

No. 700,392.

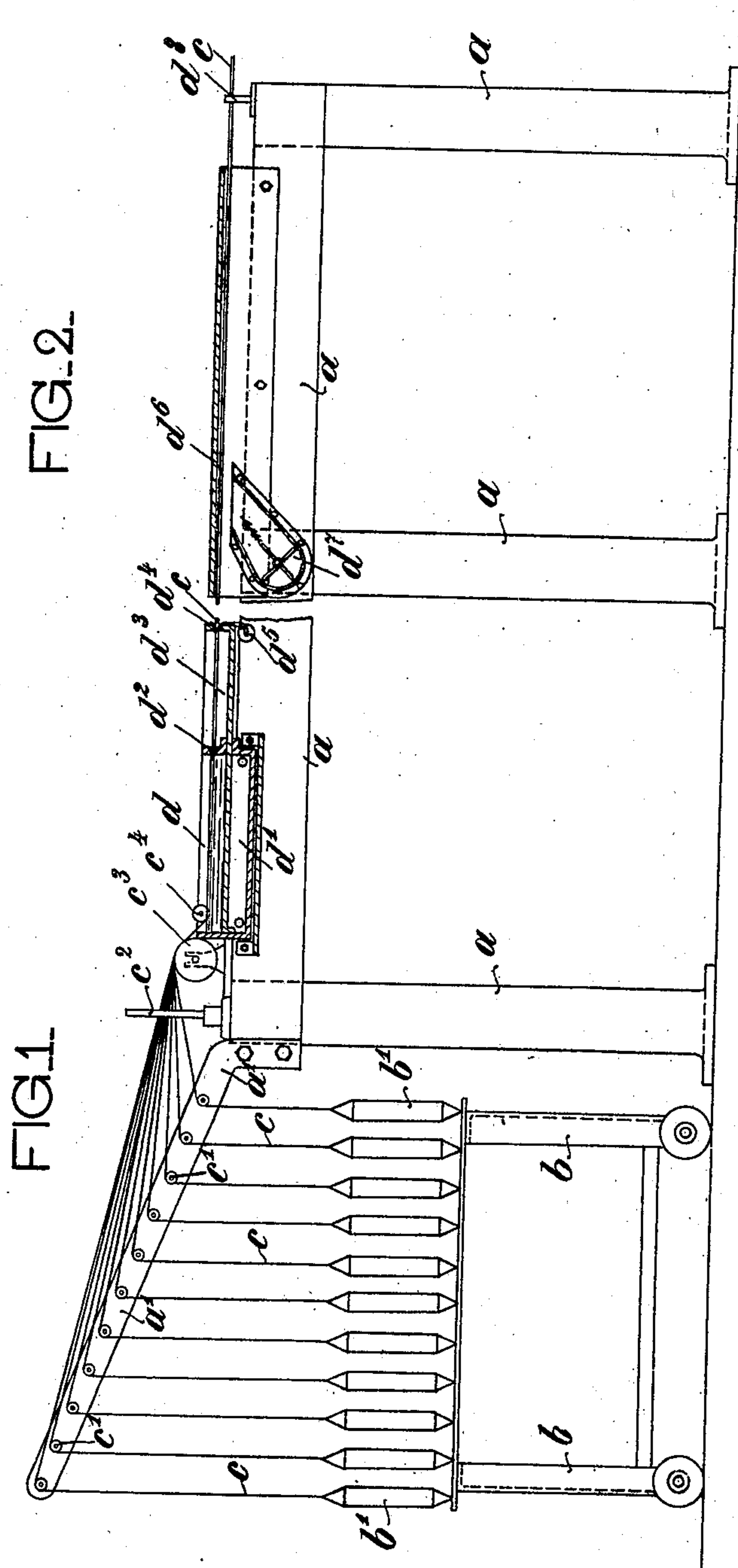
Patented May 20, 1902.

**K. WIESSNER.
MATCH MACHINE.**

(Application filed Apr. 7, 1900.)

(No Model.)

6 Sheets—Sheet 1.



Witnesses:
William Schutz
Edward Ray.

Inventor:
Karl Weissner
by his attorneys
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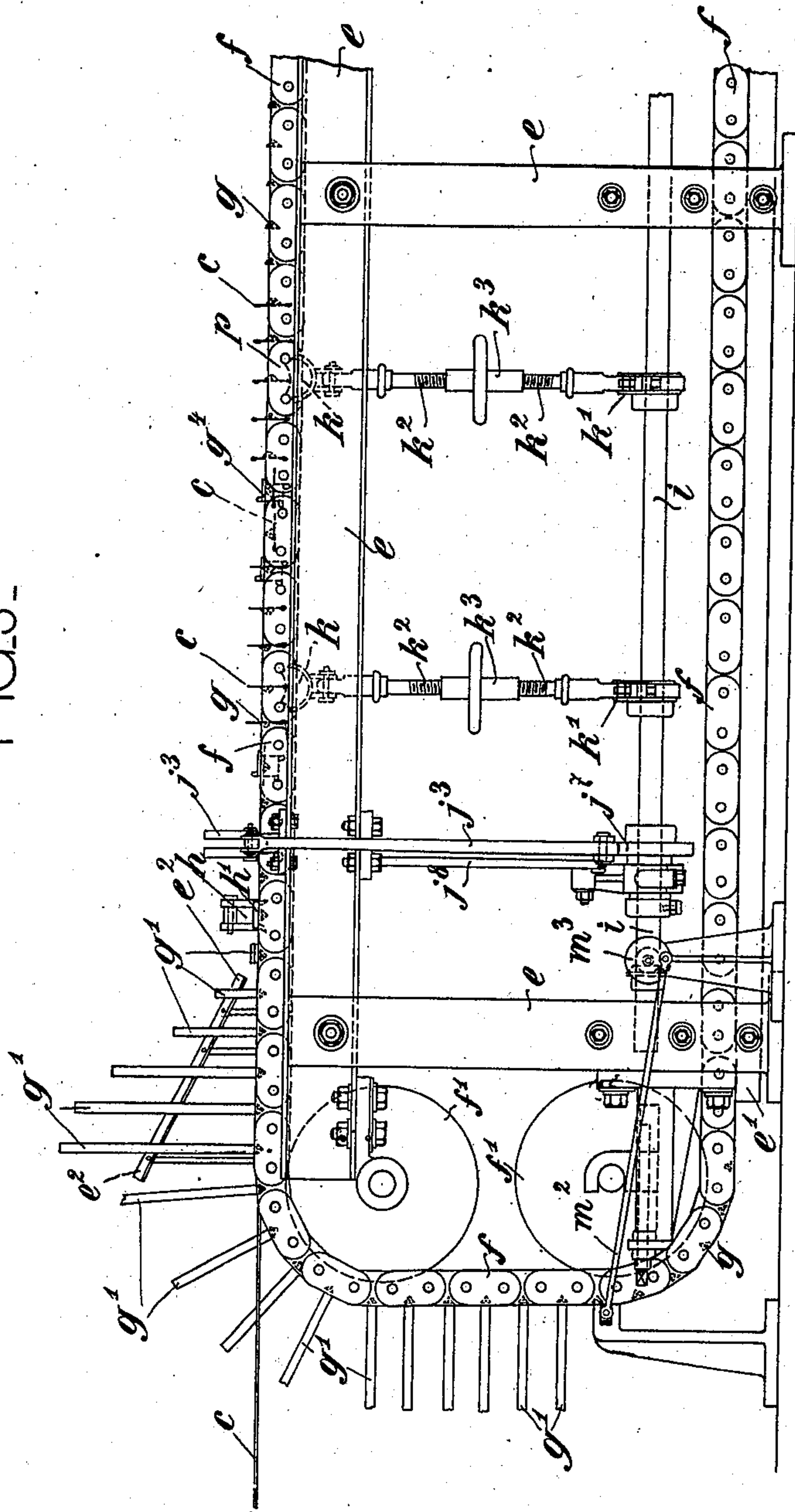
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6 Sheets—Sheet 2.

FIG. 3.



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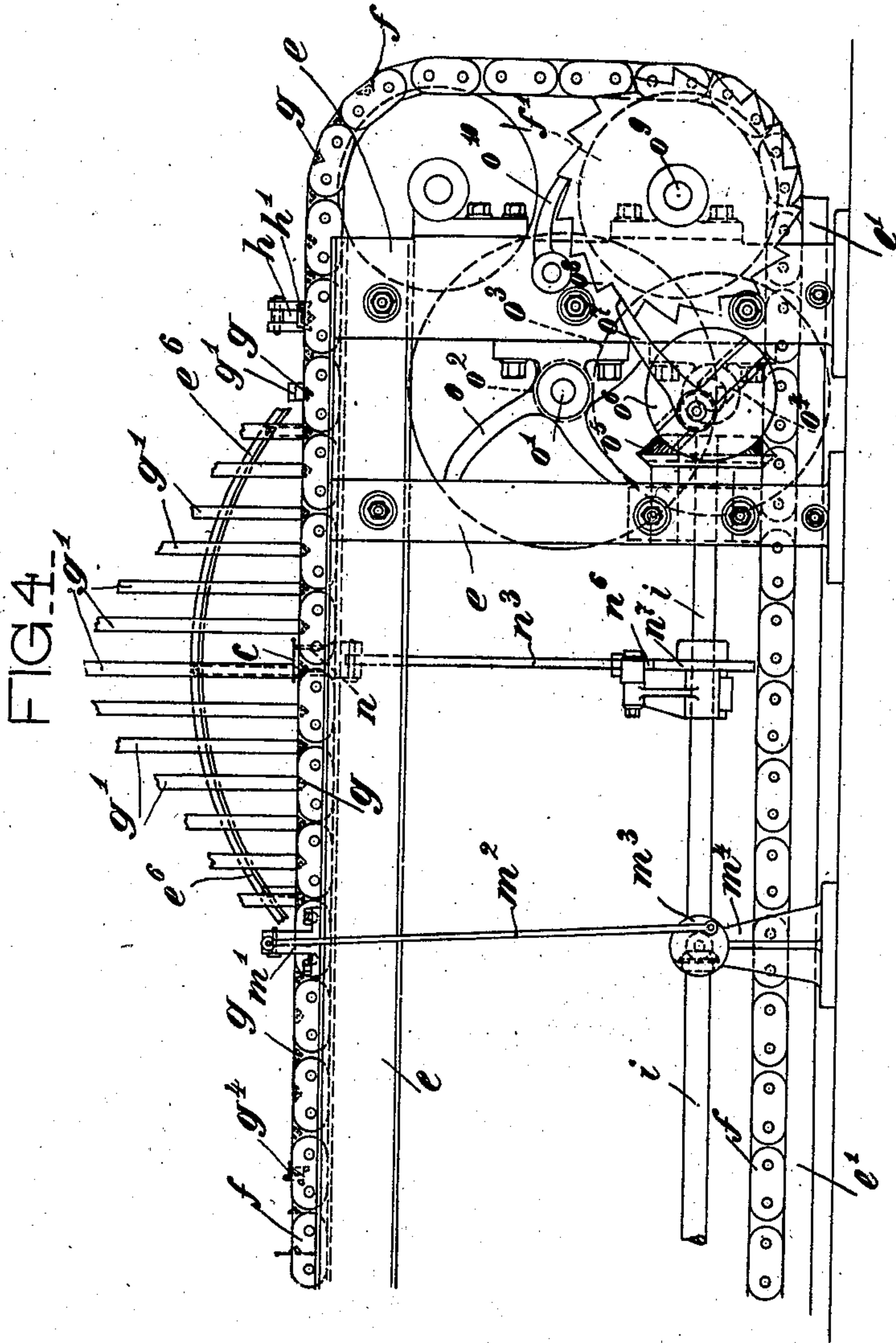
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6 Sheets—Sheet 3.



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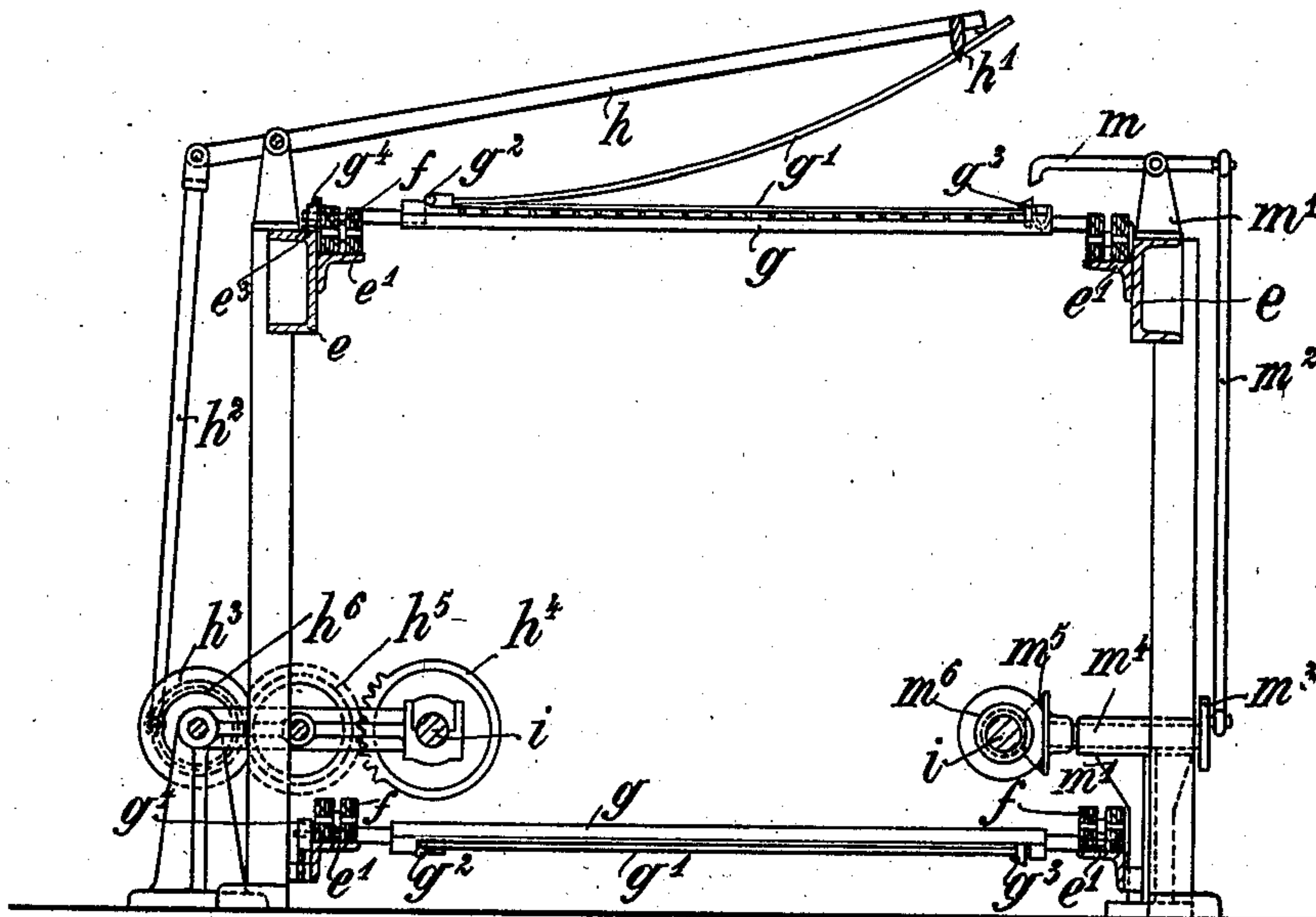
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6 Sheets—Sheet 4.

FIG. 5.



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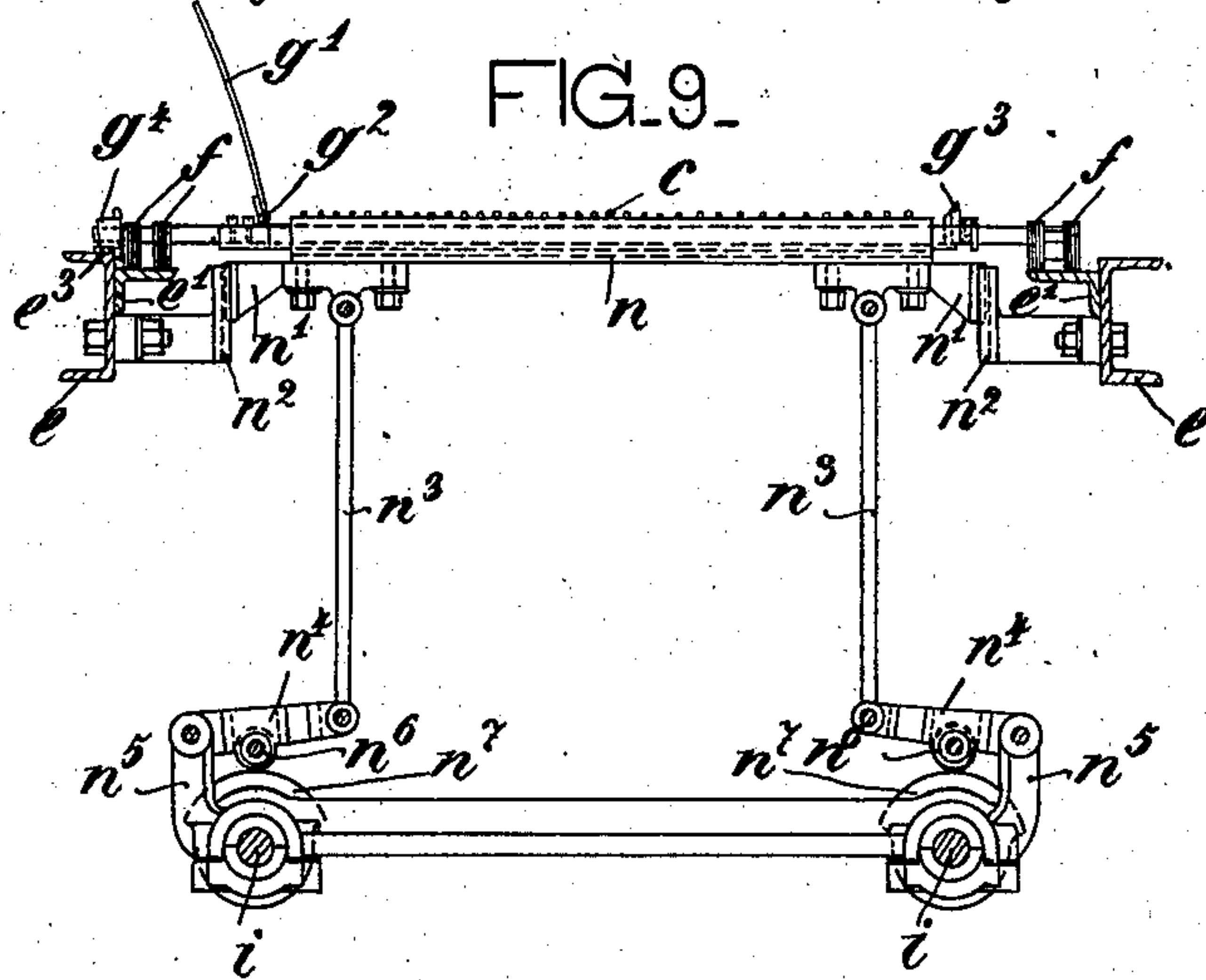
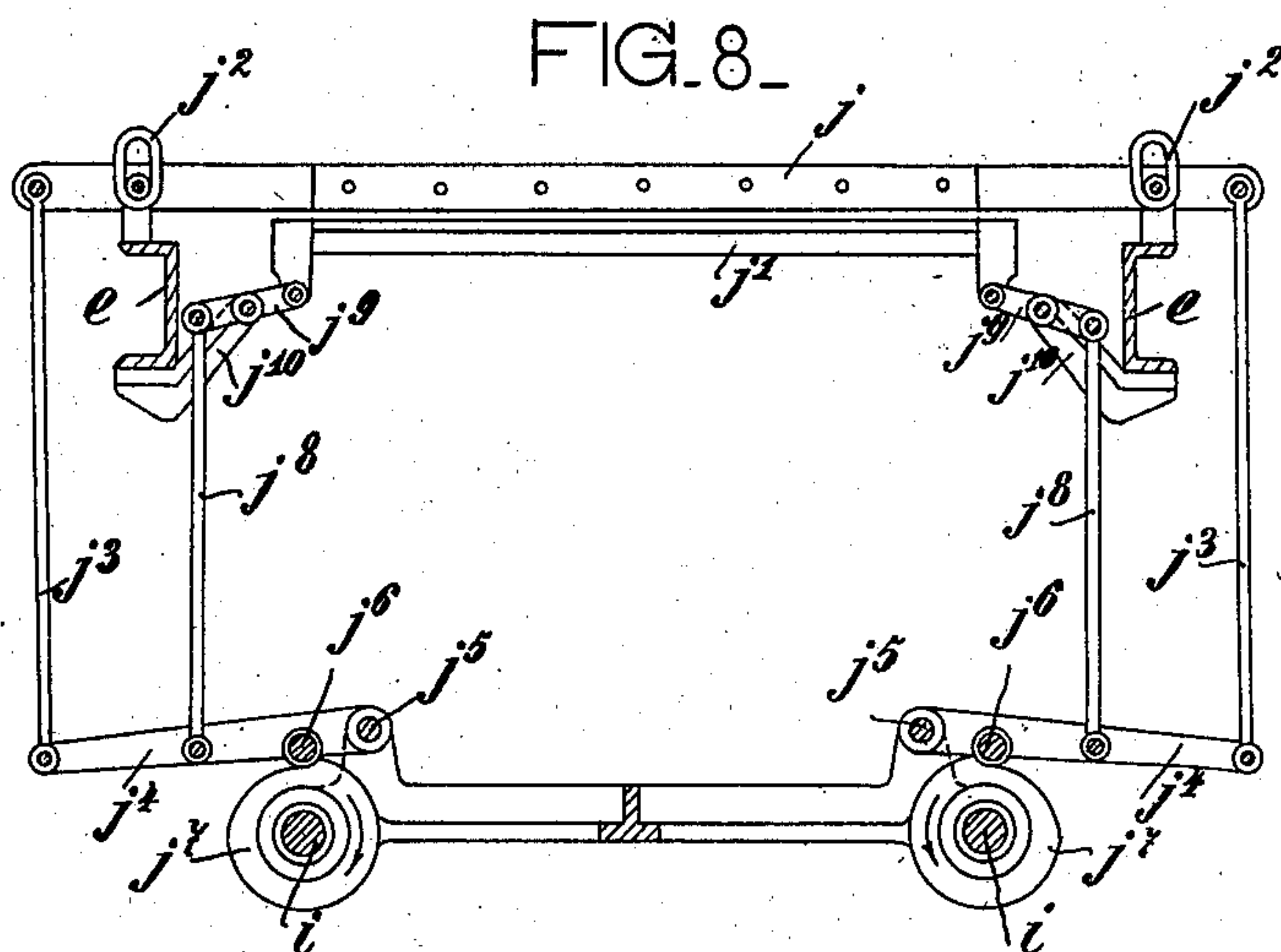
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(Application filed Apr. 7, 1900.)

(No Model.)

6 Sheets—Sheet 6.



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UNITED STATES PATENT OFFICE.

KARL WIESSNER, OF RADEBERG, GERMANY.

MATCH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 700,392, dated May 20, 1902.

Application filed April 7, 1900. Serial No. 11,985. (No model.)

To all whom it may concern:

Be it known that I, KARL WIESSNER, a subject of the King of Saxony, residing at 10 Fabrikenstrasse, Radeberg, in the Kingdom of Saxony and Empire of Germany, have invented new and useful Improvements in Machines for Making Wax and Like Matches, of which the following is a specification.

This invention relates to machines for making wax and like matches, which consist of a wick or thread coated with wax or similar vegetable, animal, or mineral materials and furnished with a head for ignition by a continuous series of operations.

The improved match-making machine is illustrated in the accompanying drawings, wherein—

Figures 1 and 2 are side elevations representing the front or first part of the machine, comprising a spool frame or table, a wax-trough, a cooling-box, and a fan. Figs. 3 and 4 are side elevations of the second part of the machine, which comprises the devices for clamping, cutting, dipping, and removing the wax-coated threads or the strips forming the matches and the driving mechanism of the machine. Fig. 5 is a transverse section showing the device for closing the clamping-springs upon the conveyer-bars and for locking and unlocking such springs. Fig. 6 shows details of the locking device, and Fig. 7 details of a device for turning the conveyer-bars. Fig. 8 is a transverse section showing the device for cutting the wax-coated wicks or threads into lengths forming the match-strips. Fig. 9 is a transverse section representing the device for lifting the matches off the conveyer-bars. Fig. 10 is a vertical transverse section showing the device for closing the clamping-springs upon the conveyer-bars and the guide for such springs at the front part of the machine. Fig. 11 is a similar vertical transverse section showing the device for closing, locking, and unlocking the springs of the conveyer-bars and also the guide for such springs at the rear part of the machine.

In carrying my invention into practice I arrange in front of the frame *a* of the machine a portable frame or table *b*, carrying a number of spools *b'*, from which the threads *c* pass over small guide-pulleys *c'*, held by an

arm *a'*, secured to the front end of the said frame *a*, Fig. 1. From these pulleys *c'* the threads *c* pass through a comb *c²*, designed to obviate their entanglement, to a guide-roller *c³*, held by brackets on the top of the frame *a*, and thence to a guide-roller *c⁴*. This guide-roller *c⁴* is arranged in a trough *d*, serving for the reception of the wax or like material and adapted to be heated by steam, which is introduced into a box *d'* below the said trough *d*, with the object of melting the material in the trough and keeping it in a suitable condition. On leaving the guide-rollers *c⁴* the threads *c* pass to the end of the trough *d* at such a depth below the surface of the molten wax material that they will receive a coating of the required thickness. In this state the threads are conducted through funnels or draw-rings *d²*, provided at the rear of the wax-trough *d*, and having for their object to remove any superfluous material and to give them a round shape, whereupon they traverse a box *d³*, which has no heating arrangement, thus allowing the coating on the threads to set, Fig. 1. As the wax-coated threads *c* pass from the box *d³* they are caused to move through draw-rings *d⁴*, which are heated a little by means of a small steam-pipe *d⁵* in order that besides reducing the coating to exactly the required thickness such coating may receive a polished surface. The coated threads are next conducted through a cooling-box *d⁶*, Fig. 2, into which a current of cold air is forced through the intervention of a fan *d⁷*, arranged on the frame *a*, which also carries at the rear of the said box a comb *d⁸*, serving to maintain the coated threads in their proper path, so as to preclude entanglement. In their further passage the wax-threads *c*, which have by this time obtained the requisite rigidity, reach the frame *e* of the machine, Fig. 3, which is placed at the rear of the frame *a*, Figs. 1 and 2, and are taken up by a conveyer consisting of endless chains *f*, which are arranged to run around pulleys *f'* on either side of the frame *e*, and of bars *g*, carried by the chains and adapted to be turned therein. The chains *f* are guided by means of angle-irons *e'*, secured to the top and bottom parts of this frame *e*, Figs. 3 and 5.

Each of the conveyer-bars *g* is furnished on the top with a spring *g'*, hinged thereto by one

of its extremities at g^2 , while the other extremity is adapted to be locked with the aid of a spring hook or catch g^3 against the tension of the spring, which enables it to turn backward on the release of its free extremity, Figs. 5, 6, 9, and 11, the object of the springs being to clamp the wax-threads upon the bars for conducting them over the top part of the machine for further treatment. With this object the clamping-springs g' , while the conveyer-bars move upward with the endless chains f in front of the frame e , Fig. 3, are released by the catches g^3 and thrown backward, by reason of their elasticity, so as not to obstruct the movement of the wax-threads c coming from the frame a . On reaching the top of the machine the springs g' come in contact with a curved guide e^2 , fixed to the frame e and serving to turn them forward gradually, so as not to disturb the position of the threads c on the bars g , Fig. 10. Then the front extremities of the springs are taken hold of in succession by an arm h , designed to force them downward into engagement with the spring hooks or catches g^3 , thereby clamping the wax-threads c upon the conveyer-bars g . The arm h , which has a spring fork or gripper h' at its front end, is pivoted in a bracket on one side of the frame e and is connected at its rear end with a rod h^2 , furnished below with a pin engaging with the groove of a cam h^3 , which is actuated by one of the driving-shafts i of the machine through the intervention of gear-wheels h^4 , h^5 , and h^6 . By this means an oscillating movement is imparted to the aforesaid arm h , which working intermittently depresses each of the clamping-springs g' as they come within its sphere of action, Fig. 5. After the wax-threads c have thus been clamped by the springs g' upon the conveyer-bars g they proceed to the cutting device, Figs. 3 and 8, which is designed to cut the wax-thread c between every two such bars into lengths corresponding each to the total length of two matches. This device comprises an upper knife j and a lower knife j' , which when they are not cutting leave an interval between them for the passage of the conveyer-bars g . The ends of the upper knife are held in slotted guides j^2 , secured to the frame e . These guides may be vertical, as shown, but are generally more or less inclined to facilitate the cutting action. Rods j^3 connect the ends of the knife j with the ends of lever-arms j^4 , pivoted at j^5 and carrying friction-rollers j^6 , adapted to run upon the peripheries of cams j^7 on the driving-shaft i in order to impart reciprocating movement of the upper knife j , while the lower knife j' receives similar but opposite movement from the same cams j^7 and lever-arms j^4 through the medium of rods j^8 and of levers j^9 , pivoted to brackets j^{10} on the frame e , Figs. 3 and 8. The lengths or strips thus cut and held horizontally upon the bars g are now conveyed to a trough k , containing ignition material, for the purpose of being furnished with a

head at either end. Before the conveyer-bars g pass above the said trough they have to make a quarter of a turn in order to place the strips c vertically, Fig. 3. One end of each bar g extends for this purpose to the outside of one of the endless chains f , wherein the bars can turn, and has secured to it a square head g^4 , furnished with lugs g^5 and arranged to slide upon a guide-bar e^3 , fixed to the frame e , Figs. 5 and 7. As each of the bars g approaches the trough k one of the lugs g^5 on its head g^4 strikes against a fixed pin e^4 , causing a corner of such head to slide into a notch or recess e^5 in the guide-bar e^3 , so that in the continued sliding movement of the head the next face of the square will bear upon the guide-bar, Fig. 7. While the match-strips are thus held vertically upon the bar g above the trough k the latter is caused to move upward to such an extent that the ignition material contained therein will cover their lower ends to form the heads of the matches, whereupon the trough returns to its former position. This reciprocating movement is communicated to the trough by the two driving-shafts i through the medium of eccentrics k' and eccentric-rods k^2 , made in two parts and connected by nuts k^3 , which engage right-handed and left-handed screw-threads on the two parts of the rods and carry hand-wheels to facilitate the adjustment required for varying the length of the rods according to the level of the ignition material in the trough k . After the match-strips have been provided with a head at one of their ends the square head g^4 of each conveyer-bar g as it slides along on the guide-bar e^3 strikes with its lugs g^5 twice in succession against a fixed pin e^4 and drops into notches or recesses e^5 , (such as shown in Fig. 7,) so as to cause the said bar by making two quarters of a turn to hold the other ends of the strips downward before the bar g passes above a second trough k for furnishing these ends with heads in the same manner and by exactly similar devices as before described, Fig. 3. The match-strips having been prepared thus far, the conveyer-bar g is caused to make a fourth quarter of a turn in order to place them again in the horizontal position on this bar, whereupon the latter passes to a device designed for releasing the end of the clamping-spring g' from the catch g^3 for the purpose of enabling the match-strips to be removed, Figs. 4, 5, and 6. This device has a hook-shaped lever m , pivoted in a bracket m' on the frame e and connected by a rod m^2 with the pin of a crank-disk m^3 on a shaft which is held in a bracket m^4 and carries a bevel-wheel m^5 , gearing with a bevel-wheel m^6 on one of the driving-shafts i of the machine. In the downward movement of the hook-shaped arm of the lever m the hook engages with the catch g^3 and sets the clamping-spring g' free, Fig. 6. This spring, owing to its elasticity, is thrown upward into contact with a curved guide e^6 , Fig. 11, which allows

it to uncover the match-strips gradually without disturbing them in their position on the bars *g*. When the clamping-springs *g'* are turned completely backward, the bars *g*, with the match-strips lying loosely across them, pass above a U-shaped box or channel *n*, to which an upward-and-downward movement is imparted in order to lift the match-strips off the bars. The channel *n*, which is guided in its vertical movement by means of slides *n'*, fixed to it, and guides *n²*, fixed to the frame *e*, is connected by rods *n³* with lever-arms *n⁴*, pivoted to brackets *n⁵* and carrying friction-rollers *n⁶*, which bear upon the peripheries of cams *n⁷*, secured on the two driving-shafts *i* of the machine. The match-strips are removed by hand from the channel *n* and subsequently cut in the middle. After the conveyer-bars have left the channel *n* and proceed toward the end of the machine the clamping-springs *g'*, which were turned completely backward, Figs. 4 and 9, are gradually moved forward again by the second half of the guide *e⁶*, Fig. 11, and are then taken hold of by the end of the arm *h*, which forces their extremities under the spring hooks or catches *g³*, Figs. 4 and 5. Then the clamping-bars *g* are conveyed by the endless chains *f* down the rear end of the frame *e* and forward at the lower part to the front end of this frame, where as they move upward the clamping-springs *g'* are released again from the spring hooks or catches *g³* by another hooked lever *m*, connected by a rod *m²* with a crank-disk *m³*, whose shaft is operated through bevel-wheels by one of the driving-shafts *i*, Figs. 3 and 5.

The driving mechanism is provided at the rear end of the machine and, as shown by way of example, comprises belt-pulleys *o*, keyed upon a transverse shaft *o'*, which carries a toothed pinion *o²*, gearing with a toothed wheel *o³* upon a second transverse shaft *o⁴*. Upon this shaft are keyed two bevel-wheels arranged to mesh with bevel-wheels *o⁵*, secured upon the rear ends of the aforesaid two driving-shafts *i*. The second transverse shaft *o⁴* has also arranged upon it a disk *o⁶*, upon the face of which are adjustably pivoted the pawls *o⁷*, serving to operate ratchet-wheels *o⁸* on the shaft *o⁹* of the pulleys *f'*, while stop-pawls *o¹⁰* prevent the back movement during the time the pawls *o⁷* accomplish their return movement to engage the next teeth of the ratchet-wheels. By this means intermittent forward movement is imparted to the endless chains *f* and rotary movement to the two driving-shafts *i*, the movements of the various devices being of course timed for enabling them to perform the operations hereinbefore set forth.

It may be observed that when the machine is first set in operation it is necessary to conduct the threads from the spools by hand through the front part of the machine in the manner specified and to lay their ends on the conveyer-bars, upon which as the machine

begins to act they are held by the clamping springs; but afterward such manipulation will not be required, because before the threads are used the spools may be replaced and the ends of the threads tied together.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a match-machine of the class described the combination of a portable frame, spools carried thereby, a stationary frame having arms which carry guide-rollers for the threads coming from the spools, a wax-trough having guide-rollers in front and draw-rings at its end for the passage of the threads, a steam-box, a cooling-box having draw-rings at its end, a cooling-box furnished with a fan, combs to guide the threads, a pair of endless chains passing around pulleys at the ends of a frame and guided by angle-irons secured to the top and bottom parts of said frame, conveyer-bars having clamping-springs hinged to one end of them and catches fixed to the other end of the same, an arm pivoted to the frame and connected by a rod to a cam adapted to impart oscillating movement to said arm for engaging the end of the clamping-spring with said catches, substantially as specified.

2. In a match-machine of the class described the combination with a pair of endless chains to which intermittent motion is imparted, conveyer-bars having clamping-springs hinged to them for holding the match-threads thereon, and catches locking the springs upon the bars, of an upper knife held by its ends in slotted guides and connected by rods to lever-arms bearing upon cams, and a lower knife pivoted to levers connected by rods to said lever-arms for imparting opposite movement to said knives, substantially as specified.

3. In a match-machine of the class described the combination with a pair of endless chains passing around pulleys at the ends of a frame and guided by angle-irons at the top and bottom parts of said frame, conveyer-bars having clamping-springs hinged to one end of the bars and catches fixed to the other end of the same, of square heads arranged on one end of the bars and furnished with pins, guide-bars secured to the frame and forming a sliding surface for the heads, said guide-bars being provided with notches and pins, with which the square heads and pins engage in the forward movement of the conveyer-bars, substantially as specified.

4. In a match-machine of the class described the combination with a pair of endless chains passing around pulleys at the ends of the frame and guided by angle-irons at the top and bottom parts of said frame, conveyer-bars having clamping-springs hinged to one end of the bars and catches fixed to the other end of the same, a trough containing ignition material, eccentric-rods attached thereto and made in two parts connected by nuts engaging with right and left handed screw-threads,

and eccentrics adapted to impart reciprocating movement to said trough, substantially as specified.

5 5. In a match-machine of the class described the combination, with a pair of endless chains passing around pulleys at the ends of a frame and guided by angle-irons at the top and bottom parts of said frame, conveyer-bars having clamping-springs hinged to one end of the
10 bars and catches fixed to the other end of the same, of hook-shaped levers pivoted in brackets on the frame, crank-disks connected by rods to said levers, and by bevel-gear to the driving-shafts of the machine to release the
15 clamping-springs from said catches, substantially as specified.

6. In a match-machine of the class described the combination, with a pair of endless chains

passing around pulleys at the ends of a frame and guided at the top and bottom parts of said 20 frame, conveyer-bars having clamping-springs hinged to one end of the bars and catches fixed to the other end of the same, a channel adapted to be moved upward and downward in guides on the frame, lever-arms bearing 25 upon cams on the driving-shafts and connected to the channel by rods, substantially as specified.

In witness whereof I have hereunto signed my name in the presence of two subscribing 30 witnesses.

KARL WIESSNER.

Witnesses:

FELIX F. LOEPER,
E. LOEPER.