(No Model.) 2 Sheets—Sheet 1.

T. G. THOMPSON.

MACHINE FOR ASSORTING BRISTLES.

No. 560,870. Patented May 26, 1896.

Fig. 1.

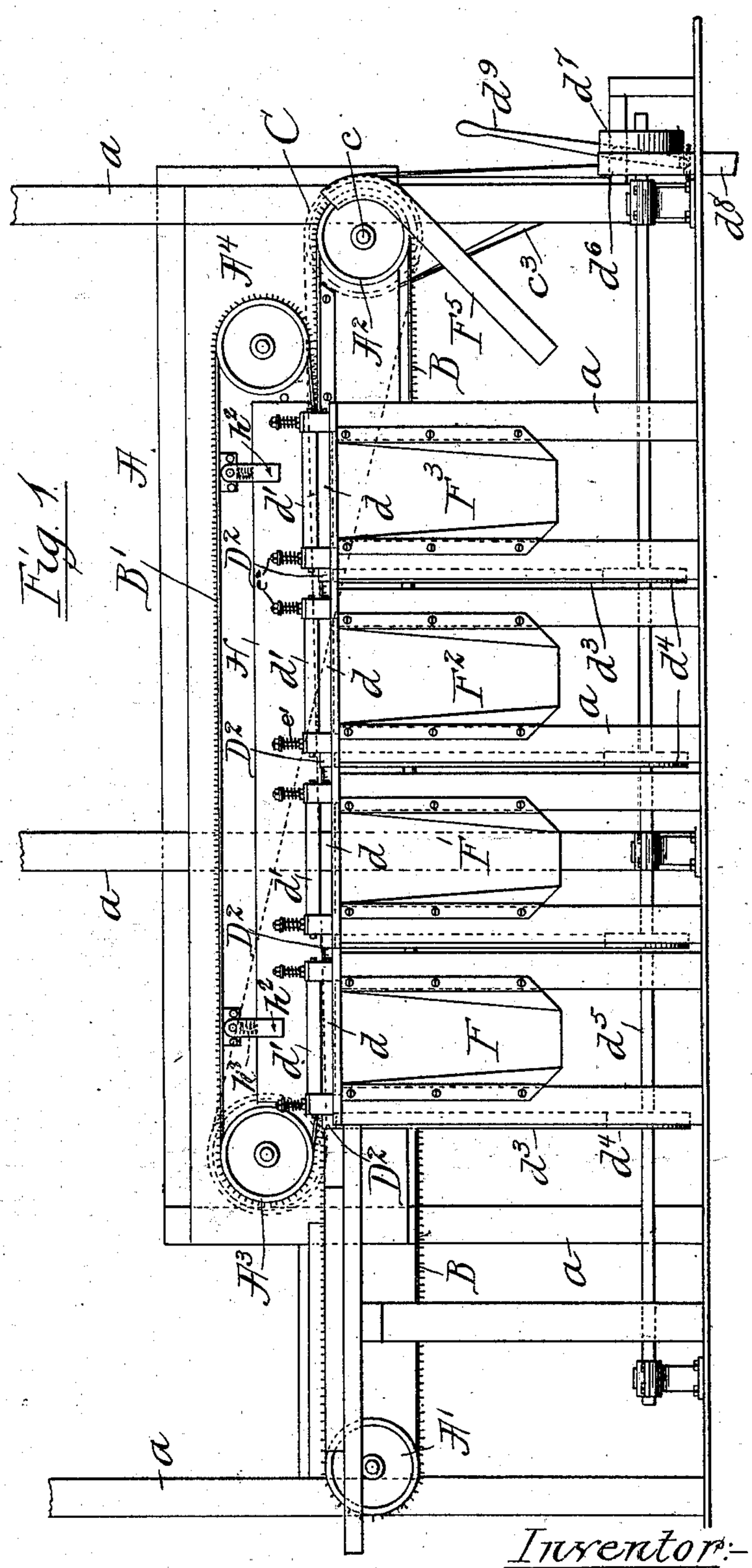
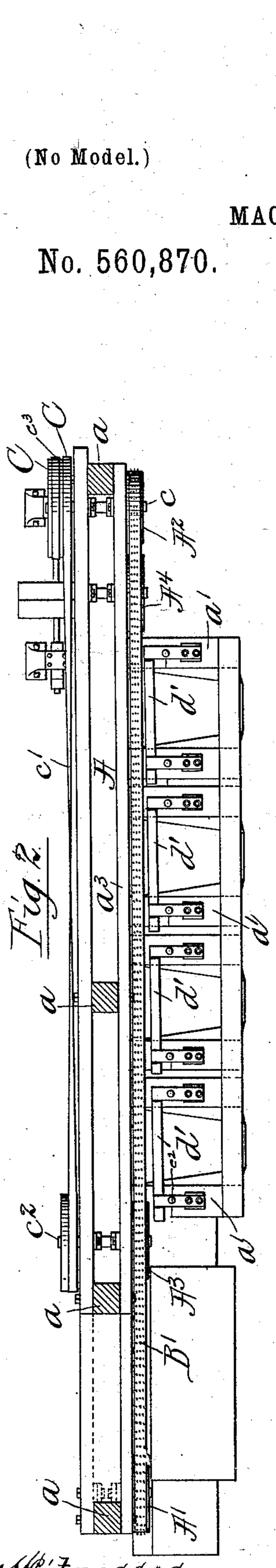


Fig. 2.



Witnesses:-
John W. Adams.
L. Clinton Hamlink

Inventor:-
Thomas G. Thompson.
by:- Dayton, Tooker & Brown
his Attys.

(No Model.) 2 Sheets—Sheet 2.

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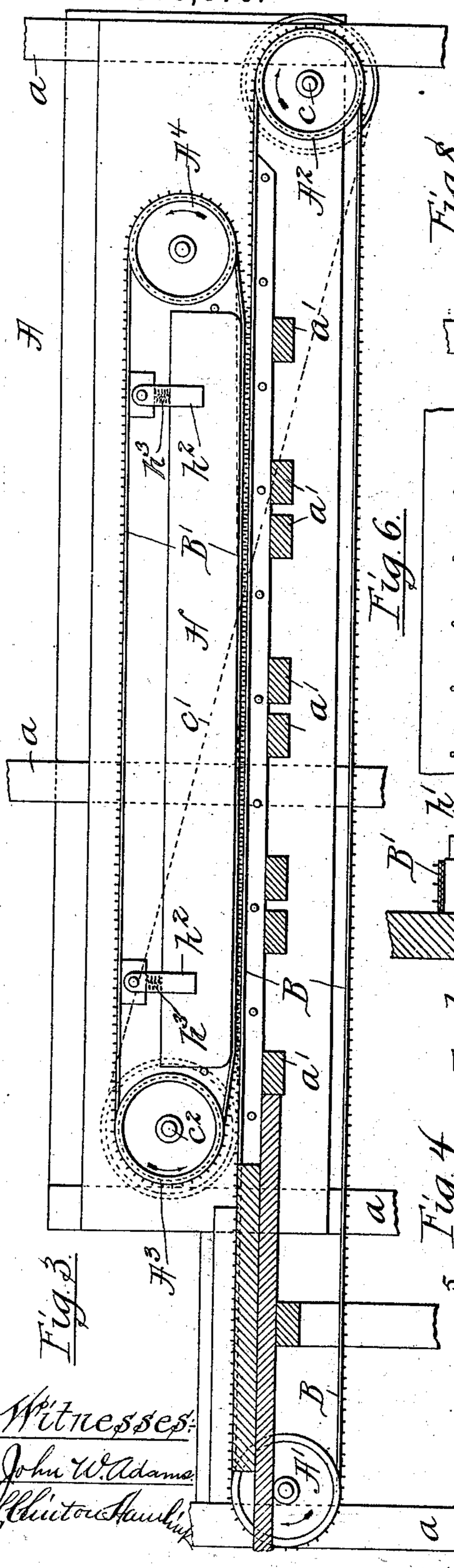

Fig. 3.

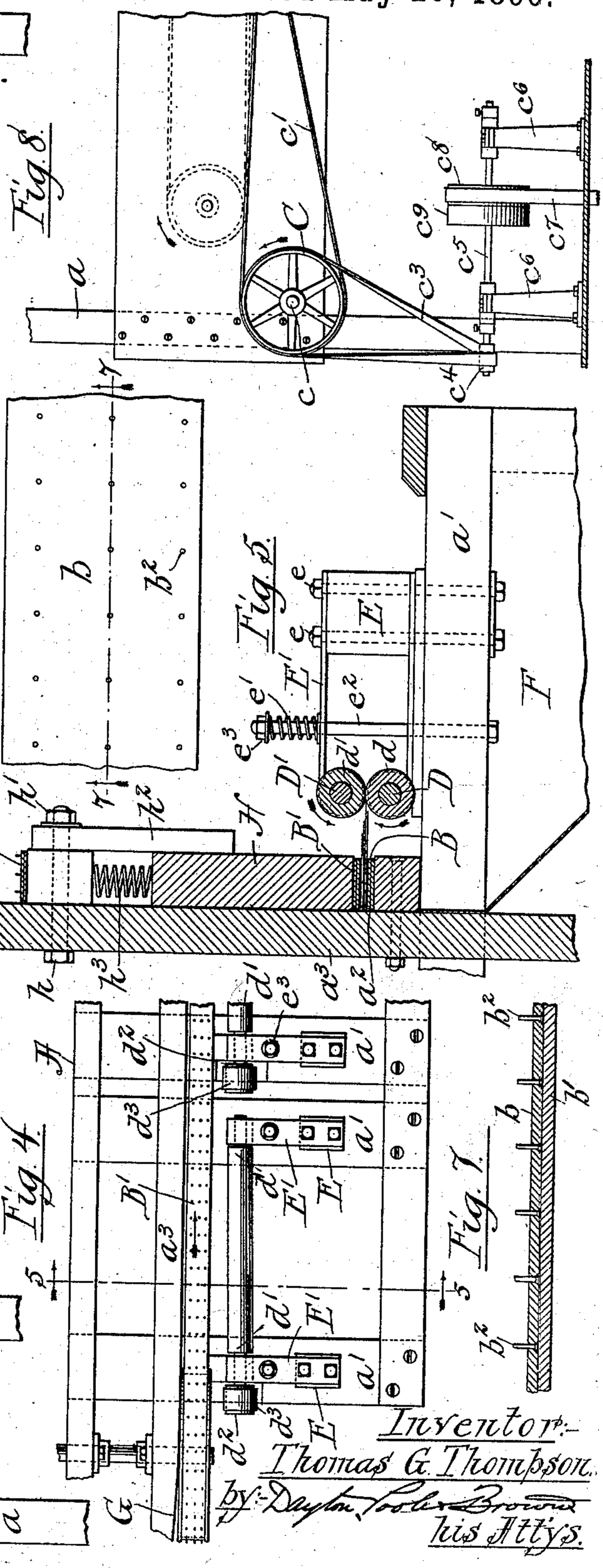

Fig. 8. Fig. 6. Fig. 5. Fig. 4. Fig. 7.

Witnesses:
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Inventor:
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by: Dayton, Tooley & Brown
his Attys.

UNITED STATES PATENT OFFICE.

THOMAS G. THOMPSON, OF CHICAGO, ILLINOIS.

MACHINE FOR ASSORTING BRISTLES.

SPECIFICATION forming part of Letters Patent No. 560,870, dated May 26, 1896.

Application filed December 23, 1895. Serial No. 573,054. (No model.)

To all whom it may concern:

Be it known that I, THOMAS G. THOMPSON, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Assorting Bristles; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in machines for assorting bristles—that is to say, assorting a quantity of bristles of various lengths into separate piles, the bristles of each pile being of uniform length. I have denominated said improvement a "dragging-machine," because the separation of bristles, when performed by hand, is termed "dragging."

A principal object of my invention is to provide an extremely simple practical machine which may be fed by the operator with the exercise of but little care, and therefore with great rapidity, and which will act to automatically assort and separate the bristles as they are fed through the machine.

A machine embodying my invention will comprise a suitable frame provided with a traveling bristle-carrier, one edge of which travels against a straight edge or fixed part of the frame of the machine. The machine will also comprise a suitable friction device placed above the operative portion of said carrier for the purpose of frictionally retaining said bristles upon said carrier. The machine will also comprise one or more pairs of drawing-rolls, the axes of which will be parallel to the line of travel of the bristle-carrier. These rolls will be placed at varying distances from the margin of said carrier opposite that edge which abuts said straight edge or stationary part of the frame of the machine and will usually be caused to revolve at a much higher rate of speed than the travel of the bristle-carrier, whereby the outer ends of those bristles that are placed upon the carrier which project beyond a predetermined length will be caught by said revolving rolls and instantly dragged away from the carrier, leaving upon the latter the bristles having less than the predetermined length. Means will also be employed to receive the bristles from the different sets of drawing-rolls, also means for imparting the desired speed to the different parts, and means for causing the proximate ends of the bristles to engage the stationary part of the machine to thus shift the bristles transversely of the carrier for the purpose of bringing said ends in a common plane.

While the invention contemplates the parts above described used in connection with a single set or pair of rolls, I prefer in practice to use a machine having at least four of such sets or pairs of rolls arranged at different distances from the outer margin of the traveling carrier, so as to make simultaneously at least five different separations.

The invention will be more fully understood by reference to the accompanying drawings, in which—

Figure 1 is a side view of a machine embodying my invention. Fig. 2 is a plan view of the same. Fig. 3 is a longitudinal vertical sectional view taken between the traveling carrier and the drawing-rolls. Fig. 4 is an enlarged plan view of a portion of a machine, showing the position of a pair of drawing-rolls. Fig. 5 is an enlarged transverse vertical sectional view taken through one pair of the drawing-rolls. Figs. 6 and 7 illustrate in plan and in vertical sectional view a preferred form of the traveling carrier or belt. Fig. 8 is a side view of the discharge end of the machine, showing the driving mechanism.

The machine is composed, preferably, of an open frame, of vertical supports or timbers a and cross-pieces a', (designated as a whole by the letter A.) Suitably mounted in horizontal bearings on said frame are two pulleys A' A^2, over which travels a horizontally-arranged carrier B, one margin of which travels parallel with and adjacent to a straight edge or surface a^2 of an upright part or back board a^3 of the frame A. Said carrier will preferably take the form of an endless belt, but any other form of carrier may be used. A similar carrier B′ is mounted above the carrier B and travels over revoluble pulleys A^3 A^4, suitably mounted on the frame A, as shown. At one end of the machine I provide a shaft c, upon which is mounted a pair of pulleys C C and the pulley A^2, over which the carrier or belt

B travels. One of the pulleys C is connected by a belt c' to the shaft c^2, on which the pulley A^3 is mounted. Motion is given to the shaft c by means of a belt c^3, passing over the other pulley C and connected with any suitable source of power. As indicated in Fig. 8, the belt c^3 may be trained over a pulley c^4 on a counter-shaft c^5, mounted in suitable bearings on the standards c^6 c^6, and which counter-shaft may be operated by a belt c^7, passing over the fast and loose pulleys c^8 c^9. The belts c' c^3 will be so connected that the pulleys A' A^2 and A^3 A^4 will travel in the direction indicated by the arrow thereon in Fig. 3, and whereby the carriers B and B′ will be caused to move in the same direction.

As a preferred form of construction I have shown the carriers as comprised of two members b b'. From the inner surface of the outer member b are driven a plurality of headed pins b^2. In a carrier-belt of, say, an inch or an inch and a quarter in width I prefer to place three rows of said pins b^2 across the width of the belt and to arrange the pins at equal distances apart throughout the length of the belt, as indicated in Fig. 6, as I find this a convenient and economical arrangement. The length of the pins b^2 will be governed by circumstances; but I prefer a pin that projects less than one-eighth of an inch above the carrier-belt. While I have shown said carrier constructed as described I do not desire to be limited thereto, as it will be obvious that any traveling carrier having a roughened surface sufficient to take hold of the bristles will answer the purpose. The effective part of the machine will of course be that opposite the dragging-rolls, and hence the carrier B′ is positioned opposite said rolls while the lower carrier B will project at each end of the frame beyond the pulleys A^3 A^4 at the forward end for the purpose of enabling the operator to place the bristles upon said carrier, and at the rear end to carry the shortest bristles—to wit, those that have not been taken up by any set or pair of rolls—past the rear end of the upper carrier B′ and deliver them into a proper chute or receptacle, the length of the said extension being regulated as desired.

Mounted in any suitable manner upon the cross-timbers a' of the frame of the machine are two shafts D D′, parallel to each other, their axes being substantially parallel to the direction of travel of the carriers. Upon each shaft D D′ is mounted a roller d d', and upon one of the shafts, preferably the lower one D, is mounted a driving-pulley d^2. A belt d^3 passes over said pulley d^2 and over a pulley d^4 on the counter-shaft d^5, which latter is driven by any suitable source of power. Where a plurality of dragging-rolls d d' are employed, the shaft d^5 should preferably extend beneath them all, each set of rolls having a driving-pulley d^2, connected by a belt d^3 with a pulley d^4 on said shaft. It is also preferable to have a pair of driving-pulleys d^6 d^7 mounted on said shaft d^5, over one of which pulleys a belt d^8 is trained, and which belt is connected with any suitable source of power. Any suitable shifting device (indicated by the lever d^9) may be employed to shift the belt d^8 from the pulley d^6 to the pulley d^7, or the reverse, one of which pulleys will be loose upon the counter-shaft d^5, whereby the machine may be conveniently started and stopped.

As a cheap and simple construction for causing the upper roll d' to be maintained in frictional, at the same time in yielding, contact with the lower roll d, I bolt a spreader-block E upon the cross-timber a' of the frame of the machine and secure to said block E a yielding or spring plate E′ by the same bolts e by which the said block E is secured to the cross-timber a'. To the free or forward end of said plate E′ and to the under side thereof is secured any suitable journal-bearing for the shaft D′. When motion is imparted to the lower roll d by the belt d^3, as stated, motion is also imparted to the upper roll d' by reason of the frictional contact of the latter with the frame. When a bristle is presented to the rolls d d', the revolution of the latter will drag the bristle away from the carrier B and between the rolls d d', after passing through which the bristle will be deposited in any suitable chute F. In order to permit the rolls d' to be raised slightly, so as not to crush or grind the bristles, the plate E may be given a suitable resiliency or spring action and will be caused to return the upper roll d' promptly by reason of the spring e', suitably coiled about a bolt e^2, which latter projects through the cross-timber a and through the plate E′. The spring e' is located above the plate E′, its lower end bearing on said plate and its upper end bearing upon a washer held in position by a nut e^3. While this is a simple arrangement for the purpose indicated, I do not desire to be limited thereto, but desire to hold within the scope of my invention any form of dragging-rolls, one of which shall be positively operated from a suitable source of power, and the other of which shall be arranged in frictional, but yielding, contact therewith. If the longitudinal axes of each set of drawing-rolls be parallel with the direction of movement of the carrier B, it is manifest that the ends of the long bristles which are to be caught between said dragging-rolls will have a sweeping motion as they are drawn from the carrier B, which will tend to carry other bristles that may be lying adjacent thereto on the carrier off from said carrier, perhaps to fall into the chute through the space between the carrier and the rolls, or to be caught by the rolls and carried through, whereby no proper separation of the bristles as to length will be made. In order to obviate this difficulty, I place the dragging-rolls d d' in a parallel direction to the direction of travel of the carrier B, but not precisely parallel thereto. In other words, looking at Fig. 4 of the drawings, the left-hand

side of the figure represents the feed end of the machine, and it will be noticed that the left end or feed end of the roll d' is positioned at a greater distance from the margin of the carrier B than is the other or right-hand end of the roll d'. I regard the placing of the rolls in a parallel direction to the direction of travel of the carrier B, but at a slight inclination therefrom, as an important element of my invention.

A very desirable feature of my invention consists in the arrangement of the feed end of the machine, whereby the inner ends of the bristles are caused more readily to come into the same plane and abut against the straight edge face of the board a^3. In practice the bristles are laid on the carrier B with their butt-ends projecting over the inner margin of the said carrier—to wit, projecting over that margin of the carrier adjacent to the surface of the board a^3. At a suitable distance forward of the pulley A' the said face of the board a^3 is cut away or inclined, as clearly indicated at G. It will be obvious, therefore, that as the carrier B moves forward in the direction indicated by the arrow, Fig. 4, the butt-ends of the bristles placed thereon and projecting over the margin of said carrier, as stated, will come in contact with the inclined or cut-away surface G of the board a^3, and as said carrier continues to move forward the inclined surface G acts as a wedge and pushes the bristles transversely across the carrier, so that finally the butt-ends of all the bristles will be substantially in the same plane. Of course a skilful operator would place the bristles very carefully upon the carrier B in feeding them to the machine, so that a majority, if not all of the butt-ends thereof, would lie in the same plane; but should any project over through carelessness or otherwise then the inclined surface G will act as indicated, and thus stack up or abut the bristles. When the bristles, therefore, are carried along by the carrier B, the longest bristles only will be caught between the No. 1 set of rolls d d', while the next longest bristles will be caught between set No. 2 of the rolls d d', said set No. 2 being positioned somewhat closer to the margin of the carrier B than is No. 1, and so on through the various separations until finally there remain upon the carrier B only those bristles of the predetermined minimum or less than the minimum length, which bristles are carried along until they fall into the chute F^5. The bristles coming from the No. 1 set of rolls will fall into the trough or chute F, suitably positioned in the frame of the machine beneath said rolls, while the bristles coming from sets No. 2, No. 3, and No. 4 will fall into similar receptacles F' F^2 F^3.

In some cases the desired tension upon the bristles as they lie upon the carrier B may be given by the lower lap of the upper carrier B'; but in order to get positive and the very best results I recommend the use of some suitable tension device upon the upper surface of the lower lap of said carrier B'. One form of such tension device I have illustrated herein, as follows: A guide-board H, as thick as the carrier B' is wide, is movably mounted on the frame A between the pulleys A^3 and A^4. In the instance illustrated the guide-board H is pivotally secured to the back plate a^3 by a bolt and nut h h' and a pair of links h^2, the bolt h passing through the upper ends of said links. It is desirable that the speed of the carriers B and B' shall be relatively slow with respect to the speed by which the dragging-rolls are rotated. Whatever speed is given to the rolls—say from thirty to one hundred revolutions per minute—it is desirable that the dragging-rolls be run at anywhere from five and six hundred to eighteen hundred revolutions per minute, the object being to drag the bristles very suddenly from between the upper lap of the carrier B and the lower lap of the carrier B the instant the outer or free end is caught between the dragging-rolls, and I find the very best results are secured by considerable difference in the speeds, as indicated.

The machine above described is very simple and cheap in construction, is very durable, has no complicated parts to get out of order, and is very successful in operation. It may be manipulated by unskilled labor and has a much greater capacity per working day than several skilled men, while at the same time the separation into lengths are made with perfect accuracy.

The guide-board H may be operated by gravity; but I prefer to insure a positive operation thereof by means of a spring h^3, one end of which rests upon the upper edge of the guide-board H, and the other end presses against a block or support on the back plate a^3.

I claim as my invention—

1. The combination with revoluble dragging-rolls, of a bristle-carrier, comprising two endless belts arranged to travel adjacent to each other at one side and provided with intermeshing studs and means for moving said carrier lengthwise of and adjacent to said rolls, whereby some of the bristles held by said carrier will be caught between said rolls and dragged from the carrier, substantially as described.

2. The combination with revoluble drag-rolls and driving connections whereby they are driven at a high speed, of a bristle-carrier upon which the bristles are frictionally held, and means for moving the carrier lengthwise of and adjacent to the dragging-rolls at a relatively low speed, whereby the bristles are each withdrawn from the carrier with a jerking movement, and without disturbing those of a shorter length adjacent thereto.

3. The combination with a bristle-carrier and means for imparting a slow motion to the same, of a straight edge surface or guide arranged adjacent to and parallel with one of the margins of said carrier, at the receiving end thereof, a plurality of revoluble rolls

mounted in pairs lengthwise of said carrier, but at varying distances therefrom, and means for imparting a rapid revolution to the rolls, substantially as described.

4. The combination with a bristle-carrier and means for actuating the same, of a straight edge surface adjacent to and parallel with one of the margins of said carrier, and revoluble dragging-rolls mounted lengthwise of said carrier opposite to the said straight surface, the latter being provided at the feed end of the machine with a tapered or cut-away portion, substantially as described.

5. In a bristle-separating machine, the combination with a horizontally-arranged bristle-carrier and means for actuating the same, of a vertically-arranged pair of drag-rolls means for actuating one of said rolls, and a tension device acting upon the other roll and arranged to permit bodily approach and recession of the latter, substantially as described.

6. In a bristle-separating machine, the combination with a bristle-carrier and a bristle-retaining carrier, and means for actuating the same, of means for yieldingly holding the retaining-carrier against the main carrier, consisting of a spring pressed or weighted guide having an acting face arranged parallel with the supporting-surface of the main carrier, and adapted to act upon the retaining-carrier to hold it yieldingly against said main carrier and revoluble rolls for dragging the bristles of a desired length from between the carriers, substantially as described.

7. In a bristle-separating machine, the combination with two endless carrier-belts, as B B′ arranged one above the other, and means for imparting motion thereto, of means for causing the lower lap of the upper carrier to move in frictional contact with or a predetermined distance from the upper lap of the lower carrier, consisting of a spring pressed or weighted guide having an acting face arranged parallel with the supporting-surface of the main carrier and adapted to act upon the retaining-carrier to hold it yieldingly against said main carrier, one or more sets of rolls for dragging bristles of a predetermined length from between said carriers, and means for actuating said rolls, substantially as described.

8. In a bristle-separating machine, the combination with a bristle-carrier and a bristle-retaining carrier, and means for actuating the same, of revoluble rolls for dragging bristles of a desired length from between the carriers, and means for yieldingly holding the retaining-carrier against the main carrier, comprising a board, as H, movably secured to the frame of the machine, and a spring, as h^3, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 20th day of November, A. D. 1895.

THOMAS G. THOMPSON.

Witnesses:
TAYLOR E. BROWN,
WILLIAM S. HALL.