

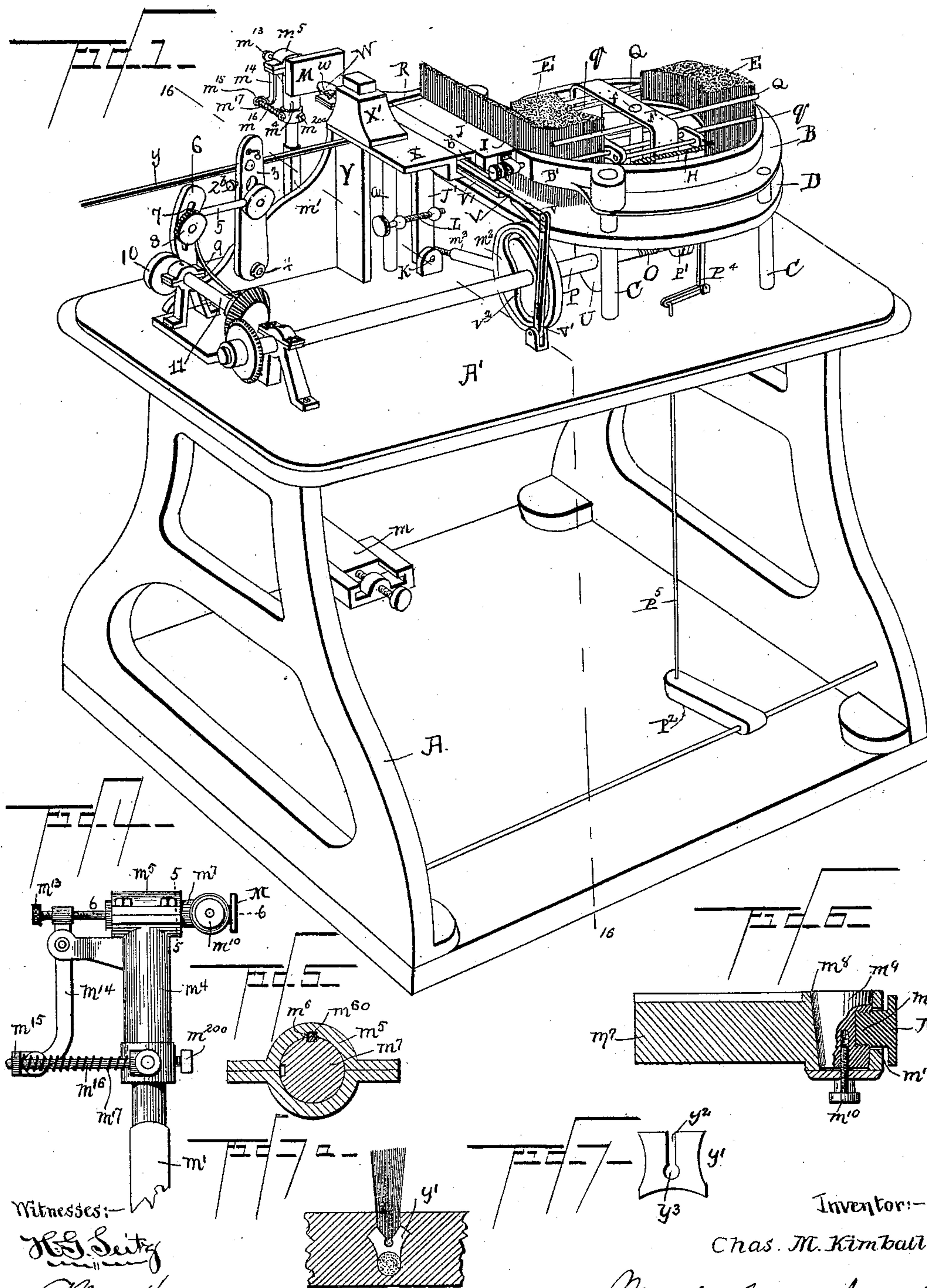
(No Model.)

6 Sheets—Sheet 1.

C. M. KIMBALL.
BRUSH MACHINE.

No. 532,735.

Patented Jan. 15, 1895.



Witnesses:

H. G. Seitz

A. W. Harrison

Inventor:

Chas. M. Kimball,

By his Attorneys, *Wright, Brown & Corsey*

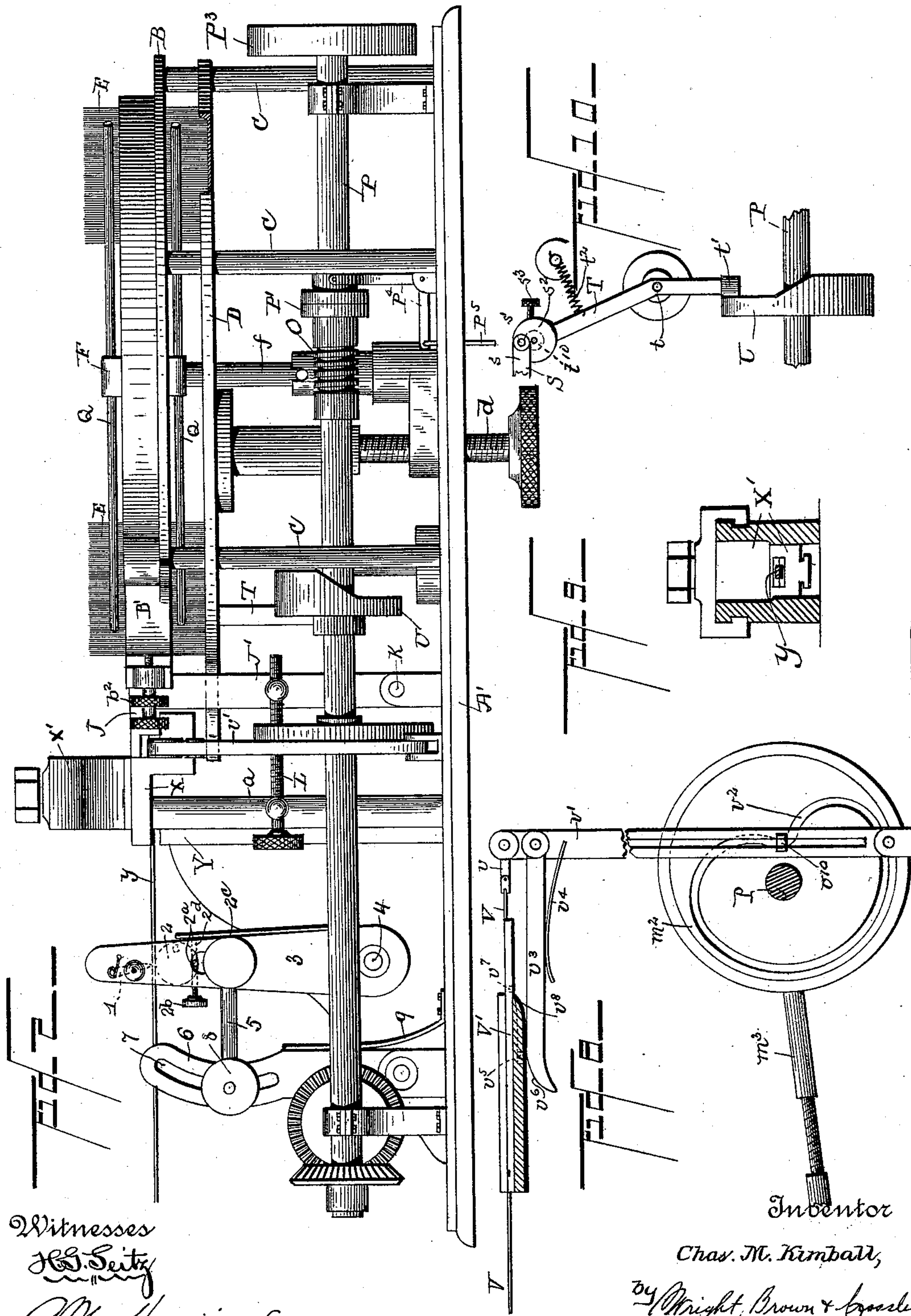
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6 Sheets—Sheet 2.

C. M. KIMBALL.
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Witnesses
J. G. Seitz
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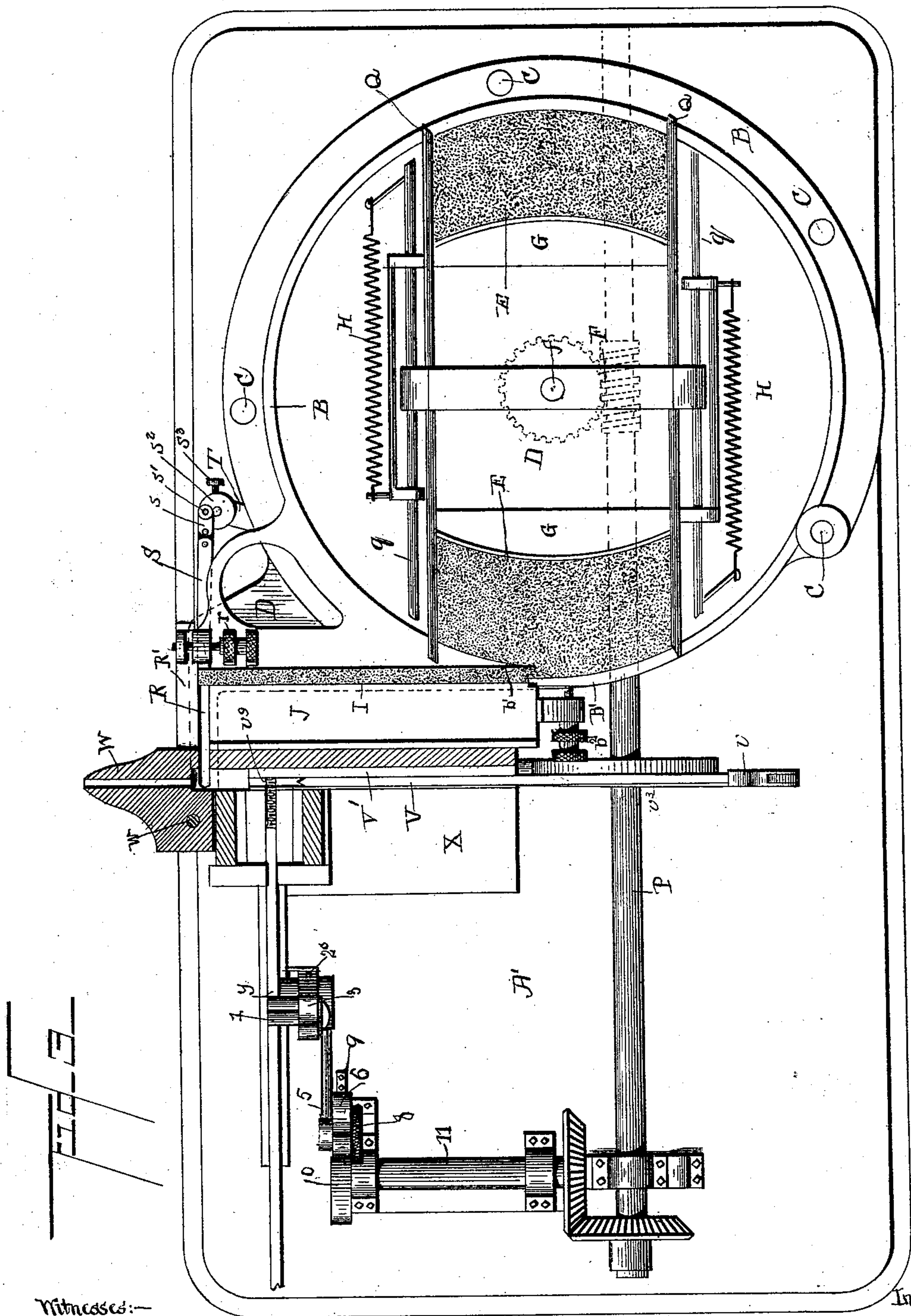
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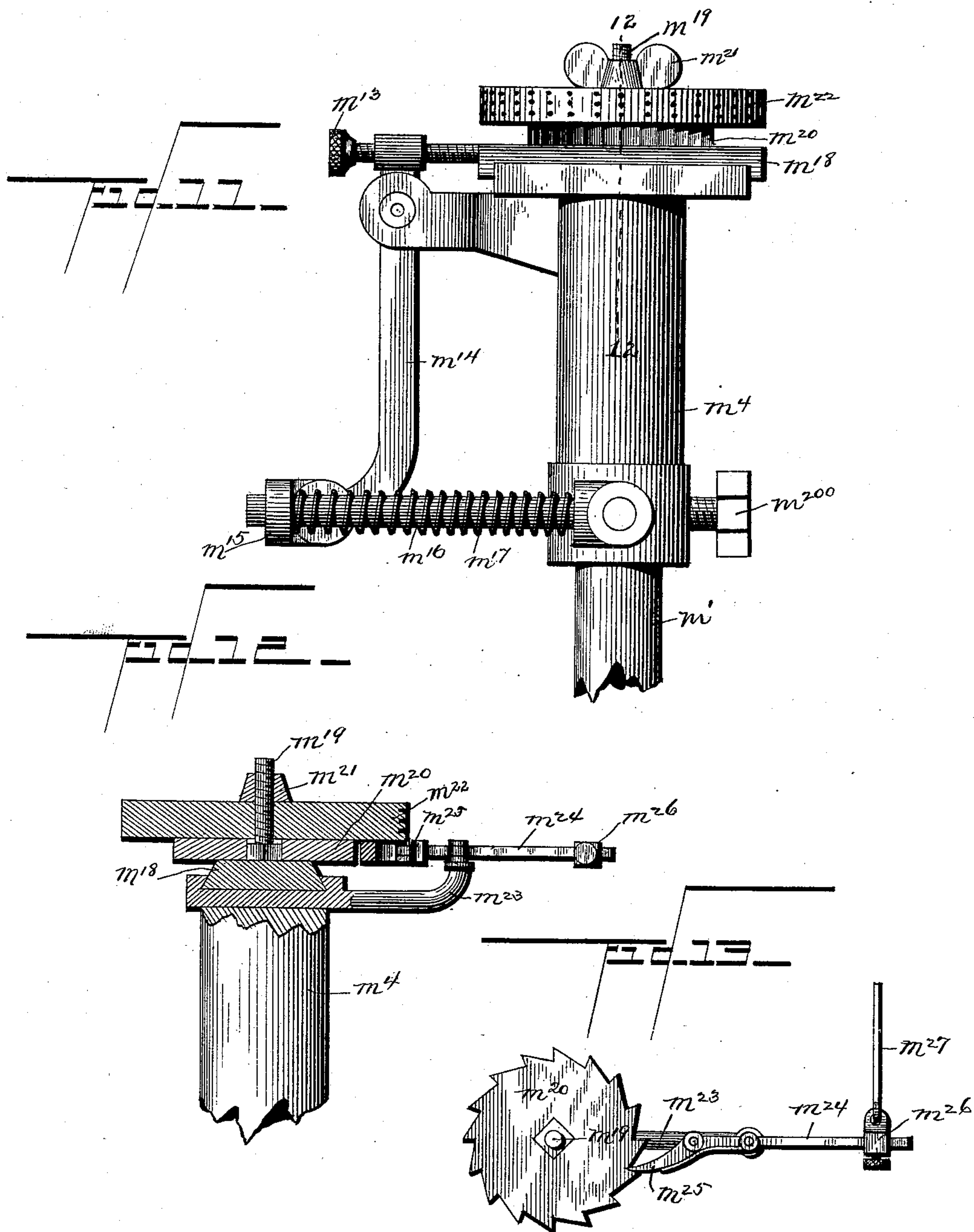
(No Model.)

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Patented Jan. 15, 1895.



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(No Model.)

6 Sheets—Sheet 5

C. M. KIMBALL.
BRUSH MACHINE.

No. 532,735.

Patented Jan. 15, 1895.

Fig. 10a.

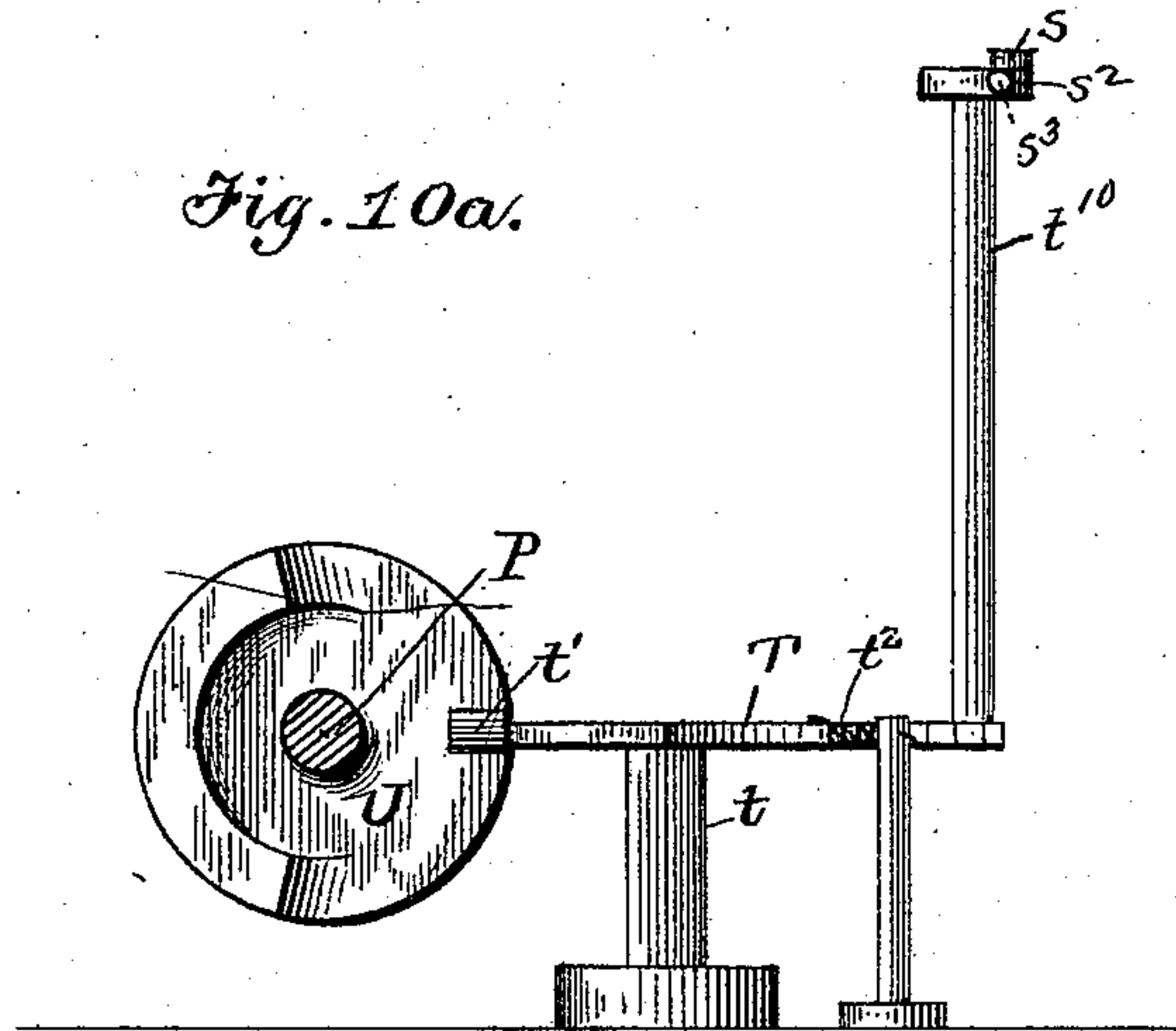


Fig. 14

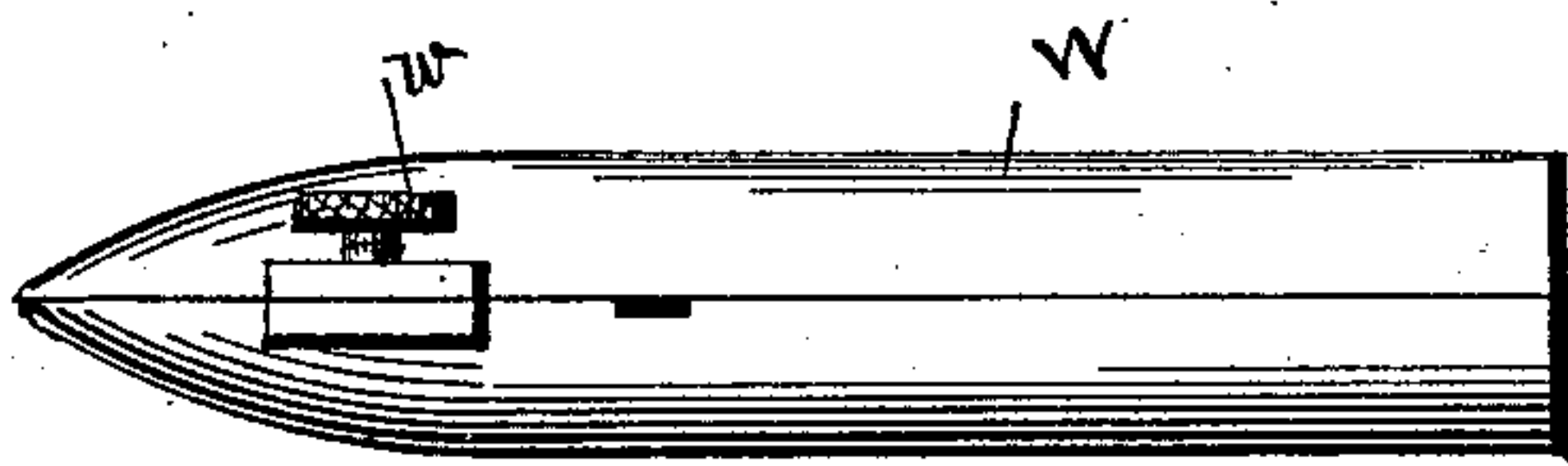


Fig. 14a.

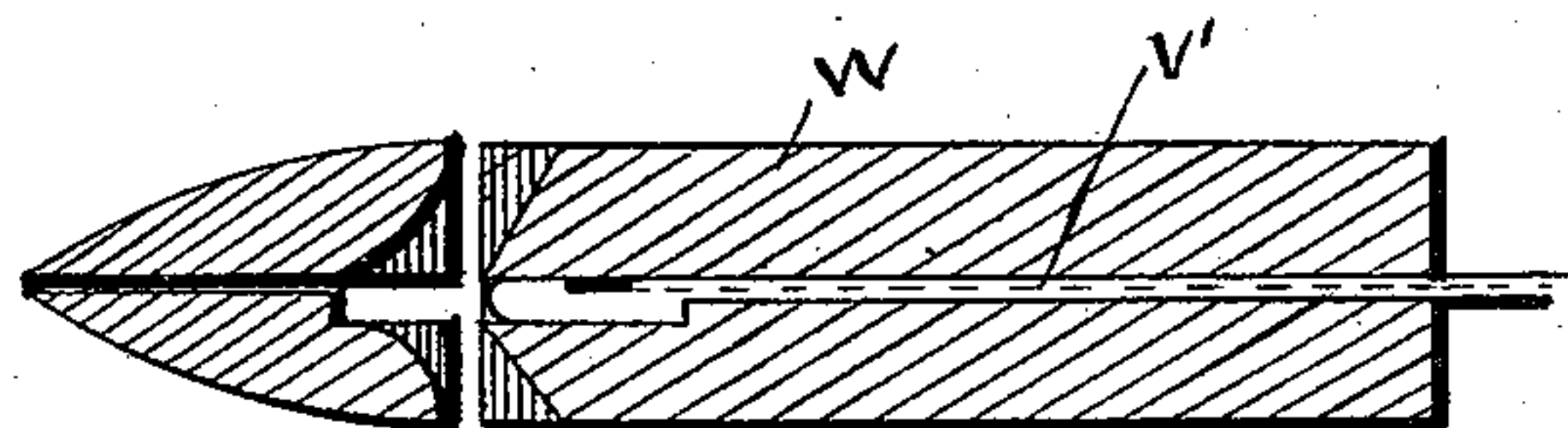
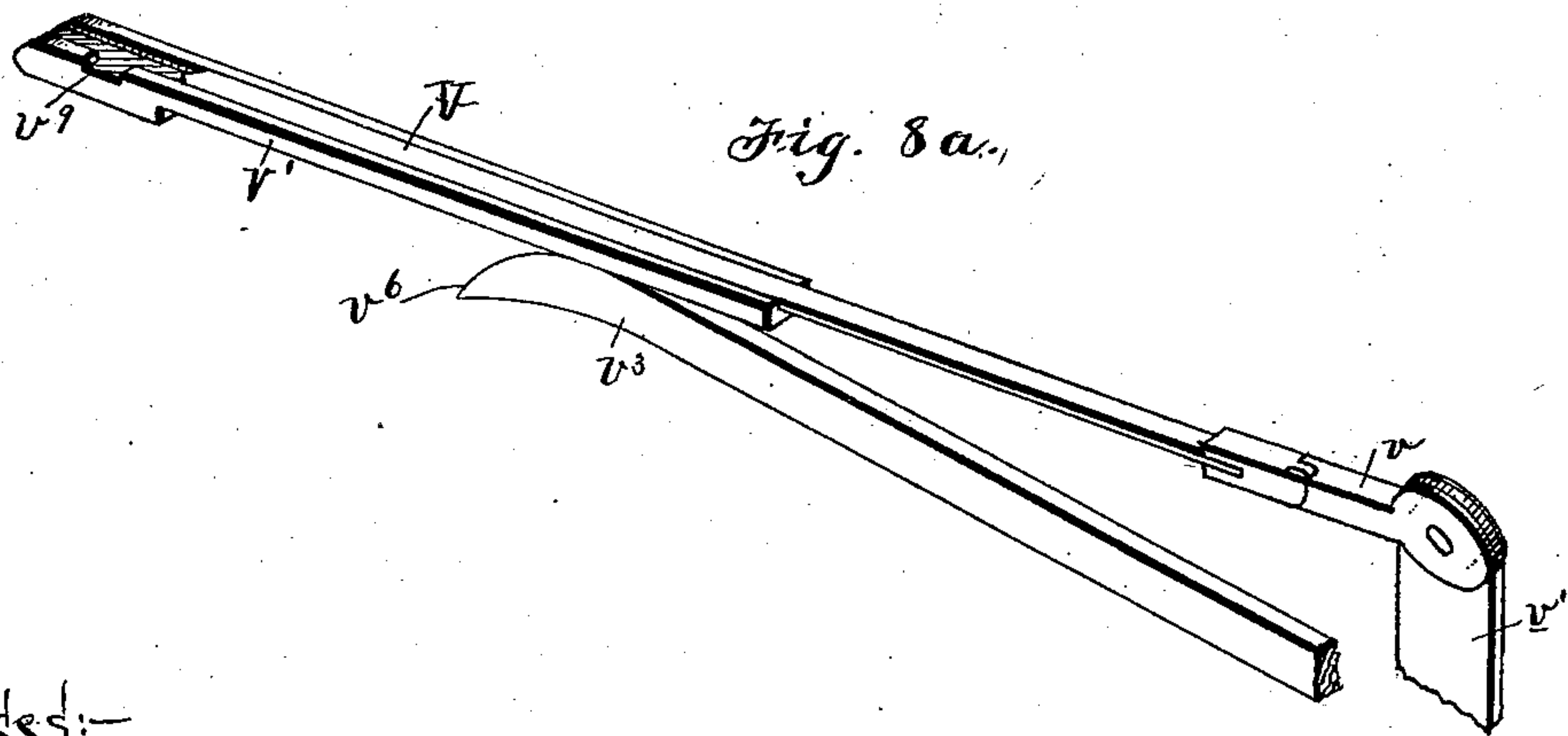


Fig. 8a.



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(No Model.)

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Fig. 16.

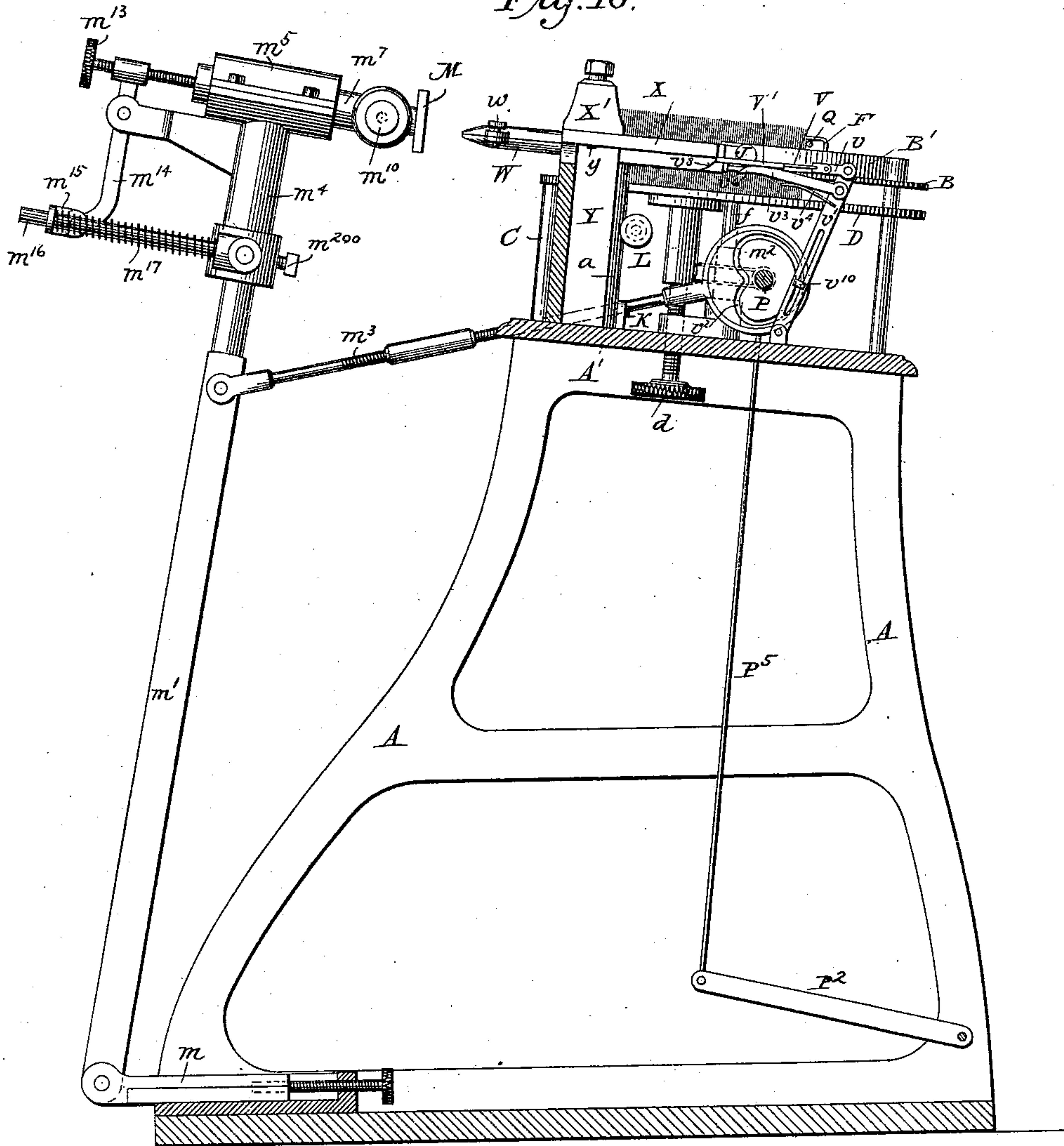
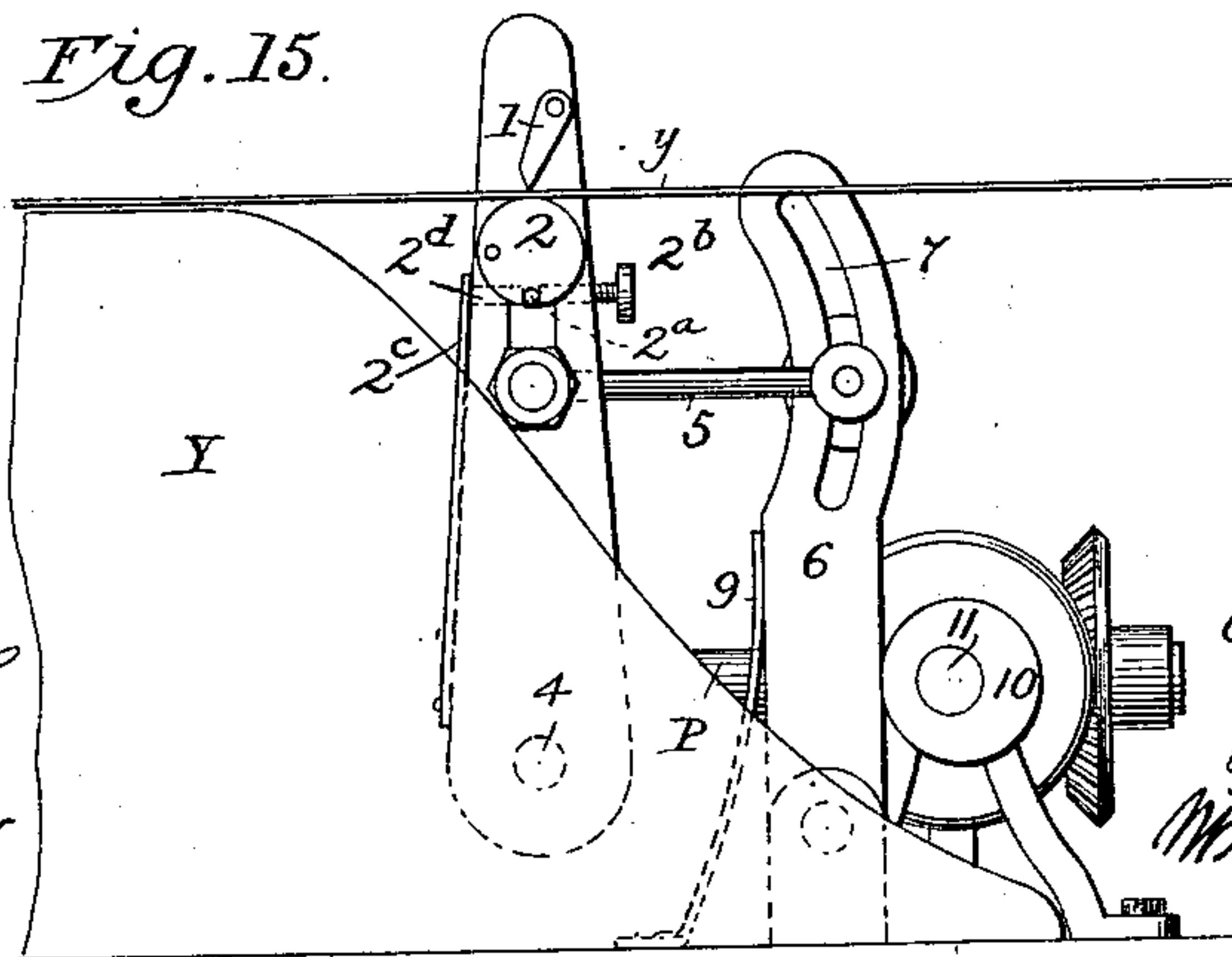


Fig. 15.



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Inventor,

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UNITED STATES PATENT OFFICE.

CHARLES M. KIMBALL, OF AUBURNDALE, OHIO.

BRUSH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 532,735, dated January 15, 1895.

Application filed November 15, 1892. Serial No. 452,043. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. KIMBALL, of Auburndale, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Machines for Making Brushes, of which the following is a specification.

My invention relates to improvements in machines for inserting bristles or their equivalents, into brush backs and fastening the same by means of metallic fasteners.

My improvements have reference to the automatic feeding device for separating and feeding the bristles into a narrow row; the adjustable gate and channel; the mechanism for feeding the metal from which the fasteners are formed; and the reciprocating back rest.

My invention consists in the construction and combination of parts as hereinafter described and claimed.

In the drawings, which accompany and form part of this specification, Figure 1 is a perspective view of the entire machine, some of the details of construction being omitted therefrom. Fig. 2 is a front elevation of the parts of the machine above the stand. Fig. 3 is a plan view of the same with the needle pipe in horizontal section, and omitting the back rest for the brush block. Fig. 4 is a side elevation of the back rest, its supporting rod being broken away. Fig. 5 is a section on the line 5—5 of Fig. 4. Fig. 6 is a section on the line 6—6 of Fig. 4. Fig. 7 is an enlarged view of the metallic fastener. Fig. 7^a is a detail illustrating the position and shape of the tuft fastener after being secured in the block. Fig. 8 is a detail view showing the fastener carriage and the inserter, and the means for reciprocating them. Fig. 8^a is an enlarged detail perspective view of the fastener carriage and inserter needle. Fig. 9 is a detail sectional view illustrating the punch for forming the metallic fasteners. Fig. 10 is a detail plan view of the separator and its pivoted arm and the cam on the main shaft for operating the latter. Fig. 10^a is a side elevation of the parts shown in Fig. 10. Fig. 11 is a detail side elevation illustrating a modified construction of the means for holding a brush-block while the tufts are being inserted. Fig. 12 is a section taken on the

line 12—12 of Fig. 11. Fig. 13 is a plan view of the ratchet wheel and pawl shown in Fig. 12. Fig. 14 is a detail side elevation of the needle pipe, and Fig. 14^a is a vertical longitudinal section of the same. Fig. 15 is a detail rear elevation of the parts of the machine shown at the left in Fig. 2. Fig. 16 is a sectional view of the machine on the line 16—16 of Fig. 1.

Similar letters and figures of reference refer to the same parts throughout the several views.

A is the frame of the machine, the upper portion or top A' of which supports the ring B by means of the columns C.

D is a metallic disk or table, which is vertically adjustable by means of a screw *d* and is guided in its vertical movement by the posts C. The object of this vertical adjustment of the table D is to enable bristles E, of different lengths, which rest with their lower ends on said table, as shown in Fig. 2, to have their centers brought opposite the center of the channel hereinafter described.

Passing through the center of the table D is a shaft *f* to the upper end of which is secured a head F, to which head are secured rods Q, Q, extending across the table. Between these rods, at each end thereof, are placed the bristles E having their lower ends resting upon the table D, and being pressed outwardly against the ring B by cross pieces G, G, which slide on guide rods *q*, *q* permanently attached to the head F at each end thereof; said cross pieces G, G, being pressed outwardly against the bristles by means of springs H.

The ring B, instead of being continuous, has a portion B' pivoted to one of the posts C, to form a gate, and opposite the free end of this gate, the ring is brought to a sharp point *b'*. The pressure of the mass of bristles against the gate will serve to keep said gate open as far as would be permitted by the adjusting screw *b*², said screw serving to reduce the size of the outlet for the bristles, when desired.

Extending from the bristle outlet and tangential to the ring is a channel I formed between the fixed portion of the frame and an adjustable plate J, which is carried by the

upper end of the arm J', pivoted at K to a bracket secured to the frame A'. The plate J is adjusted so as to widen or narrow the channel I by means of a screw L, tapped through a stud connected with the arm J' and passing through a stud on the supporting rod α , so as to revolve therein and not move longitudinally. Preferably the channel I will be wider than the opening at the gate so that the bristles, in being guided from the gate, will pass more freely along the channel.

The table D is extended as shown in Fig. 3 partly by dotted lines, under the channels I and R, to support the bristles after leaving the main portion of the table.

The shaft f , and the head F, are revolved by means of a worm gear (not shown), meshing with a worm O on the main shaft P, which is driven by a belt applied to pulley P³. This main shaft is divided and provided with a friction clutch P' of any preferred construction, the movable portion of which is operated by a treadle P², through the medium of suitable lever and rod connections, such as shown at P⁴ and P⁵ respectively in Figs. 1 and 2.

The outer end of the channel I, is intersected by another channel R at right angles to it, through which the separator S is given a reciprocating motion by the arm T pivoted to the frame at t and having at its other end a friction roll t' which is, by means of the spring t^2 , held against a cam U on the shaft P. (See Figs. 3, 10 and 10^a.) To adjust the throw of the separator, it is connected to the arm T by means of a link s operated by a wrist pin s' projecting from a disk s^2 which may be rotatively adjusted on the upper end of standard t^{10} projecting upward from the outer end of the arm T and secured in its adjusted position by means of a set screw s^3 .

The separator S passes through the line of bristles, at the end of the channel I, thereby separating a knot or tuft of bristles and carrying such tuft to the farther end of the channel R, directly in front of an inserter needle V. To adjust the width of the channel R, the side of said channel, opposite the end of the plate J is formed by a plate R' which may be adjusted toward and from the said end of the plate J by means of an adjusting screw r . (See Fig. 3.)

The inserter needle V is reciprocated in the channel formed for it in the carriage V', through the medium of a link v (see Fig. 8) connected to the upper end of a lever v' which is pivotally connected to a bracket upon the table A' and vibrated by means of a stud v^{10} on said lever entering a cam groove v^2 formed in the side of an eccentric m^2 on the main shaft. The inserter needle, in advancing, pushes one of the metallic fasteners (which has been previously brought into proper position by means hereinafter described) before it, so that it engages the tuft, at the center of the latter, bends it double, and pushes it through the needle pipe W

into a brush back which is held, by means hereinafter described, opposite the end of said needle pipe, and which brush back or block has been previously bored. When the bottom of the hole bored in the block is reached, the point of the needle expands the fastener, thereby firmly securing the tuft in the hole of the brush block.

The needle pipe W, is made in two parts or halves, (see Figs. 14 and 14^a) the lower part of which is fitted into a recess planed in a shelf X, supported by a die frame Y and the column α . (See Figs. 1 and 3.) The other or top half of the needle pipe is secured to the lower part by suitable clamping means, as a screw w .

The metal fasteners are formed from a tape or strip of metal y which is automatically fed from a coil (not shown) to the dies, indicated at X' in Fig. 1, the latter being operated in any preferred or well-known manner.

To automatically feed the strip of metal step by step, it is passed between a pawl 1 and an eccentric 2, both of which are carried by an arm 3 pivoted to the frame at 4 (see Figs. 1, 2 and 15) and vibrated by means of a link 5 the outer end of which is secured to a rock arm 6 which is provided with an arc slot 7, the thumb nut 8 serving to secure said link at different distances from the center of motion of the rock arm so as to adjust the amount of feed of the metallic strip. The rock arm 6 is held by a spring 9 against a cam 10 secured to a shaft 11, which is suitably geared to the main shaft of the machine. The eccentric 2, is provided with a pin 2^a against which the adjusting screw 2^b bears. Against the other side of said pin 2^a bears a plug 2^d carried by a spring 2^c the object of which is to permit the eccentric to yield so that the strip will not be fed, should the strip or the fasteners become clogged in the dies. By adjusting the screw 2^b, the device is adapted to feed a metallic strip of a different thickness. Should the strip become clogged, the pawl 1 will push the eccentric down against the stress of the spring 2^c and then pass and lose its grip on the strip. To warn the attendant that this has happened I have provided a signal such as a bell carried by the arm 3, said bell being struck by a hammer carried by the pawl 1 when the latter has been thrown over so as to lose its grip on the strip.

To hold the brush block while the tufts are being inserted, I have provided the following construction as shown in Figs. 1, 4, 5, 6 and 16. m is a sliding plate, adjustable in ways attached to the base of the frame by means of a suitable adjusting screw. To this sliding plate is pivotally connected an arm m' which is vibrated by means of an eccentric m^2 on the main shaft P, through the medium of an adjustable link m^3 , (see Figs. 1, 8 and 16) said link being composed of right and left hand screws connected respectively to the arm and the eccentric strap, and a right and left hand threaded sleeve uniting them. Ver-

5 tically adjustable on the upper end of the arm m' is a sleeve m^4 , said sleeve being provided with an adjusting nut m^{200} (see Figs. 4 and 11) adapted to bear against the said arm m' and hold the sleeve in its adjusted position. The upper end of the sleeve is provided with a tubular bearing, the cap m^5 of which has a longitudinal groove m^6 . The plunger m^7 fits the bearing and is provided with two longitudinal grooves located at an angular distance from each other of ninety degrees. By means of a feather m^{60} fitted into groove m^6 and into one of the grooves of the plunger m^7 , the said plunger may be fitted to the bearing in either one of two positions and permitted to slide longitudinally therein. The plunger near one end is bored out laterally in tapering form as at m^8 , and thereto is fitted a taper block m^9 which is tightly held therein by means of a thumb screw m^{10} . By loosening said thumb screw, the block may be rotated slightly in its bearing. The outer end of the plunger is provided with a slot m^{11} , through which extends a shank m^{12} , rigidly connected to the plug m^9 and having at its outer end a back rest plate M. As shown in Fig. 6, the shank m^{12} is screwed into the side of the plug m^9 . By the means thus described, the back rest plate may be held at various angles opposite the end of the needle pipe W. The object of setting the plunger in either one of two positions permitted by the feather and the grooves described, is to prevent the splitting of the brush backs when making fine brushes and working on the outside rows. When such outside rows are being worked on, the greatest diameter of the doubled tuft is liable to extend across the grain of the wood, and the change of position above referred to, enables such tuft to be driven in with its greatest diameter in line with the grain of the wood.

In order that the back rest may yield somewhat to allow for different depths of holes bored in the brush back, I provide a screw m^{13} , bearing against the rear end of the plunger, said screw being tapped through the end of an arm m^{14} pivoted to a bracket projecting from the sleeve m^4 , said arm being provided at its lower end, with a sleeve m^{15} which slides on a pin m^{16} pivotally connected with the sleeve m^4 , a spring m^{17} being interposed between said sleeve m^{15} and the inner end of the pin.

To make a brush, the block, (which has been bored with the required number of holes) is held in the hands of the operator with one of the tuft holes directly in front of the inserter pipe W. The back rest then advances lightly against the block until the tuft of bristles has been fastened into the block. As a strip of metal is fed forward, the die punches out a fastener which is then, by a further advance of the strip, pushed onto the reciprocating fastener carriage V'. (See Figs. 3 and 8 and 8^a.) The inserter needle reciprocates in a channel formed in the upper surface of the car-

riage V' while the said carriage is designed to carry the fastener across the channel R which fastener doubles the bristles. It is then necessary that the carriage V' should advance no farther, but the needle V must continue to advance so as to carry the doubled tuft and the fastener through the pipe W and into the brush block. To thus operate these parts, there is pivoted to the lever v' below the point of connection of the needle V, an arm v^3 which is normally pressed upward by a spring v^4 and is provided with an upwardly projecting stud v^5 and a forwardly extending cam surface v^6 . The fastener carriage has a hole v^7 and the bed in which the carriage reciprocates has a cam surface v^8 . It will thus be understood that as the lever v' moves forward, the carriage and needle advance together until the cam surface v^6 of the arm v^3 reaches the cam surface v^8 , and the stud is thus withdrawn from the hole v^7 and the carriage stops. On the return of the lever v' the stud v^5 re-engages the hole v^7 and withdraws the carriage into position to receive the next fastener in its recess v^9 .

The metallic fastener y' shown in Fig. 7, is provided with three concaved edges, as shown, and with a slot y^2 terminating in a circular opening y^3 . The intermediate concaved surface engages and partially surrounds the tuft of bristles as shown in Fig. 7^a, and as the needle advances, its pointed end enters the slot y^2 and when the fastener and bristles are stopped by the bottom of the hole in the brush lock, the said pointed end of the needle spreads the fastener, as shown in Fig. 7^a, and causes the heel points of the fastener to enter the wood at the sides of the hole in the brush block, and causes the intermediate concaved surface of the fastener to still further surround the tuft so as to prevent the side bristles of the tuft from working loose. Owing to the enlarged opening y^3 , the fastener is caused to take an easy bend around the tuft.

The object of providing two cross pieces G, G, and two bristle receptacles, is to enable me to use two different colors of bristles or different kinds of stock, it being convenient in making brushes "hit or miss," that is, in different colors with no particular pattern or for making the center of one color and the outside row of another color. In the latter case, if it is desired to omit one color, for a certain length of time, the operator can hold the gate B' closed during the movement past it of the undesired stock of bristles.

The object of the sliding plate m and the adjustable link m^3 of the back rest, is to enable an adjustment whereby the working space between the back rest plate and the end of the needle pipe W may be varied.

If it is desired to make circular or wheel brushes for polishers, I may provide the sleeve m^4 with a flat plate at its upper end, having a dove tailed groove, as indicated in Figs. 11 and 12, in which groove slides a

block m^{18} having a screw m^{19} projecting from its upper surface. Fitted to turn loosely on the screw is a ratchet wheel m^{20} , between the upper surface of which and a nut m^{21} there
 5 may be clamped a circular brush block, as at m^{22} . Pivoted to a bracket arm m^{23} is a lever m^{24} having a spring pressed pawl m^{25} pivoted to its inner end, said pawl engaging the teeth of the ratchet m^{20} . Adjustably secured to
 10 the outer end of lever m^{24} is a block m^{26} to which is connected one end of a link m^{27} as shown in Fig. 13, the other end of said link being suitably connected to the frame of the machine.

15 With this modified construction, it will be obvious that the movements imparted to the arm m' will cause the ratchet wheel and the circular brush block to be rotated the space of one or more teeth at each movement of
 20 said arm m' , the number of teeth passed over by the pawl m^{25} being determined by the distance at which the block m^{26} is set from the pivot of the lever m^{24} .

I do not claim herein the metallic tuft fastener shown and described, as the same is shown, described and claimed in my Patent No. 503,795, dated August 22, 1893.

Having now described my invention, what I claim is—

30 1. In a brush making machine, the combination with a rotary bristle receptacle, of a channel or passage extending tangentially therefrom, a separator for removing a tuft of bristles from the end of such passage, and
 35 means for doubling said tuft and inserting it in a brush block, substantially as described.

2. In a brush making machine, the combination with a table of a plurality of rotary bristle receptacles, adapted to carry bristles
 40 of different colors a channel or passage extending tangentially from the path of movement of the bristles, a separator for removing a tuft of bristles from the end of such passage, and means for doubling said tuft
 45 and inserting it in a brush block, substantially as described.

3. In a brush making machine, the combination with a vertically adjustable table, of a horizontal rotary bristle receptacle, adapted
 50 to confine a mass of bristles with their lower ends resting on said table, a channel or passage extending tangentially from the receptacle, an adjustable gate for permitting the passage of bristles from the receptacle to the
 55 said channel, a separator for removing a tuft of bristles from the end of such passage, and means for doubling said tuft and inserting it in a brush block, substantially as described.

4. In a brush making machine, the combination with a ring B, having an adjustable
 60 gate B', of the vertically adjustable disk or table D, a shaft extending vertically through the table and having a cross head at its upper end, guide rods carried by said cross head,
 65 and cross pieces G, G, fitted to slide on said

rods and having springs H connected thereto, substantially as described.

5. In a brush making machine, the combination with a movable bristle receptacle having an adjustable outlet gate of a bristle conduit leading therefrom, said conduit being
 70 adjustable in width, and means for separating a tuft of bristles from the mass and inserting them into a brush block, substantially as described.

6. In a brush making machine, the combination with a conduit for metallic fasteners, of a fastener carriage, suitably supported and
 80 movable in a path intersecting the path of the fasteners, an inserter needle also movable in said fastener carriage, a lever for reciprocating said needle and carriage, and means for automatically detaching said carriage from the lever, at a predetermined point, substantially as described.

7. In a brush making machine, the combination with a conduit for the metallic fasteners, of a fastener carriage V' suitably supported and having a groove therein, an inserter needle in said groove, a lever connected
 90 to said needle, the arm v^3 connected to said lever and having a stud and cam surface, a stationary cam surface v^8 , said carriage being provided with a hole v^7 , to receive the stud substantially as described.

8. In a brush making machine, the combination with a frame, of an adjustable sliding plate, an arm pivotally connected thereto, and means for vibrating said arm and a back rest supported by the upper end of said arm, substantially as described.

9. In a brush making machine, the combination with the vibrating arm m' having an adjustable fulcrum at its lower end and a back rest at its upper end, of a shaft having
 105 a cam and an adjustable connection between said cam and arm, substantially as described.

10. In a brush making machine, the combination with the vibrating arm m' the sleeve m^4 carried thereby and having a tubular bearing at its upper end, provided with a groove, a plunger fitted to said bearing and having two grooves therein, a feather adapted to connect the groove in the bearing with one of the grooves in the plunger and a back rest plate
 115 carried by said plunger, substantially as described.

11. In a brush making machine, the combination with a vibrating arm, having a bearing at its upper end, of a plunger fitted to said
 120 bearing and having a taper bore near one end, a taper plug fitting said bore, means for clamping said plug in the bore, and a back rest plate projecting from said plug, substantially as described.

12. In a brush making machine, the combination with dies for forming fasteners from a strip of metal, of a vibrating arm carrying a pawl and a yielding eccentric for feeding
 130 the strip of metal and a spring for pressing

the eccentric upward, substantially as described.

13. In a brush making machine, the combination with dies for forming fasteners from
5 a strip of metal, of a vibrating arm carrying a pawl and a yielding eccentric for feeding the strip of metal, a bell carried by said arm and a hammer connected with the pawl, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 10th day of November, A. D. 1892.

CHARLES M. KIMBALL.

Witnesses:

JNO. RITCHIE,

HORACE A. MERRILL.