrated periphery, the serrations in said cylinders being of different pitch in successive order, concaves adjacent to said cylinders, and an inclined bed plate for supporting said concaves, and means for moving said bed plate, substantially as specified.

3. The combination with the outer casing and the revolving cylinders, movable bearing blocks supported in said outer casing to support said cylinders, an inclined bed plate having concaves arranged opposite to said cylinders, said cylinders and concaves being serrated, as described, and means for adjusting said bed plate longitudinally to adjust said concaves to or from said cylinders, substantially as specified.

4. The combination with an outer casing having slotted side plates as described, bearing blocks in said side plates, horizontal cylinders arranged in said casing and supported in said bearing blocks, an inclined bed plate having removable concaves therein, means for adjusting said bed plate longitudinally, a top plate for said casing, a series of shower pipes arranged therein above and between said cylinders, substantially as specified.

5. The combination with an outer casing and horizontally-arranged cylinders therein, concaves below each of said cylinders ar-

5 ranged in an inclined bed plate, said cylinders being each formed of a series of longitudinal bars to produce a ribbed or serrated periphery, said concaves being correspond-
ingly serrated, shower pipes adjacent to said cylinders, and a screen between the end of said bed plate and the discharge opening in said casing, substantially as specified.

10 6. The combination with the serrated or ribbed cylinders, and serrated or ribbed concaves adjacent thereto, an inclined movable bed plate in which said concaves are supported, side pieces having ways or flanges for supporting said bed plate, a tapered adjusting
15 bar extending through said side pieces so as to bear at one end against said side pieces and at the other against said bed plate, and means for moving said adjusting piece longitudinally to produce an adjustment of said bed plate,
20 substantially as specified.

25 7. The combination with a cylinder, and a concave opposed thereto, an inclined movable bed plate for supporting said concave, a tapered adjusting piece adapted by its longitudinal movement to produce a movement of said bed plate, and a screwthreaded adjusting

nut for moving said tapered piece, substantially as specified.

8. The combination with an inclined movable bed plate, of a tapered adjusting piece 30 bearing against the same, a screwthreaded stud adjacent to said adjusting piece, and a movable nut on said stud adapted to operate said adjusting piece, substantially as specified.

35 9. An outer casing having slotted openings therein, bearing blocks in said openings, and horizontal rollers extending through said casing and journaled in said bearing blocks, said rollers being each provided with a concave, 40 and means for adjusting said concaves uniformly, as described, each of said bearing blocks being provided with adjusting devices whereby the rolls may be independently adjusted, substantially as specified. 45

In testimony whereof I have hereunto set my hand this 31st day of October, A. D. 1894.

THOMAS C. CADWGAN.

Witnesses:

OLIVER H. MILLER,
CHAS. I. WELCH.