

(No Model.)

3 Sheets—Sheet 1.

C. B. ANDREWS.
MACHINE FOR BUNCHING MATCHES.

No. 507,399.

Patented Oct. 24, 1893.

Fig. 8.

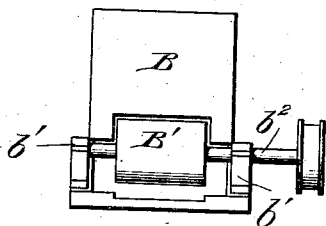
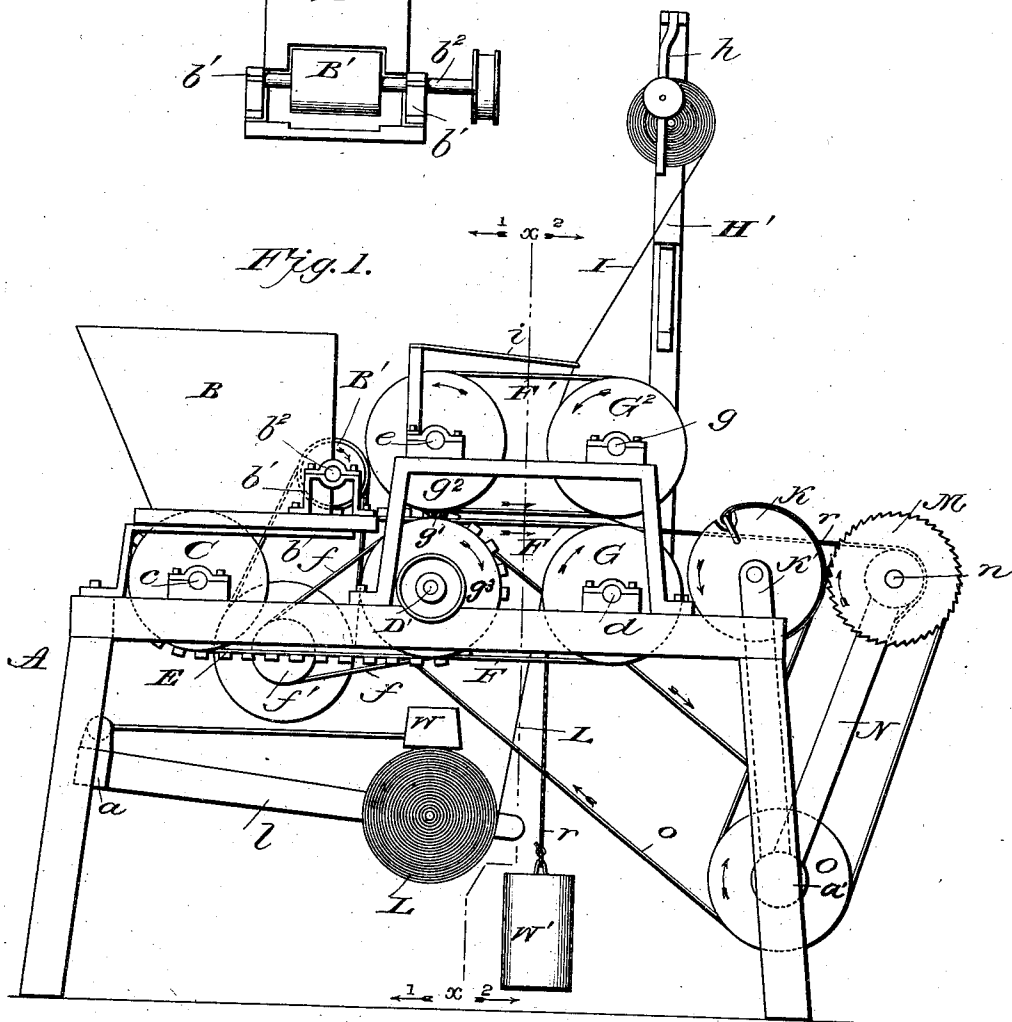


Fig. 1.



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Fig. 2.

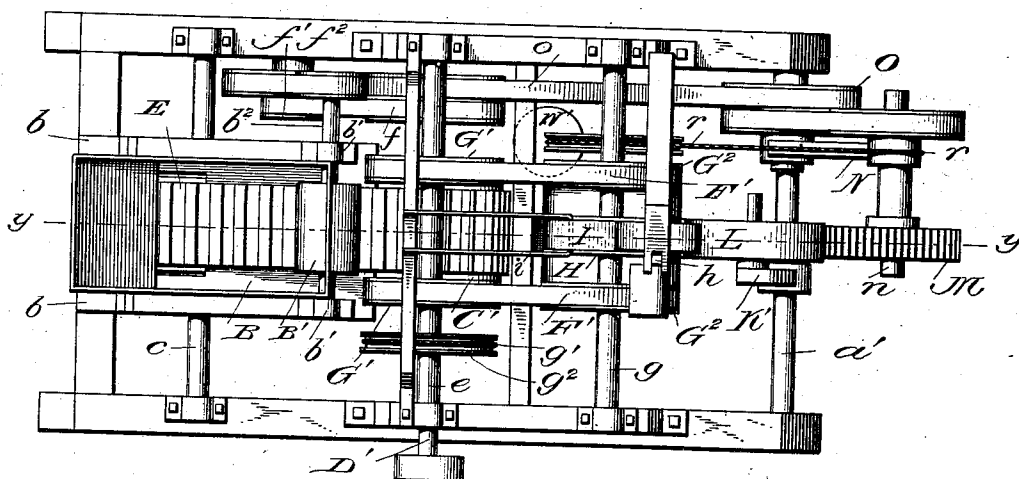


Fig. 4.

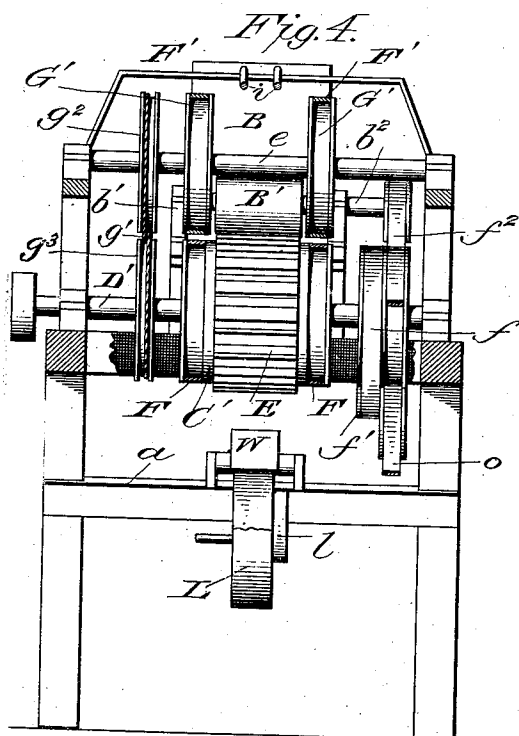
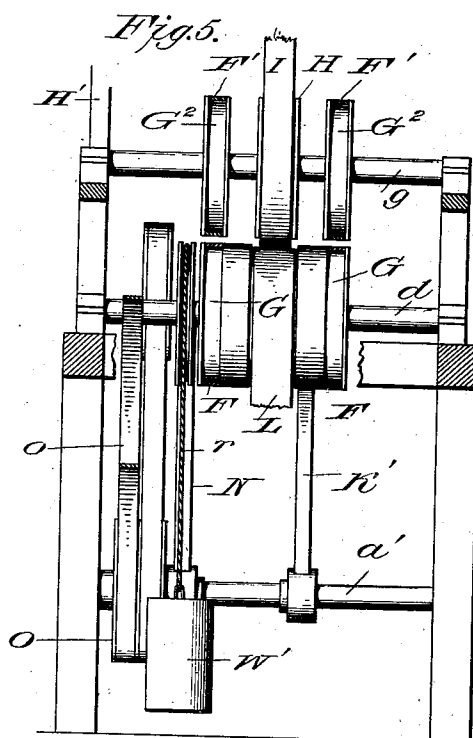


Fig.5.



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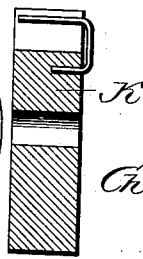
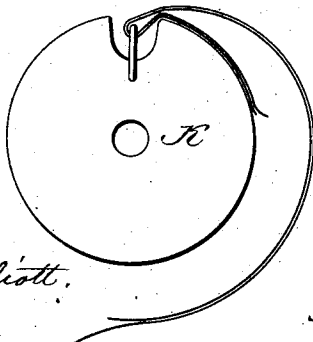
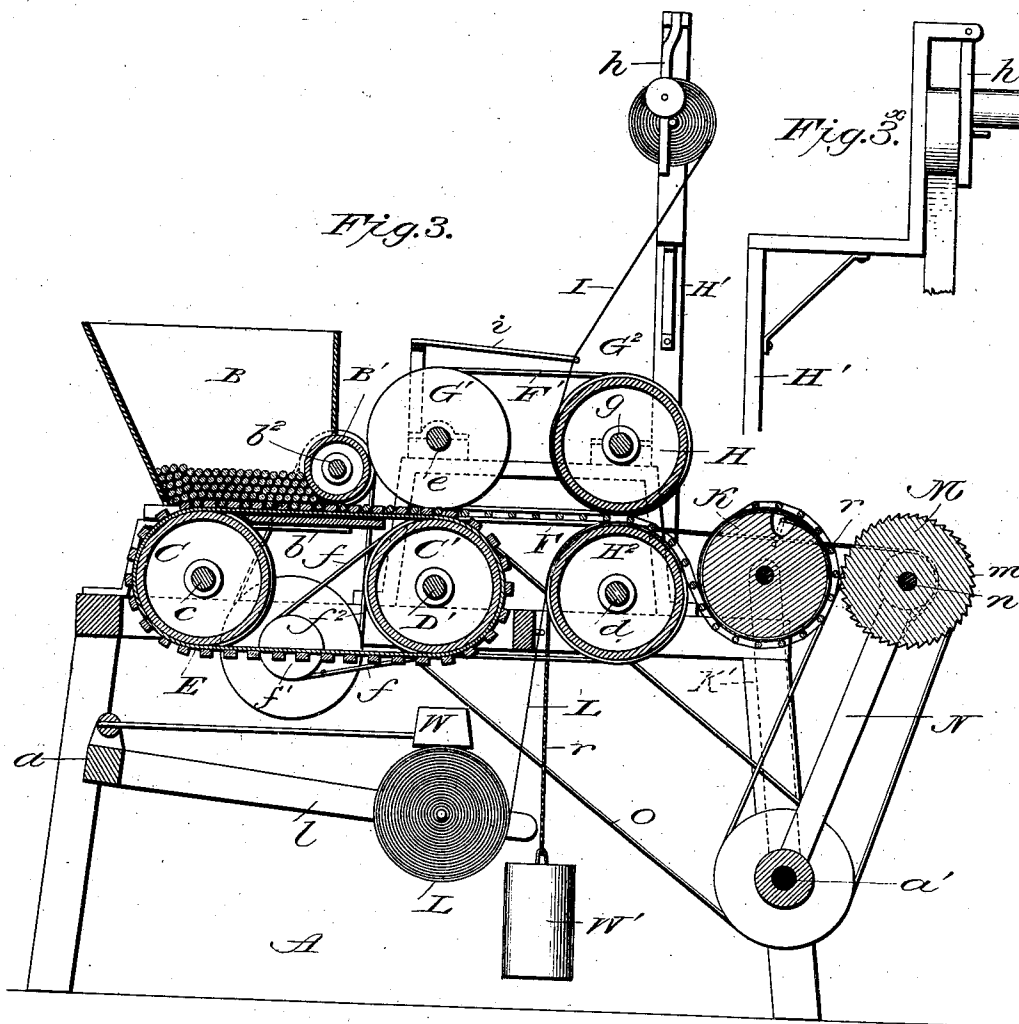
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UNITED STATES PATENT OFFICE.

CHARLES B. ANDREWS, OF LEBANON, PENNSYLVANIA, ASSIGNOR OF ONE-
HALF TO CHARLES E. RAUCH, OF SAME PLACE.

MACHINE FOR BUNCHING MATCHES.

SPECIFICATION forming part of Letters Patent No. 507,399, dated October 24, 1893.

Application filed February 23, 1893. Serial No. 463,397. (No model.)

To all whom it may concern:

Be it known that I, CHARLES B. ANDREWS, a citizen of the United States of America, residing at Lebanon, in the county of Lebanon and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Bunching Match-Sticks; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in machines for bunching match sticks; and it consists more especially in the combination of a conveyer belt which carries the match sticks from the hopper to carrying belts, from which they are fed upon a web wound upon a frictionally controlled spool and over which passes a binding tape, so that the match sticks will be bunched upon the spool; and the invention further consists in the construction and combination of the parts, as will be hereinafter fully set forth and claimed.

In the accompanying drawings, forming part of this specification, Figure 1 is a side elevation of a machine constructed in accordance with my invention. Fig. 2 is a plan view. Fig. 3 is a vertical sectional view on the line $y-y$ of Fig. 2. Fig. 3^x is a detail view of the binding tape spool support and friction device. Fig. 4 is a vertical sectional view on the line $x-x$ of Fig. 1, looking in the direction of the arrow No. 1. Fig. 5 is a sectional view on the line $x-x$ of Fig. 1, looking in the direction of the arrow No. 2. Figs. 6 and 7 are detail views of the spool over which the web and binding tape pass to hold the match sticks thereon. Fig. 8 is a detail view of the roller which operates over the conveyer-belt and is located partially within the hopper.

A designates the frame of the machine, which is provided with supporting legs to one pair of which is attached a transverse bar a while the other pair supports a transverse shaft a' . At one end of the frame are secured brackets $b b$ upon which is attached a hopper

B, and adjacent to said hopper these brackets support journals b' for a shaft b^2 , which carries a drive pulley and a feed-roller B', which feed roller lies partially within the hopper and immediately above the conveyer-belt.

C and C' designate a pair of flanged rollers which are mounted upon shafts c and D' , the latter being the driving shaft, and over these rollers passes the conveyer-belt E, said conveyer-belt being made up of a flexible band having transverse strips separated so that the space between any two will receive a single match stick. The roller C' is of greater width than the roller C, so that the lower carrying-belts, F F, may pass around the roller on each side of the conveyer-belt; said carrying-belts also passing around rollers G G mounted on a shaft d .

G' G² designate two pairs of rollers mounted on shafts e and g , journaled upon a suitable frame supported by the main frame, and over these rollers pass the upper carrying belts F' F', which move directly above the carrying belts F F, leaving a space between to receive the match sticks. The upper carrying belts F' are driven by the rollers G', the shaft supporting which is rotated by a belt g' which is passed over the pulley g^2 and is then crossed and passed over a pulley g^3 on the main driving shaft. By this arrangement of the belt g' when the main driving shaft is operated the adjoining portions of the carrying belts F and F' will move in the same direction, and as the rollers are all of one size said carrying-belts will also move at the same rate of speed.

The main driving shaft D' is provided with a pulley over which a belt f passes for communicating motion to a pulley f' which is connected to the shaft carrying the feed-roller by a belt f^2 .

The shaft g upon which are mounted the rollers G² carries between said rollers an idle pulley H over which passes a binding tape I, the roll being supported by an arm H', said arm having a swinging arm h which is weighted so as to be held in contact with the roll of binding tape and exert a pressure thereon. This binding tape is passed through a suit-

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able guide *i* supported above the pulley H so as to guide said tape over said pulley, and from this pulley the tape passes over a pulley H² on the shaft *d* between the rollers G G and from there to the spool K to which it is secured.

The web L is supported in a roll upon a pin projecting from an arm *l*, and upon the roll rests a weight W at the end of a rod supported as shown. This web passes partially over the pulley or drum H² and under the binding tape I to the spool K, to which it is secured. It will be noted that the web and tape pass between the four carrying belts, where they meet, so that the match sticks will be fed between the web and binding tape before they leave the carrying-belts.

The spool K is supported by an arm K' attached to a sleeve which works loosely on the shaft *a'*, and said spool is rotated by a friction disk M provided with inclined teeth *m*, said friction disk being carried by a shaft *n* journaled in an arm N pivoted on the shaft *a'*, said shaft *n* being driven by a belt which passes over a broad pulley O loosely mounted on the shaft *a'* and driven by a belt *o* led from a pulley on the driving shaft. To the arm N is attached a cord *r*, which is led over a loose pulley on the shaft *d* and has attached thereto a weight W', the tendency of which is to keep the friction wheel M in contact with the face of the spool or web which passes over the same.

I am aware that prior to my invention it has been proposed to provide a machine for bunching match sticks in which the sticks are fed from a hopper to a carrying belt and from there wound upon a spool the movement of which is frictionally controlled, and I do not claim such construction broadly as my invention. Experience in the construction and operation of this class of machinery has shown me that feed rollers for conveying the match sticks from the hopper are objectionable owing to their curved faces, while with a belt a flat surface is provided and the sticks given a better opportunity to fall into the interstices between the slats, and consequently there is less liability of the sticks crossing and wedging in the hopper and conveying belt.

With my improved apparatus the conveyer-belt feeds the match sticks between four carrier belts from which they are fed between the web and tape. The device for controlling the rotation of the spool is simple and effective. When it is desired to remove the spool it is only necessary to swing the arm N down and remove the pin which holds the spool upon the shaft, the web and tape having been secured to the spool in the usual manner.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a machine for bunching match sticks, the combination with a hopper of an endless conveyer belt which forms the bottom of the

hopper and extends beyond the same, the conveyer belt and slats attached thereto being of less width than the length of the match sticks, pulleys C C' over which the conveyer belt passes, the pulley C' being of a greater width than the length of the match sticks, and carrier belts F F and F' F' the lower pair of carrier belts passing over the end portions of the pulley C' so as to engage with the ends of the match sticks, and a web and binding tape fed from suitable spools so as to pass over pulleys and between the carrier belts, substantially as shown.

2. In a machine for bunching match sticks, the combination of the driving shaft D' and shafts *c* and *d*, of a conveyer-belt mounted on drums on the shafts *c* and D', said conveyer-belt passing through the hopper and beyond the same, a drum G mounted on the shaft *d*, belts F F leading from the drum over which the conveyer-belt passes to the drum G, rollers G' and G² carrying belts F' F' which are located above the belts F F, the drum G being grooved centrally to guide the web and binding tape, substantially as shown, and for the purpose set forth.

3. In a machine for bunching match sticks, constructed substantially as shown, the combination of a movable arm, carrying a spool upon which the web and binding tape are wound, a serrated disk adapted to be held in contact with the spool or tapes thereon by a weight, the arms carrying the spool and the disk being pivotally attached to the same shaft substantially as shown, and for the purpose set forth.

4. In combination with a movable arm K' carrying a spool K, of a swinging arm N carrying a driven friction-wheel having a serrated face, said friction-wheel being rotated against the spool, substantially as shown, and for the purpose set forth.

5. In a machine for bunching match sticks, the combination, of a swinging arm, K', carrying a spool, an arm N having a friction wheel M which is adapted to contact with the spool, the arms K' and N being journaled upon the same shaft, pulleys carried by the shaft to which the arms are journaled and by the shaft of the friction wheel, a belt for connecting the pulleys, and a weighted flexible connection attached at one end to the arm N so as to hold the friction wheel in contact with the spool, substantially as shown, and for the purpose set forth.

6. In a machine for bunching match sticks, a conveyer-belt having transverse slats of less length than the width of the hopper, an opening in the hopper, above the slats, through which the match sticks pass, pairs of carrier-belts, the belts of each pair arranged one above the other, for taking the match sticks from the conveyer-belt; a pair of guide pulleys mounted on the same shafts with the carrier-belts over which the web and binding tape pass, said web and binding tape being located between the carrier-belts, a bunching

spool loosely mounted on a movable arm, and a friction-wheel adapted to contact with the periphery of the bunching spool, said friction wheel being held in movable engagement therewith and being driven from the main driving shaft, substantially as shown, and for the purpose set forth.

7. In a machine for bunching match sticks, the combination, of a supporting frame having a vertical portion and a horizontal projecting portion, a weighted arm pivoted to the horizontal projecting portion and provided with a projecting pin upon which is

mounted a roll of binding tape, substantially as shown, whereby the weighted arm will be adapted to contact with one of the sides of the roll of tape and force the opposite side in contact with the vertical member of the supporting frame, substantially as shown.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES B. ANDREWS.

Witnesses:

EPHRAIM LIGHT,
EBENEZER T. LIGHT.