

(No Model.)

C. AITCHISON.

BEATING ENGINE.

No. 387,840.

Patented Aug. 14, 1888.

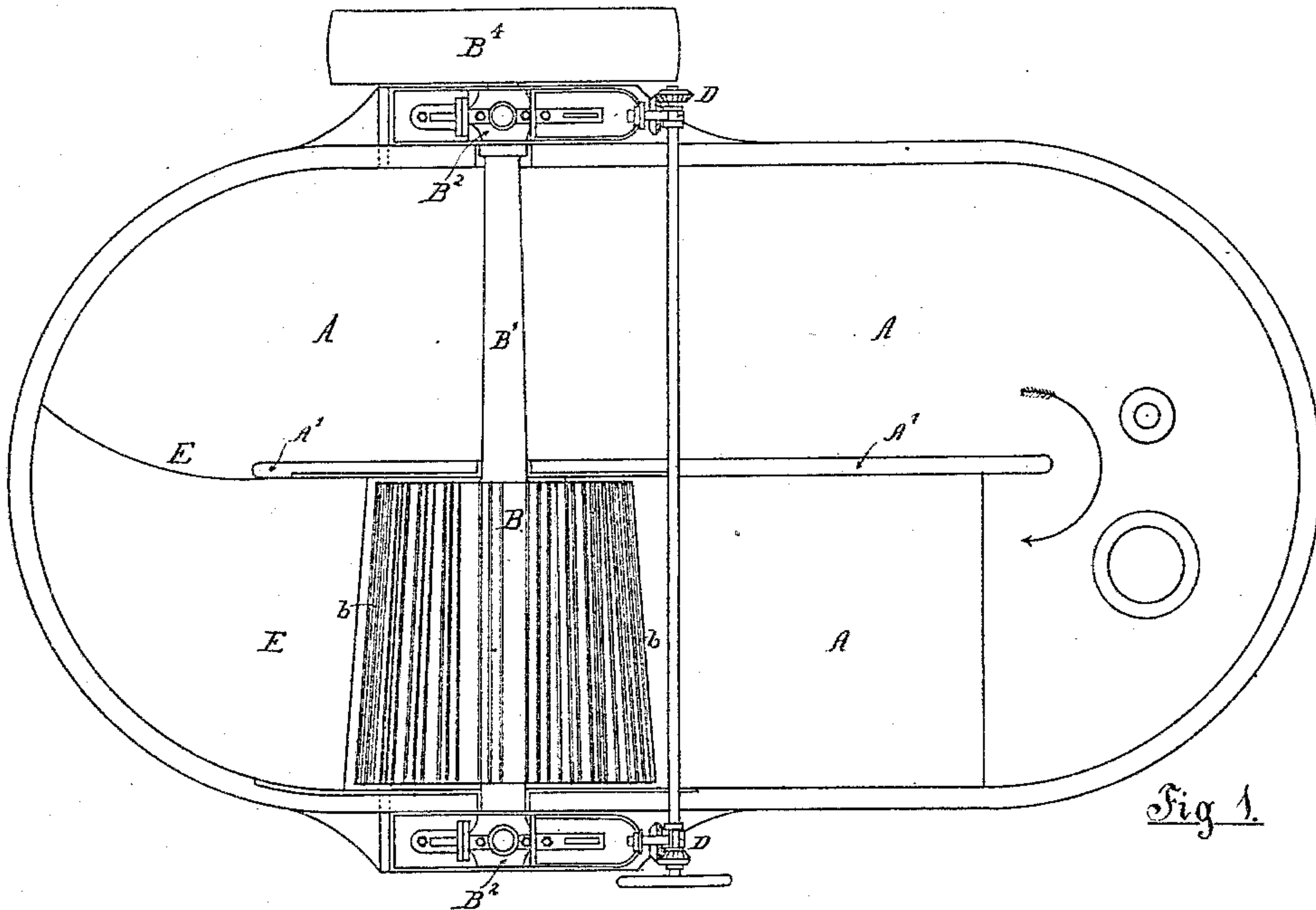


Fig 1.

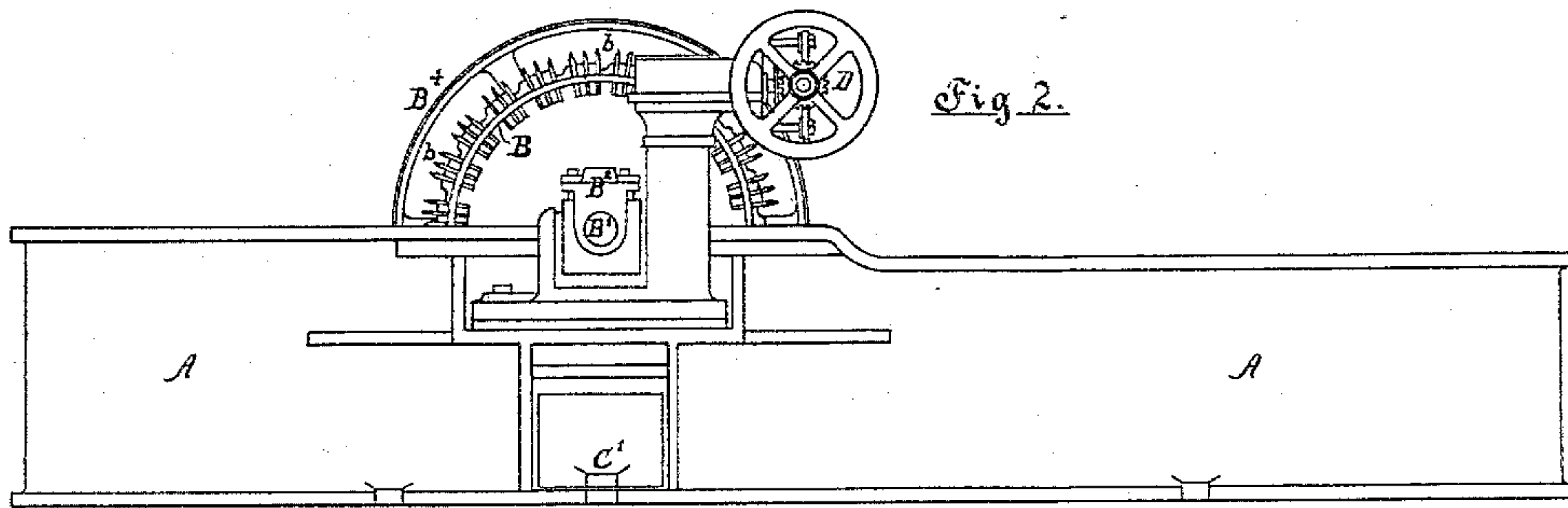


Fig 2.

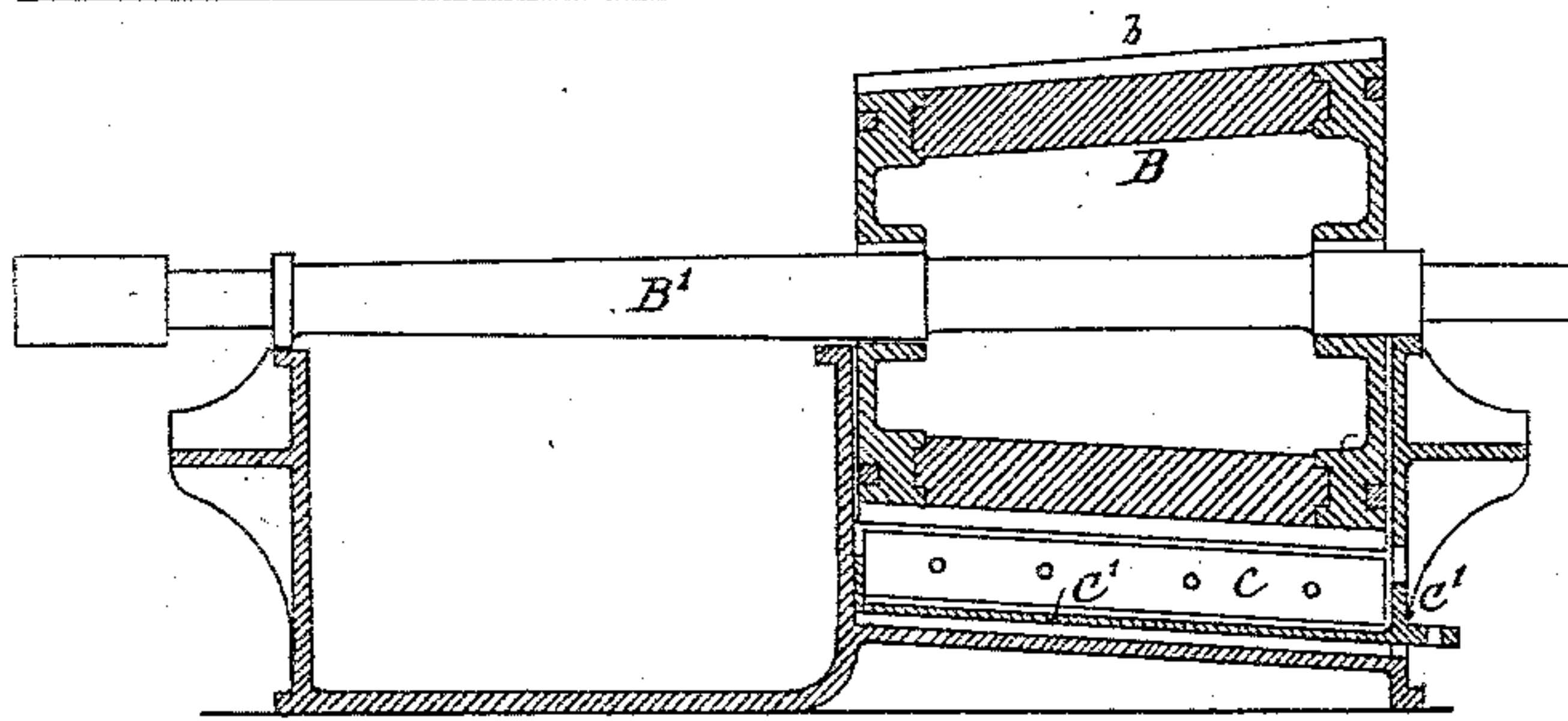


Fig 3.

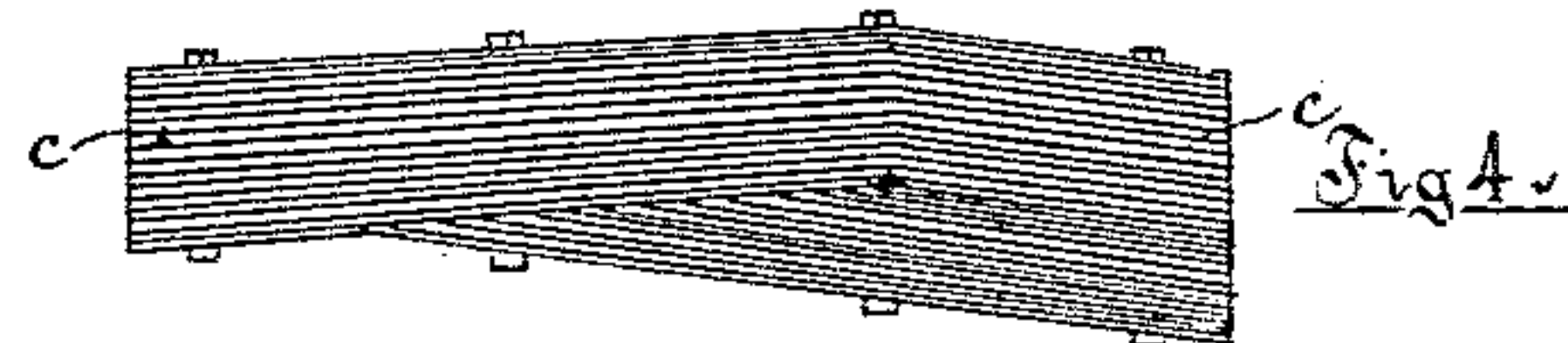


Fig 4.



Fig 5.

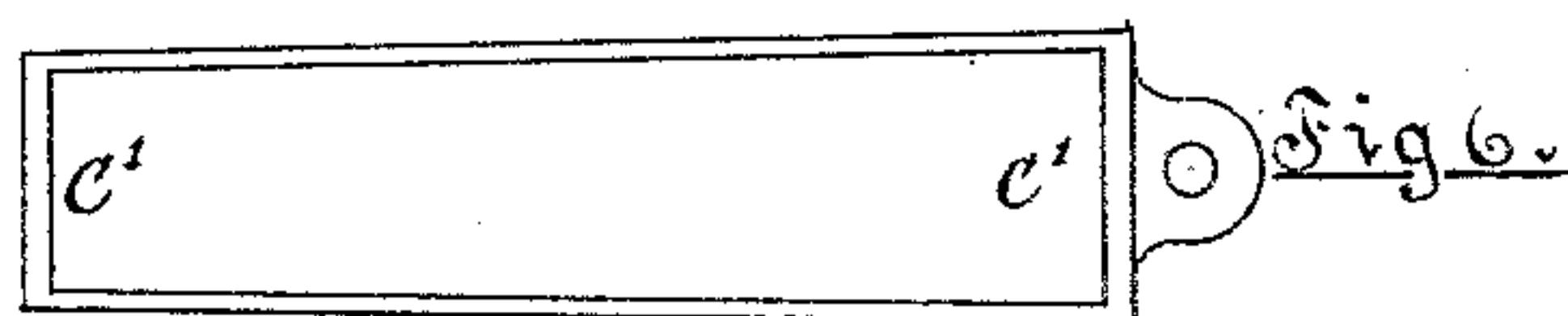


Fig 6.

Witnesses.

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UNITED STATES PATENT OFFICE.

CHRISTOPHER AITCHISON, OF LOANHEAD, COUNTY OF MID-LOTHIAN,
SCOTLAND.

BEATING-ENGINE.

SPECIFICATION forming part of Letters Patent No. 387,840, dated August 14, 1888.

Application filed September 10, 1887. Serial No. 249,322. (No model.) Patented in England May 8, 1883, No. 5,381.

To all whom it may concern:

Be it known that I, CHRISTOPHER AITCHISON, of Loanhead, in the county of Mid-Lothian, Scotland, have invented certain new and
5 useful Improvements in Beating-Engines; 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.

10 My invention (which has been patented in Great Britain, May 8, 1883, No. 5,381) relates to that class of machinery used for the manufacture of paper-pulp, known as "washing, breaking, and beating engines," and has
15 special reference to an improved construction and arrangement of the cutting-rolls and fixed knives or bed-plates of such machines, the object of which is to secure more even or regular action of the knives on the pulp.

20 In ordinary beating-engines for the manufacture and preparation of paper the roll is made in the form of a cylinder, and is consequently of equal diameter over all parts of the surface. The bed-plate, fixed under the roll, is
25 laid on a level, is of equal width, and has an equal number of knives or cutting-bars throughout. Owing to the form of the roll, the pulp travels at the same speed under all parts of its surface, and over the bed-plate it
30 traverses the same extent of cutting-surface, whether circulating near the mid-feather or central portion of the trough or vat containing the pulp or at its circumference; but the contents of the trough nearest the mid-feather
35 have a much shorter distance to travel than the contents nearest the circumference, pass more frequently between the roll and bed-plate, and are thus unduly broken up or ground before the outer orbit of pulp has been sufficiently
40 acted upon. The bed-plate is inclined correspondingly to the taper of the roll, and the breast and back fall of the trough are made to suit the form and position of the bed-plate and roll.

45 In the accompanying drawings similar letters refer to similar parts throughout the several views.

Figures 1 and 2 are respectively a plan and an elevation of the improved pulp-beating engine. Fig. 3 is a transverse vertical section

showing the construction of the conical cutting-roll and bed-plate. Figs. 4 and 5 are plans of knife-plates adapted for use with the conical roll. Fig. 6 is a plan of the box in which the knife-plates are fitted. It is not of
55 precisely the same shape as said plates, for they need not exactly fill the box.

The improved engine comprises the usual trough or vat, A, formed with a central partition or mid-feather, A', around which the pulp
60 material which is placed in the vat circulates. The cutting-roll B is fitted in the ordinary way in one of the divisions of the vat A, and is carried by a spindle, B', supported in bearings B², fitted in the sides of the trough
65 or vat, the spindle being driven by a pulley, B⁴, and belt. The cutting-roll B is made of slightly tapering or conical form, the outer end being of greater diameter than the end next the mid-feather A', and the knives *b* are fixed
70 longitudinally in the usual way. The knife-plate C is formed of ordinary cutting knives or blades, *c*, which are made to increase in number from the inner to the outer end. A number of knives *c* are fitted parallel to each
75 other, and short lengths of additional knives are fitted in the outer end of the knife-plate to give a greater breadth of cutting-surface under the outer end of the tapered cutting-roll. As shown in Fig. 4, the long knives are
80 bent near their outer ends, and the short knives are parallel to the shorter parts of these long bent knives. As shown in Fig. 5, all the knives are straight and parallel to each other. Either of these constructions may be used, as
85 preferred.

The knife-plate C is fitted in a box, C', which is fitted to slide, as usual, through an opening in the side of the vat A. The box C' rests on an inclined seat, so that the cutting surface or
90 edges of the knives *c* are in planes parallel to those of the knives *b* of the roll, as shown in Fig. 3. The ordinary device for adjusting the roll B vertically is used.

The pulp traveling around the outer wall
95 of the vat A passes over a larger cutting-surface on the bed-plate C than does the pulp circulating near the mid-feather. Compensation is thus provided for the less frequent passage under the roll B and over the bed-
100

plate C of the pulp traveling near the outer side of the vat A. Owing to the tapering shape of the roll B, a thorough mixture and interchange of the pulp is effected. It is also
5 drawn under the knives c sooner at the wider end of the bed-plate C, and is delivered with greater velocity over the back fall, E, and around the circumference of the vat A, where
10 it should travel with greatest speed, and the entire contents of the vat A are made to circulate more rapidly. The pulp is thus more regularly and efficiently acted upon and in much shorter time than in an engine of the ordinary construction, and produces a much
15 better result.

While I describe but one roll and one knife-plate, I can use two rolls and two knife-plates in the same vat, if desired.

Having thus described my invention, what I
20 claim as new, and desire to secure by Letters Patent of the United States of America, is--

1. The vat A and mid-feather A', in combi-

nation with the conical cutting-roll B, arranged transversely to said tank on one side of said mid-feather, and a set of knives arranged un- 25
der said cutting-roll and parallel therewith, the knives being collectively broader at the end under the broad end of the cutting-roll, substantially as set forth.

2. A vat, A, mid-feather A', and conical cut- 30
ting-roll, in combination with a knife-box arranged under it, and a set of long knives and a set of short knives in said box, the knives being arranged to give greater breadth of cut-
ting-surface at the end of the box which is 35
under the larger end of the conical roll, substantially as set forth.

In testimony whereof I have hereunto subscribed my name in the presence of two subscribing witnesses.

CHRISTOPHER AITCHISON.

Witnesses:

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N. B. BROWNLEE.