

No. 862,134.

PATENTED AUG. 6, 1907.

A. T. CHURCH.  
METHOD OF MAKING BRUSHES.

APPLICATION FILED AUG. 16, 1906.

2 SHEETS—SHEET 1.

FIG. 1.

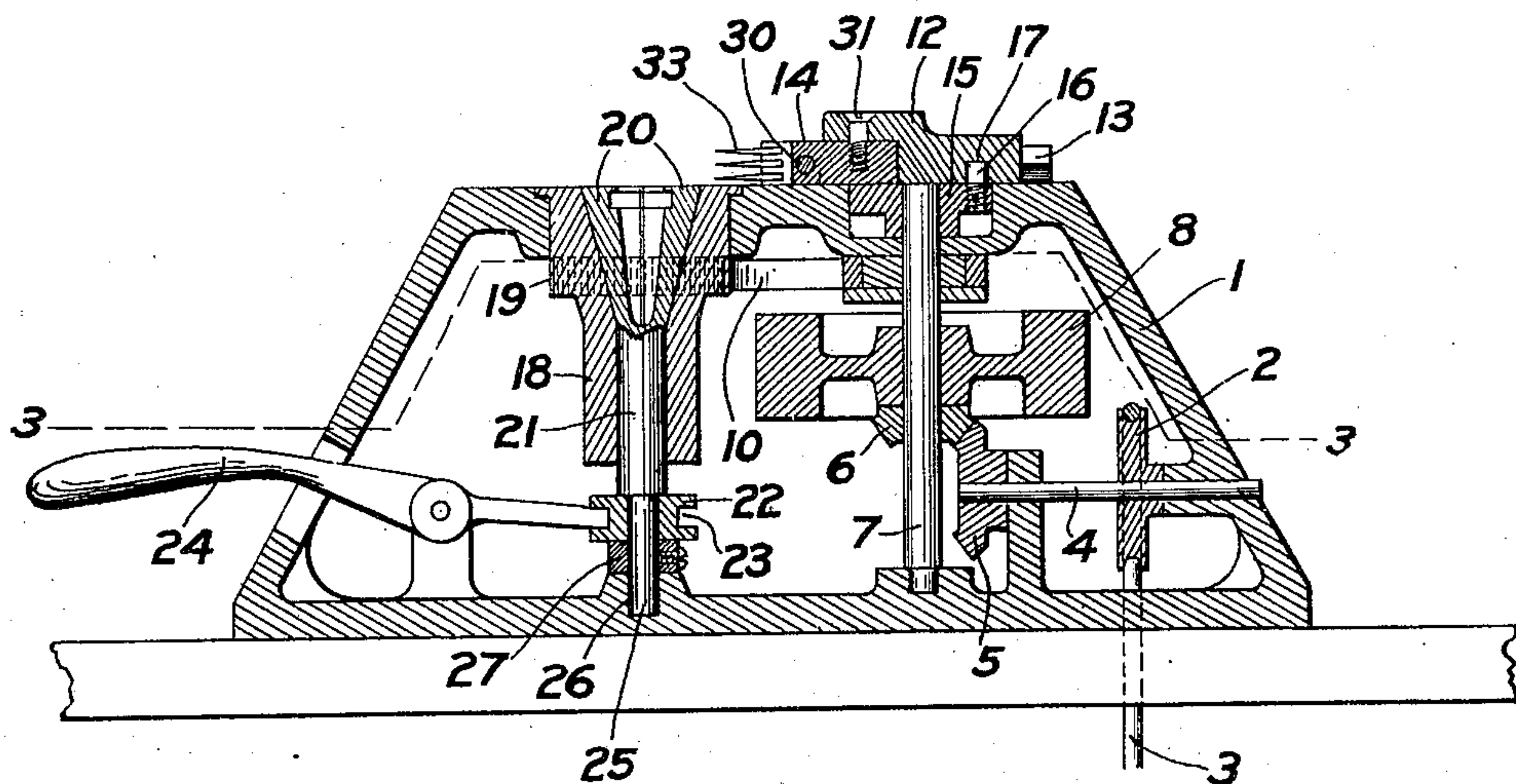


FIG. 2.

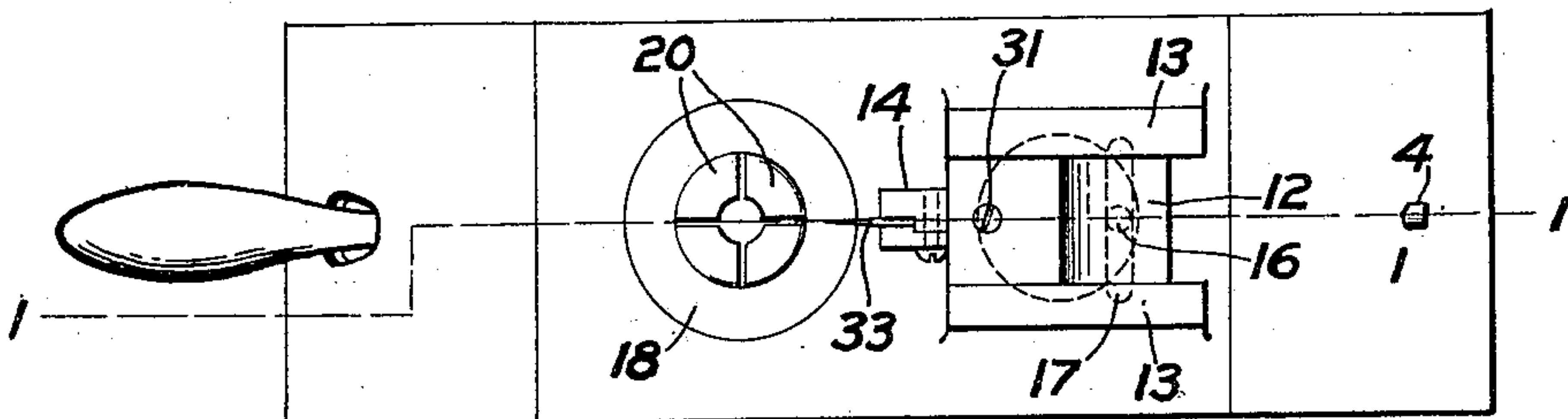
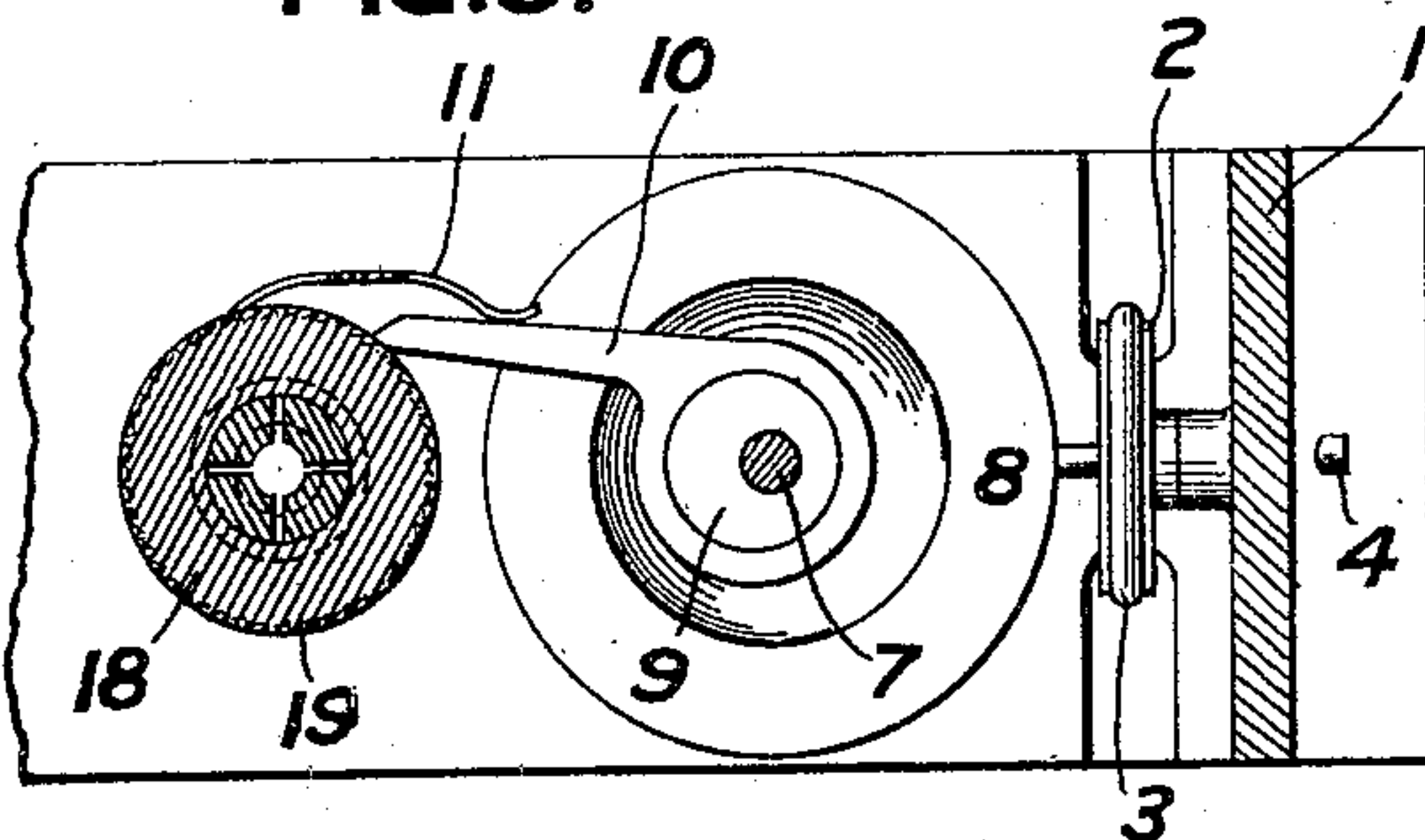


FIG. 3.



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2 SHEETS—SHEET 2.

FIG. 4.

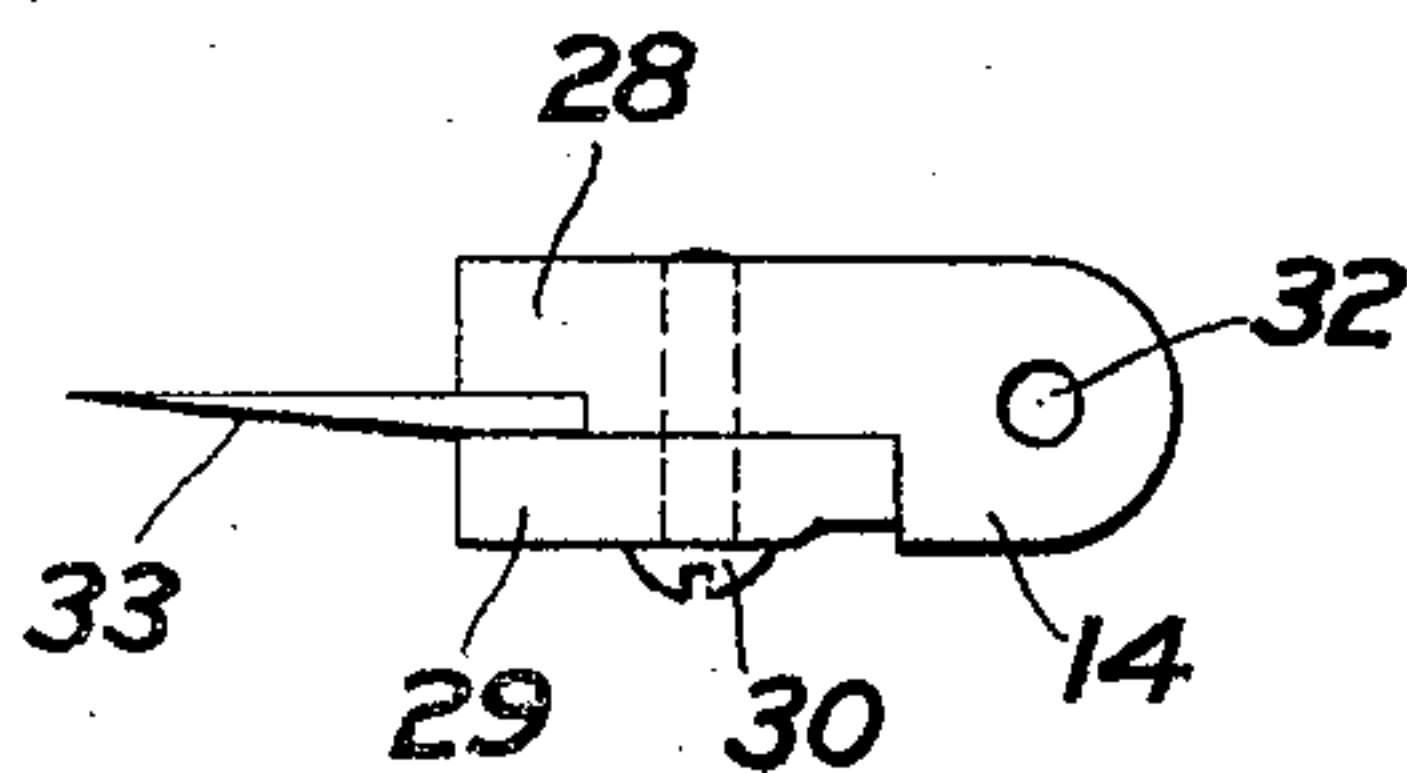


FIG. 5.

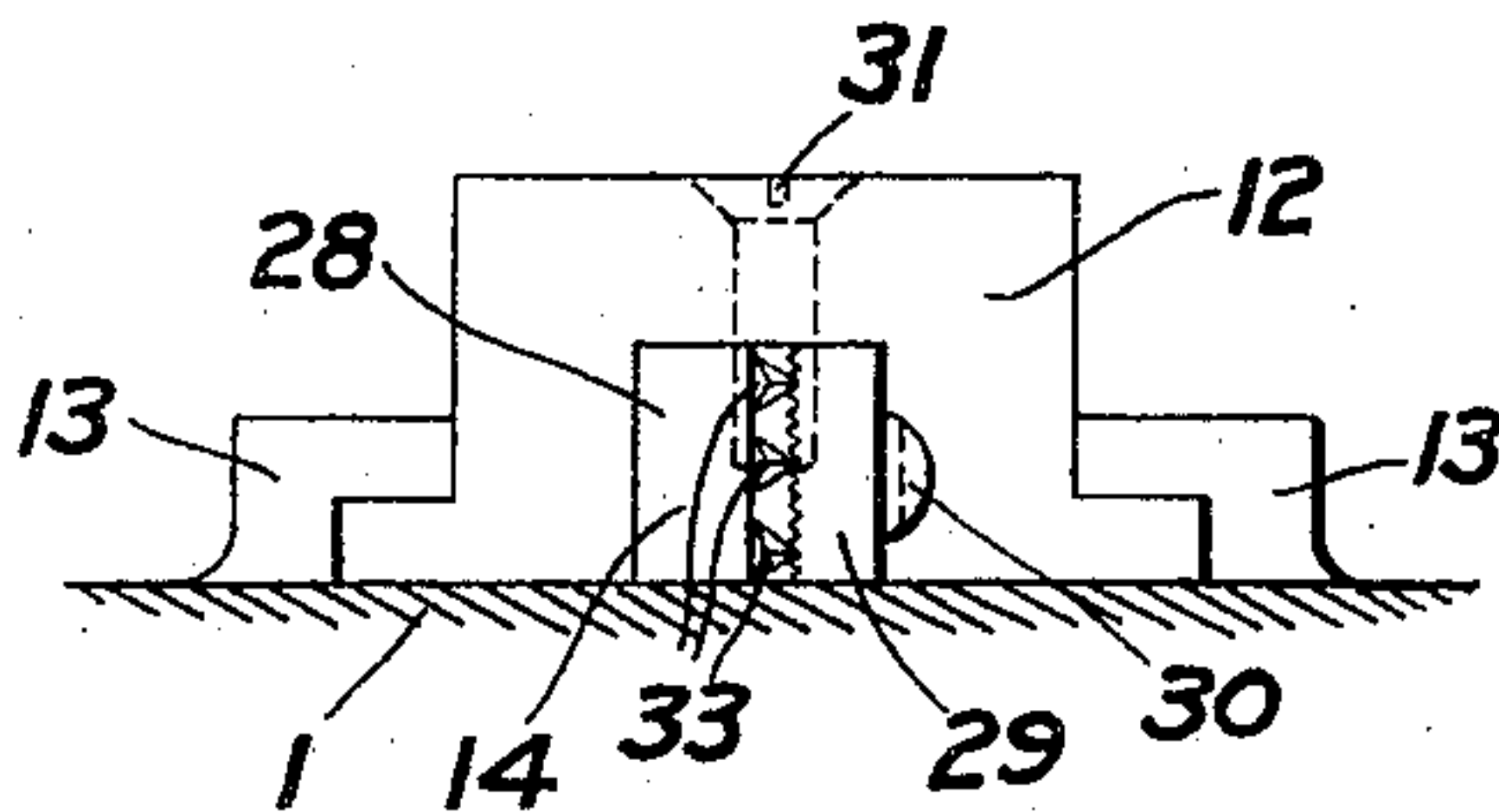


FIG. 6.

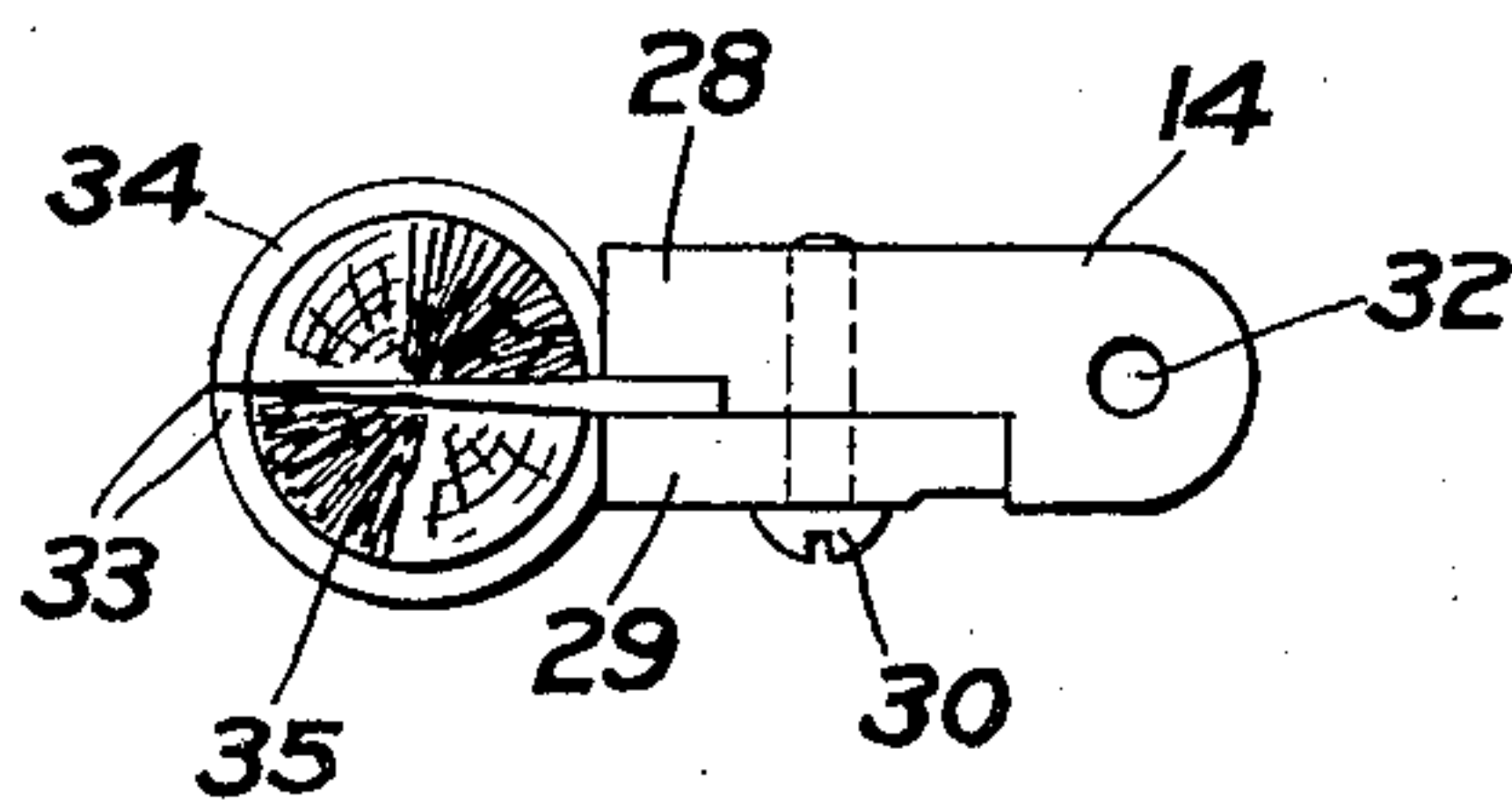


FIG. 7.

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# UNITED STATES PATENT OFFICE.

ALBERT T. CHURCH, OF ROCHESTER, NEW YORK, ASSIGNOR TO GEORGE A. HOBBIE AND HENRY W. MEADE, OF ROCHESTER, NEW YORK.

## METHOD OF MAKING BRUSHES.

No. 862,134.

Specification of Letters Patent.

Patented Aug. 6, 1907.

Application filed August 16, 1906. Serial No. 330,812.

*To all whom it may concern:*

Be it known that I, ALBERT T. CHURCH, a citizen of the United States, and a resident of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Methods of Making Brushes, of which the following is a specification.

This invention relates to the method of making brushes from fibrous material, such as wood.

10 The invention consists in the novel mode of separating the fibers and producing the brush, and in the method hereinafter described and claimed.

An apparatus suitable for the performance of the method herein claimed is shown in the drawings, in 15 which—

Figure 1 is a vertical section on the line 1—1 of Fig. 2; Fig. 2 is a top plan view of the device; Fig. 3 is a cross section on the line 3—3 of Fig. 1; Fig. 4 is a top plan view of the device for separating the fibers; Fig. 20 5 is an elevation of a detail of the machine showing an end view of the device shown in Fig. 4; Fig. 6 is a top plan view of the device shown in Fig. 4 when operating upon a piece of wood; and Fig. 7 is a view of the finished brush.

25 The apparatus has a frame 1 that supports all the parts. A driving pulley 2 operated by a belt 3 from a source of power drives the shaft 4 and the bevel gear 5. The bevel gear 5 meshes with another bevel gear 6 on a vertical shaft 7, which may carry, if desired, a 30 fly wheel 8. The shaft 7 carries means for operating a pawl and ratchet, which, in the present embodiment of the invention, is an eccentric 9, actuating a pawl 10 that is held up to its work by a spring 11. The separator is carried upon a slide 12 running between 35 the guides 13, and said separator 14 is reciprocated by means of a crank plate 15 upon the shaft 7, having a crank 16 running in a transverse slot 17 in the slide 12. Rotation of the shaft 7 causes reciprocation of said slide 12, and also reciprocation of the pawl 10. 40 A chuck is provided for holding the pieces of wood to be operated upon, and said chuck is caused to move in order that the separator may act upon different parts of the piece of wood, and separate its fibers to the degree required. In this case, the chuck is ro- 45 tated and the separator acts transversely to the piece of wood, which piece of wood is revolved, so that the separator shall split with sufficient fineness to produce the necessary number of brush fibers.

In the frame 1 is fixed a rotary head 18, upon whose 50 periphery at a suitable point is a series of ratchet teeth 19, with which the pawl 10 engages. It is obvious that in the usual way, if the pawl 10 is reciprocated, the chuck head 18 will be revolved by a series of motions each through a small arc. The rotation is, 55 therefore, step by step.

The crank plate 15 and the eccentric 9 are so placed on the shaft 7 that the pawl moves inward to turn the head 18, when the slide 12 has been retracted, and the splitting devices have been withdrawn from the block of wood held by the chuck. Any suitable 60 chuck means may be employed, but in the present case, there is shown a series of four chuck jaws 20 having a conical exterior fitting in a hollow, conical cavity in the head 18. The jaws 20 are raised and lowered, and are thus opened and closed in a familiar manner, 65 by means of the stem 21. In this case the jaws are integral with said stem 21.

Means are provided for opening and closing the jaws of the chuck without stopping the apparatus. A collar 22 is fixed on the stem 21, and has a periph- 70 eral groove 23. In its peripheral groove lies the end of the lever 24. The lower end 25 of the stem 21 extends into a socket 26 in the frame. If desired, an adjustable collar 27 may be set upon the stem 21, or its end 25, to limit the downward movement of the 75 chuck jaws, and, if desired, to hold the pawl 22 in place.

The separating apparatus consists of a holder and one or more piercers. The holder is made in any suitable manner, such as with two jaws 28 and 29 held together 80 by the screw or bolt 30. These jaws fit into a recess in the slide 12, and are held therein in any suitable manner, such as by a screw 31 passing through a portion of the slide and into a socket 32 in the holder.

Between the jaws 28 and 29 of the holder are fastened 85 a series of piercers or needles 33. These are sharply pointed, and of tapering form, and for many reasons are preferably of small width. They have no cutting jaws but act merely as sharply pointed wedges or conical stiletos. A piece of suitable wood is shaped into a 90 form, so as to be grasped by the jaws 20 of the chuck, and when so grasped is firmly held in place. A considerable portion, however, of the piece of wood extends above the chuck and into a path of reciprocation of the piercers 33. The brush is preferably made with 95 a flange 34 at the bottom, from which extends, when the brush is finished, a bunch of fibers 35.

The operation of the device is as follows:—The outer end of the lever 24 is depressed, which lifts the stem 21, raises the jaws of the chuck from contact with the 100 head 18, and thus opens the jaws. The piece of wood of suitable form is preferably steamed or soaked, so as to reduce its brittleness, and is placed in the jaws of the chuck. The lever 24 is raised, pulling the jaws down, and closing them upon the wood. The machine is 105 started, the pulley 2, shaft 4, and bevel gear 5 rotate the shaft 7. If the parts are in position shown in Fig. 1, the slide 12 moves up to the chuck, and inasmuch as the piercers move in a diameter of the piece of wood, the said piercers will stab, or transfix, or pierce said 110



piece of wood from side to side, as shown in Fig. 6, splitting it where they enter. During this forward movement of the piercers, the pawl 10 has been retracted. Now the piercers withdraw from the piece 5 of wood, and as soon as they are fully withdrawn, the pawl will have moved forward, engaged the ratchet 19, and on its further movement will rotate the chuck through a small arc of a circle, thus presenting to the piercers a new piece of the wooden block for splitting.

10 These operations proceed, until the block has been split on a sufficient number of diameters to have separated the fibers thoroughly to the desired degree of fineness. By repeating the operation the fibers may be reduced to a still greater degree of division. It will

15 be noticed that, in the embodiment of the invention shown in the drawings, lines of splitting all pass through, or close to, the axis of rotation of the block, whereby the fibers on the outside of the block are somewhat less finely divided than those at the center. If it is de-

20 sired to prevent the piercers from entering the same perforations previously made in the block, the ratchet may be made of an uneven number of teeth.

It will be seen that the method of operation is to split the block of wood crosswise, and not lengthwise, 25 of the grain, and to repeat this splitting operation on different transverse lines through the block, until the block is completely split into separate fibers. Of course the base 34 of the block is held firmly, so that

it does not split. It is obvious that this method may be carried out by hand, as well as by machine. The 30 hand method, however, would be slower and less desirable than the machine method.

What I claim is:—

1. The method of manufacturing brushes from wooden blocks, consisting in clamping the block at a certain part 35 thereof, and separating the fibers of the end of the block by piercing and splitting the block on different non-parallel lines across the grain thereof.
2. The method of manufacturing brushes from wooden blocks, consisting in clamping the block at a certain part 40 thereof, rotating the block, and separating the fibers of the end of the block by repeatedly piercing and splitting the block on different transverse lines across the grain.
3. The method of manufacturing brushes from wooden blocks, consisting in clamping the block at a certain part 45 thereof, and separating the fibers of the end of the block by splitting the block on numerous different non-parallel transverse lines across the grain, all passing approximately through the center of the block.
4. The method of manufacturing brushes from wooden 50 blocks, consisting in clamping the block at a certain part thereof, rotating said block, and separating the fibers of the end of the block by repeatedly piercing and splitting the block on different transverse lines across the grain, all passing approximately through the center of rotation 55 of the block.

ALBERT T. CHURCH.

Witnesses:

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