(No Model.)

J. D. PICKLES.

PAPER PULP BEATING ENGINE.

No. 528,027. Patented Oct. 23, 1894.

Fig. 1.

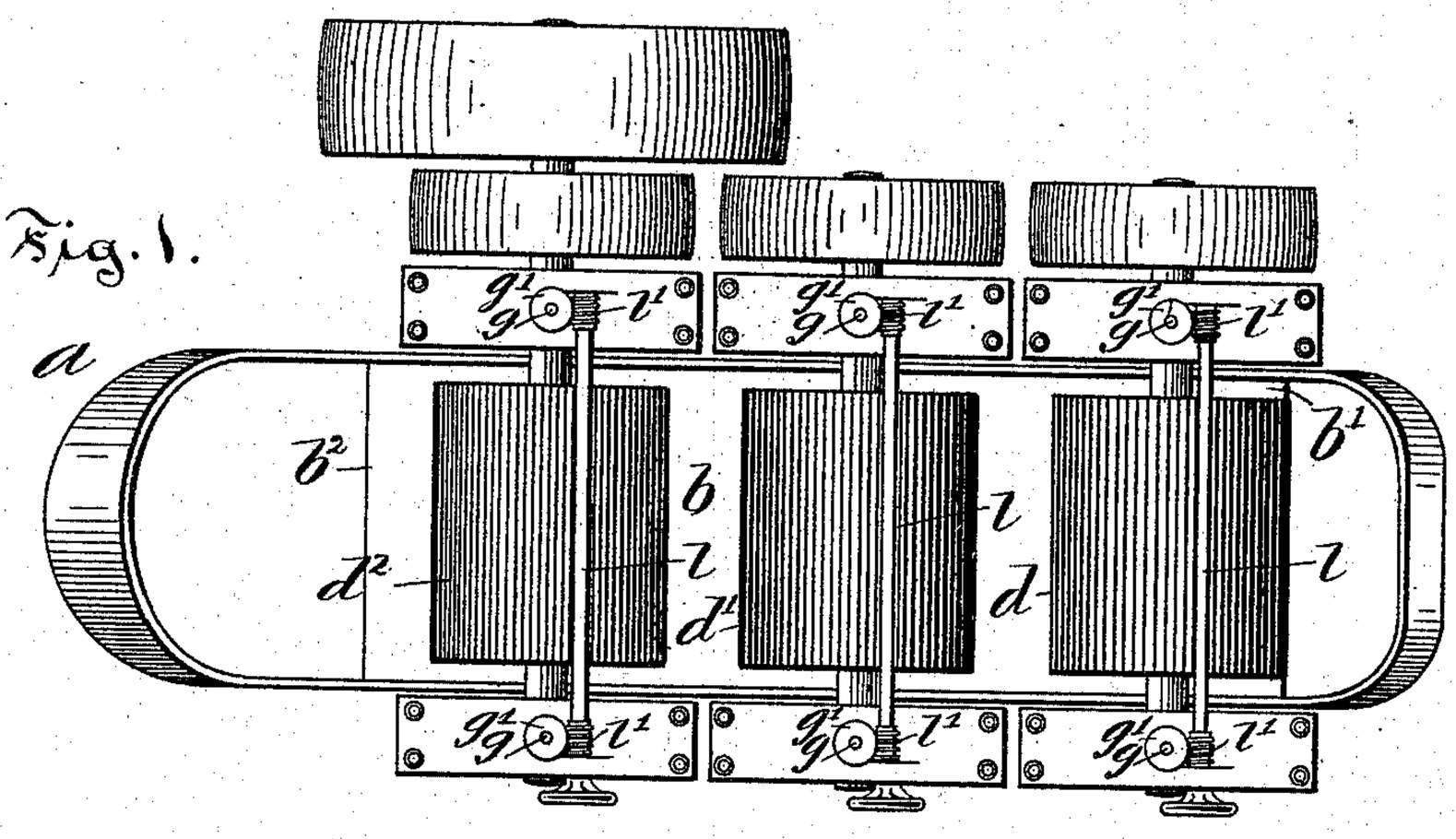
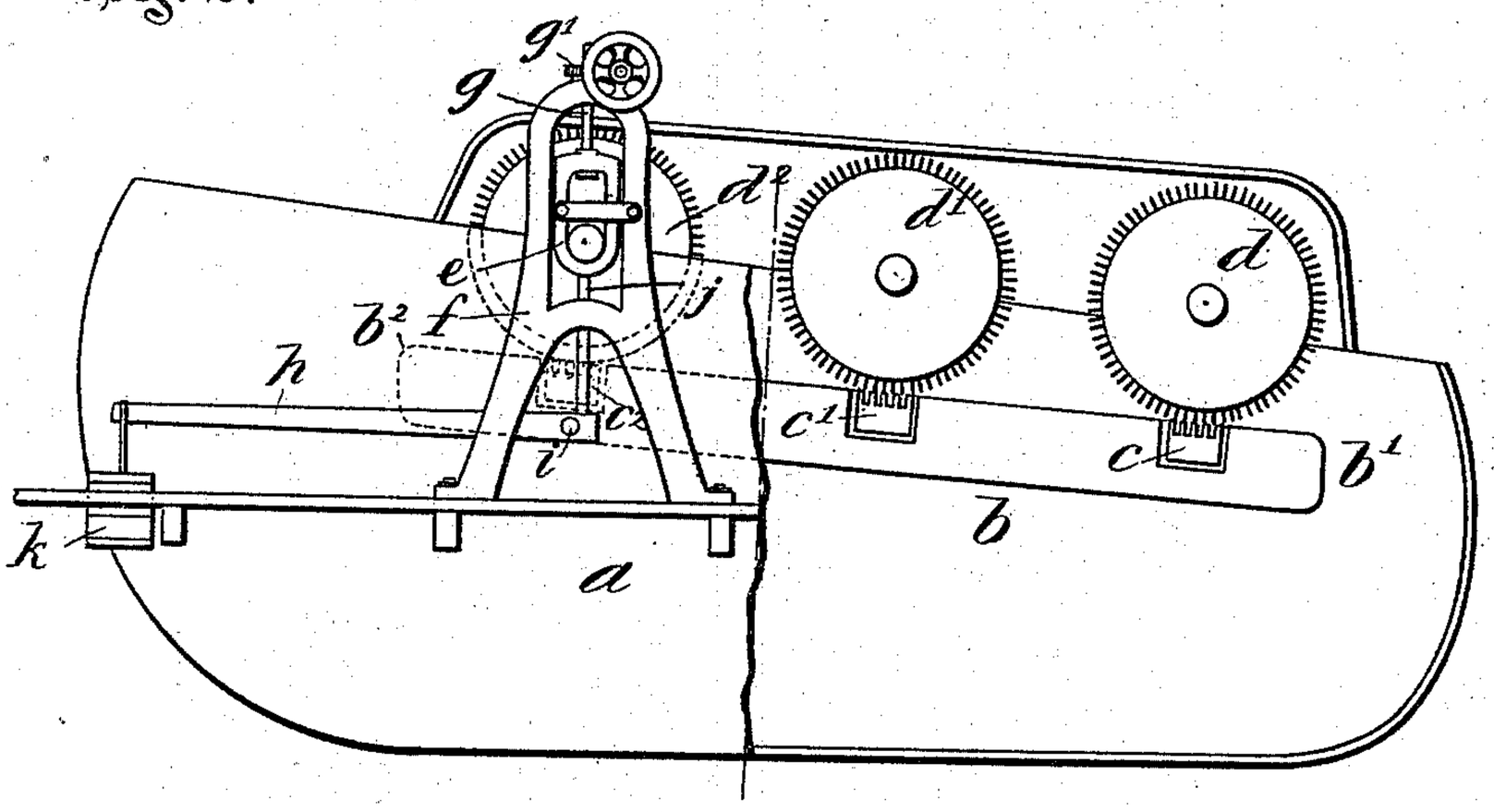


Fig. 2.



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UNITED STATES PATENT OFFICE.

JAMES D. PICKLES, OF BUCKLAND, CONNECTICUT.

PAPER-PULP-BEATING ENGINE.

SPECIFICATION forming part of Letters Patent No. 528,027, dated October 23, 1894.

Application filed January 3, 1894. Serial No. 495,565. (No model.)

To all whom it may concern:

Be it known that I, JAMES D. PICKLES, of Buckland, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Paper-Pulp-Beating Engines, of which the following is a full, clear, and exact description, whereby any one skilled in the art can make and use the same.

The object of my invention is to provide a beating engine for work on paper pulp or like material which shall have a greater efficiency under a given expenditure of power than prior engines of the like class, and which will further have for a given size of vat a greater efficiency in the treatment of the pulp.

To this end my invention consists mainly in the combination in a beater engine of an inclined bed with a beater roll and in the combination of such bed with a series of beater rolls; and it further consists in the details of the several parts making up the apparatus as a whole and in the combination of such parts as more particularly hereinafter described and pointed out in the claims.

Referring to the drawings: Figure 1 is a top or plan view of a beater engine embodying my invention. Fig. 2 is a detail view in side elevation of the engine with parts cut away to show construction.

In the accompanying drawings the letter *a* denotes a vat of suitable size and shape for holding the paper stock while it is being beaten and mixed by the action of the cutters. A diaphragm extends transversely of the vat between its sides forming a bed *b*, the front end *b'* and the rear end b^2 of the bed terminating short of the ends of the vat and thus leaving openings which allow the vertical flow of the more or less fluid mass of paper stock which is operated upon within the engine. The rear end of the bed is higher than the front end, and transversely of the bed and in its upper surface are secured bed plates *c*, *c'* and c^2, of a number equal to the number of rolls *d*, *d'* and d^2 with which the vat is supplied. These rolls are mounted transversely of the vat in suitable bearings and are provided with pulleys on their shafts by means of which they may be rotated from a suitable source of power.

It is evident that the fluid mass of pulp within the vat will stand at a level if undisturbed and that when the bed is inclined the rolls arranged along its length will be submerged to a greater or less extent, the first one of the series being the lowermost. The surfaces of the rolls are provided with the usual cutter blades and as all of the rolls turn in the same direction they serve to circulate the stock along the upper surface of the bed and to move it over the higher rear end of the bed, the head, or difference in level of the fluid mass of paper stock at opposite ends of the bed tending to promote a circulation of the stuff toward the front end of the vat, and this difference in level of the rolls aids the circulating motion which is imparted to the material by the rotation of the cutter bearing rolls. The ends of the roll shafts are each journaled in a yoke *e* that is adjustably supported in a standard *f* fixed at the side of the vat. The yoke is supported on a rod *g* the upper end of which is threaded and provided with a gear wheel *g'* which has a threaded hub fitting the thread on the rod, the rotation of the gear wheel *g'* serving to move the rod lengthwise for the purpose of raising or lowering the yoke and with it the roll suspended from it. The beater rolls in ordinary use in vats of this kind weigh about six thousand pounds and the result of the beating and cutting operation of these rolls upon the stock depends upon the distance at which the periphery of the roll, or the edges of the cutters borne in that surface, are moved with reference to the surfaces of the bed plates. A very close contact of the cutter with the surface of the bed plate produces a cutting action that reduces the fiber of the paper stock to any desired degree as to length and size.

It is desirable, particularly in wood pulp used as a stock, that the rolls should be so adjusted with reference to the cutters that while the full benefit of the weight of the roll is obtained to back up the cutting action the distance between the edges of the knives or cutters and the surface of the bed plate should be such as to produce a "brushing" action rather than a cutting, the result of such action being a sub-division of the fiber rather than a shortening of it by any cutting action.

In order to provide for the setting of the rolls twice in succession with accuracy at the same distance apart with respect to the surface of the bed plates so that the work of the machine may not be largely a matter of judgment on the part of the operator, with no certainty in results a counterpoise device is used.

By counterpoising the roll I am enabled to provide for a more accurate adjustment of the degree of separation of the cutters. The counterpoise device consists of a lever *h* supported on a pivot *i* with a brace *j* extending through a socket or guide-way, preferably in the standard and interposed between the lever and the yoke. The outer end of the lever is provided with means for supporting a weight *k*.

A shaft *l* extends across the vat supported in suitable bearings on the frame and bears worms *l'* which are in mesh with the worm gears *g'* which are borne on the upper threaded ends of the rods *g* as described. By means of a hand wheel on this shaft the beater rolls can be adjusted vertically for the purpose of setting the cutters at any desired distance from the surface of the bed plates.

The vats are provided with suitable covers overlying the rolls so as to prevent the paper stock from being thrown out in the operation of the machine.

I claim as my invention—

1. In a beater engine in combination with a vat, a transverse bed substantially straight along its upper surface and inclined upward from front to rear, a series of cutter beds arranged at different levels along the bed, and a series of beater rolls arranged at different levels along the bed with their peripheries co-operating with the cutter beds, and means for driving the rolls, all substantially as described.

2. In a beater engine in combination with a vat, a transverse bed substantially straight along its upper surface and inclined upward from front to rear and having bed plates, the beater rolls mounted in the vats, standards arranged on opposite sides of the bed, a yoke adjustably supported in each standard, the beater rolls having shaft bearings in the yoke, and the counterpoise device including the lever, the connecting rod and the counterpoise weight, all substantially as described.

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