

J. Taggart.
 Making Paper-Pulp.
 N^o 76270
 Patented Mar. 31, 1868.

Fig. 1.

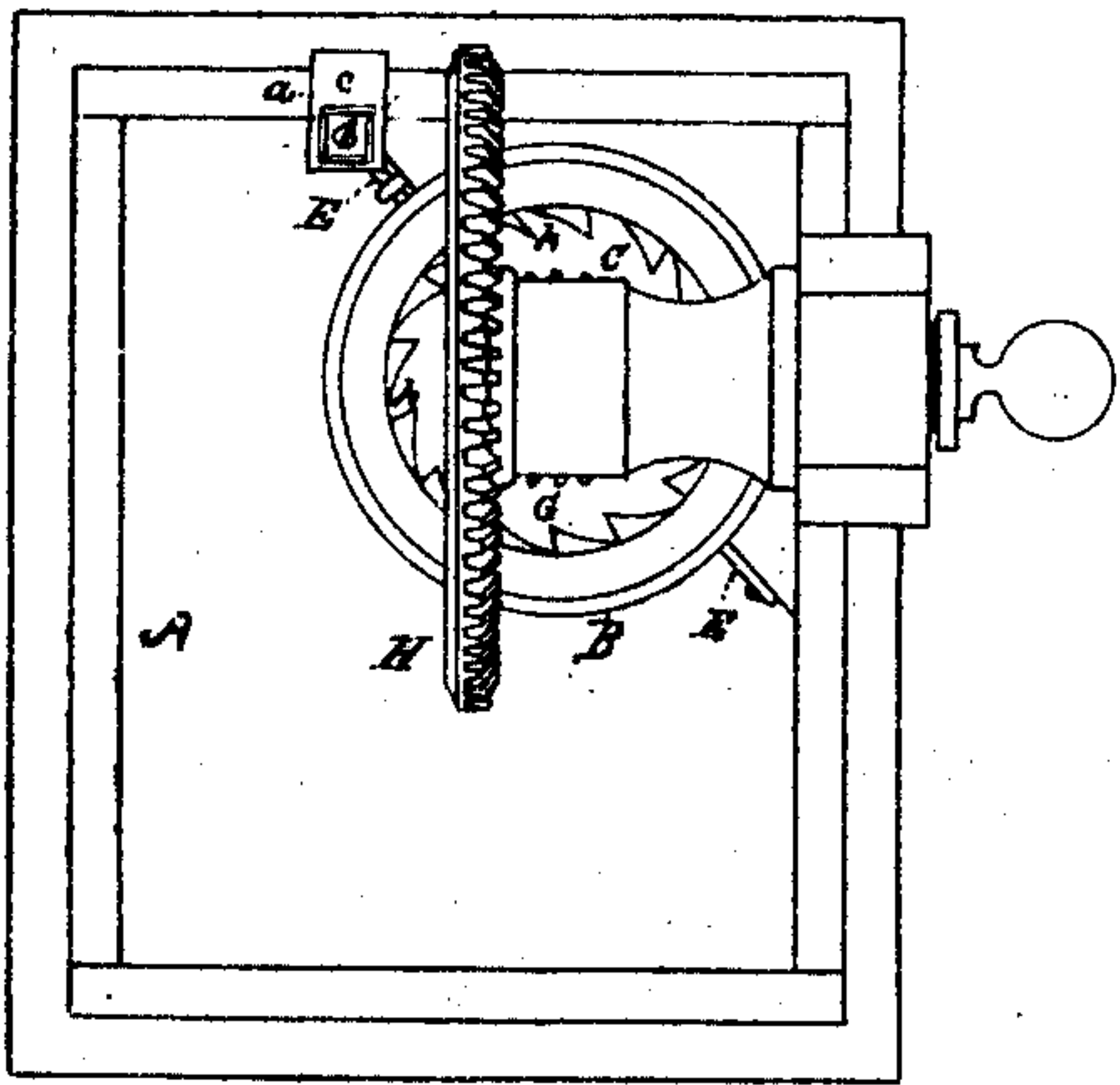


Fig. 4.

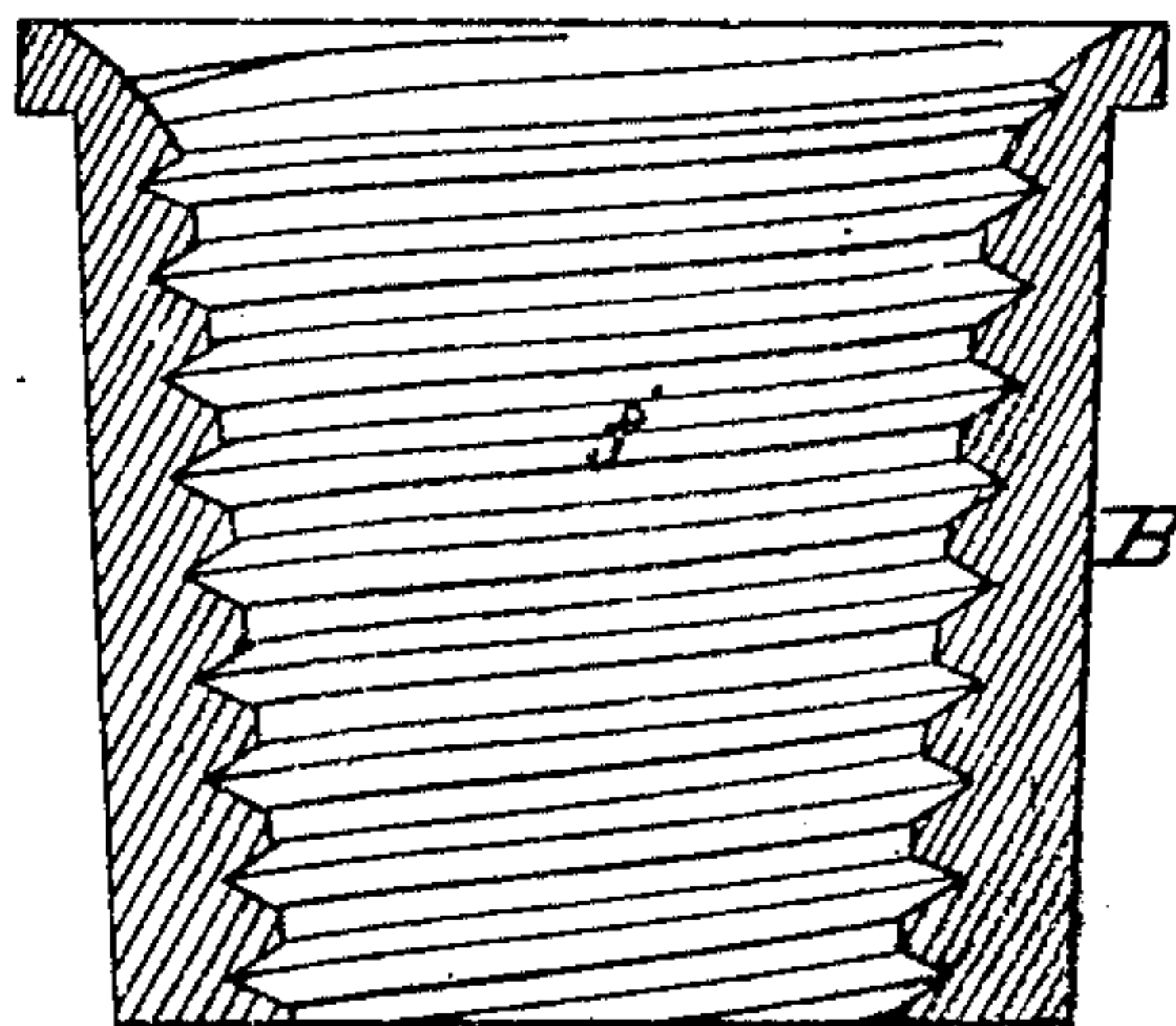


Fig. 3.

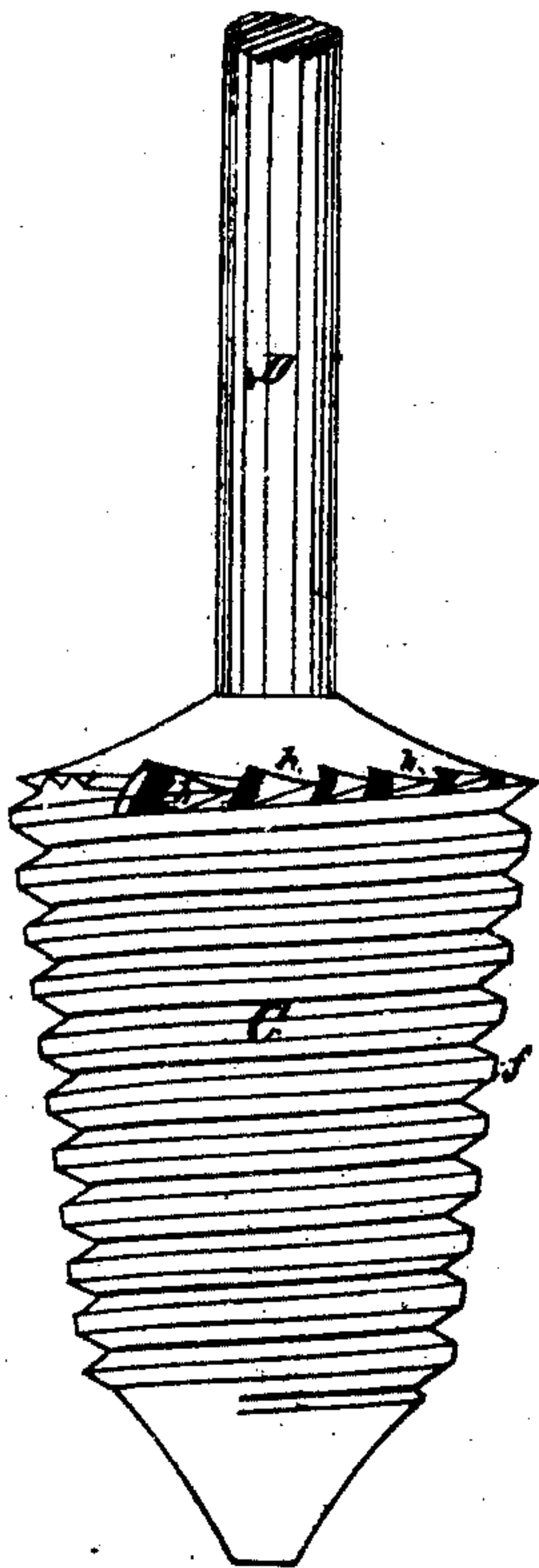
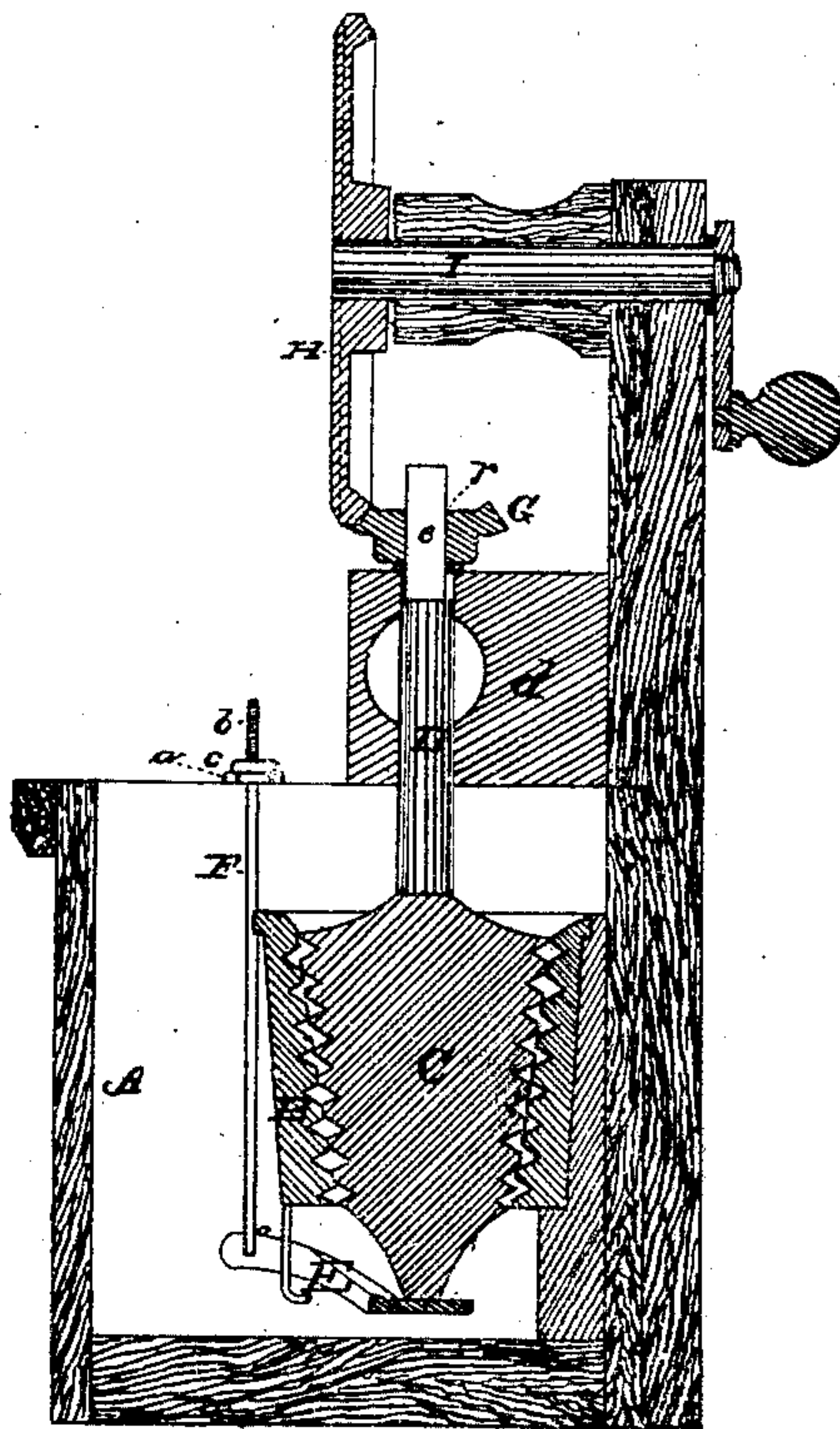


Fig. 2.



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JOHN TAGGART, OF ROXBURY, ASSIGNOR TO HIMSELF AND JEROME A. BACON, OF BEDFORD, MASSACHUSETTS.

Letters Patent No. 76,270, dated March 31, 1868.

IMPROVED MACHINE FOR MAKING PAPER-PULP.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL PERSONS TO WHOM THESE PRESENTS MAY COME:

Be it known that I, JOHN TAGGART, of Roxbury, in the county of Norfolk, and State of Massachusetts, have invented a new and useful Machine for Reducing Rags or other Fibrous Material to Pulp for being made into Paper; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, of which—

Figure 1 is a top view, and

Figure 2 a transverse section of the reducing-mechanism, and the vat or tub containing it.

In such drawings, A denotes a vat or tub, which may be square in shape, or of other proper form. In or near one corner of the tub, or in any other proper part thereof, I arrange a hollow conic frustum, B, having its lesser base or bottom elevated a short distance above the bottom of the tub. Within the said hollow conic frustum B is a conic frustum, C, fixed concentrically upon a vertical shaft, D. The lower end of the shaft, or the frustum C thereof, is stepped or supported in a lever, E, whose free end is sustained by a rod, F. This rod has a screw, b, and a nut, c, arranged on it, and goes through a stationary ear, a, projecting from the tub, the whole being as exhibited in fig. 2. The shaft I support in a bearing, d, the upper part, e, of the shaft being prismatic, and going through a bevel-pinion, G. Such pinion is supported on the said bearing, and engages with a driving bevel-gear, H, affixed to a shaft, I, which, when the machine is in use, may be revolved by any suitable motor. The prismatic part, e, of the shaft should slide freely in a correspondingly-shaped eye, r, made in the pinion, and should extend below such eye, in order that the shaft may rise or move vertically through the pinion when any foreign substance, such as a nail or a button, for instance, may be caught between the cutting-threads of the reducing-frusta. The outer curved surface of the male or inner frustum C has a helical thread, f, running around it, from top to bottom of it, such thread being either square, rectangular, or trapezoidal in its transverse section, the said thread being as shown in Figure 3, which is a side elevation of the said frustum C. The outer or female frustum B has another such helical thread, f', arranged on its inner surface, and extending from the bottom to the top thereof, such being as represented in Figure 4, which is a vertical section of the frustum B. The thread of one frustum, however, is pitched or inclined in a direction opposite to that of the other, so that when the edges of the threads are brought together, or in close proximity, and the inner frustum is in revolution within the outer one, such threads shall operate to shear and reduce rags or paper-stock when introduced between the two frusta. Instead of screw or helical threads formed on and extending around the curved surfaces of the two frusta in manner as specified, helical grooves made in such surfaces, and so arranged, may be substituted, one of such grooves being pitched in a direction opposite to that of the other. This mode of making the frusta, I do not, however, deem so advantageous as that hereinbefore described.

By revolving the inner frustum in one direction, when the tub is supplied with water, so as to extend above the top of the outer frustum, a powerful current of the water will be induced downward between the frusta, but when the inner frustum is revolved in the opposite direction, a powerful current of water will be caused to flow upward between the frusta.

The upper part of the thread of each or either frustum may be serrated or cut into teeth, as shown at h in figs. 1 and 3. This will enable the frusta to catch the bunches or masses of rags, or fibrous material, and tear the same in pieces before they may further pass between the helical cutting-threads of the frusta. The two frusta thus made may be termed conical shears, as they operate to cut the rags or paper-stock, and effect the reduction of such to pulp with very great rapidity.

Each of the frusta will operate like a screw-propeller, to force the liquid and paper-stock between the pair of frusta, and, in consequence of this, a very quick current of the liquid, and a vast amount of reduction of the stock, will take place in a very short time. The rapid reduction of the stock, or the formation of paper-pulp, by this machine, in comparison to ordinary pulp-grinders in use, is very remarkable.

The tub or cistern may be cylindrical in form, and have the frusta arranged concentrically within it. Instead of the conic frusta, two cylinders may be employed, one of such cylinders being placed concentrically

within the other, screw or helical threads being formed on the inner surface of the outer, and the outer surface of the inner of the two, and arranged with opposite pitches. The disadvantage of this form of my invention, however, is that the opposing helical threads will soon become worn, while in use, to such extent as to render the machine of little value, whereas, with the conic frusta, we have only to raise or lower in the inner frustum in order to either increase or diminish the space between the opposing threads, or we may bring the opposing threads in contact, and grind them together by means of emery, or other proper material, introduced between them while the inner frustum may be in revolution.

I am aware that two conic frusta, one being arranged within the other, and both being provided with teeth arranged in their next adjacent surfaces, have been used as a means of reducing and grinding grain, bones, plaster, and various other substances. I am aware that such have been employed in the reduction of paper-stock to pulp. The distinguishing difference between such machines and mine is that I do not use teeth alone, or straight cutters, on the surfaces of the frusta, but employ continuous spiral or helical threads, going around the frusta, and so arranged that the pitch of the thread of one frustum shall be in a direction opposite to that of the thread of the other frustum. In this way the helical grooves or spaces formed by the threads of the two frusta constitute channels for the flowage of the liquid and material to be reduced, though the outer frustum and the threads operate as screw-propellers to force the liquid through the said outer frustum, the threads in the meanwhile operating as continuous rotary shears, to effect the reduction of the stock.

What, therefore, I claim as my invention is—

The combination of the male and female cylinders or frusta, and the helical threads thereof, arranged on them so that that or those of one cylinder or frustum shall be pitched in a direction opposite to that or those of the other, as specified, the same being for use in manner and for the purpose substantially as hereinbefore set forth.

I also claim the reducing-cylinders or frusta, made with helical threads, arranged with opposite pitches, as described, and as having teeth formed on the upper part of either or each cylinder or frustum, as set forth.

I also claim the application of the shaft of the inner of the two frusta, made as described, to the driving-pinion and bearing of such shaft as to enable the frustum to rise within its fellow under circumstances substantially as set forth.

And, in combination with the reducing-frusta, so made with helical threads, arranged to pitch in opposite directions, as set forth, I claim means, substantially as described, or its equivalent, for supporting the inner frustum, and adjusting it in altitude, as specified.

I also claim the arrangement or combination of the two frusta, made, as described, with a tank or tub, substantially in manner as set forth, whereby the contents reduced in a liquid, when in the tub, and the inner frustum may be in revolution, are made to flow radially and vertically with respect to the outer frustum, as specified, such causing the pulp, in passing into the reducing-frustum, to converge toward a common centre, and, in passing out of such frustum, to diverge from the frustum tangentially, or thereabouts, whereby the pulp will be mixed to great advantage.

JOHN TAGGART.

Witnesses:

R. H. EDDY,

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