

No. 611,562.

Patented Sept. 27, 1898.

W. E. COOK.  
MATCH MACHINE.

(No Model.)

(Application filed Jan. 28, 1898.)

2 Sheets—Sheet 1.

Fig. 1.

WITNESSES

*Cleverance*  
*W. Bluff*

INVENTOR

*William E. Cook*  
*by* *Geo. W. Cook*  
*Attorney*

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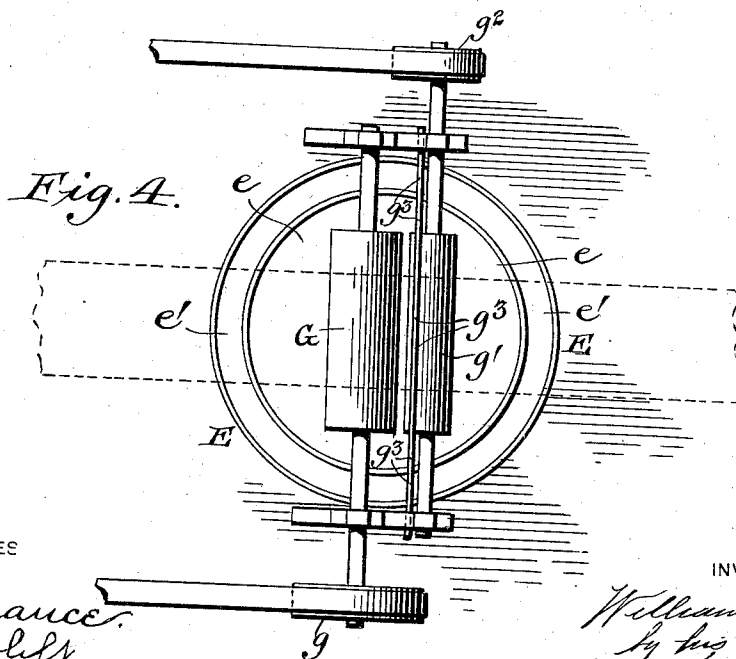
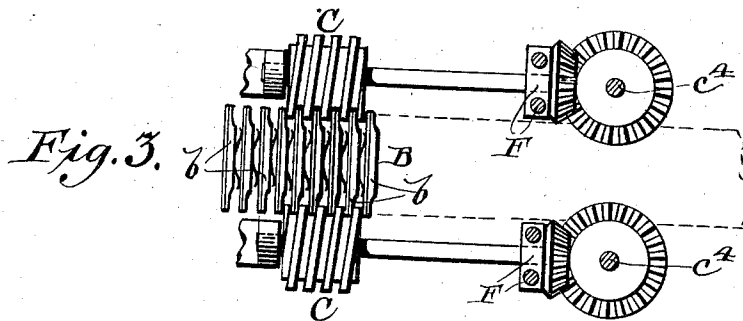
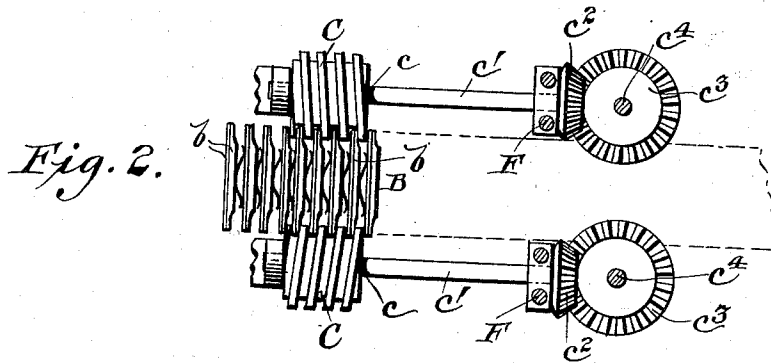
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WITNESSES

*Geverance*  
*J. R. Bluff*

INVENTOR

*William E. Cook*  
*By his Attorney*  
*Max J. Smith*

# UNITED STATES PATENT OFFICE.

WILLIAM E. COOK, OF OGDENSBURG, NEW YORK.

## MATCH-MACHINE.

SPECIFICATION forming part of Letters Patent No. 611,562, dated September 27, 1898.

Application filed January 28, 1898. Serial No. 668,327. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIAM E. COOK, a subject of the Queen of Great Britain, and a citizen of Canada, residing at Ogdensburg, in the county of St. Lawrence and State of New York, have invented certain new and useful Improvements in Match-Machines; 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.

My invention relates to improvements in match-machines, and more particularly to machines which are adapted to cut match-splints, provide them with igniting-heads, and dry them to produce completed matches in one continuous operation.

It consists in providing a machine for making matches with one or more sets of worms adapted to engage a match-splint carrier for feeding the said carrier forward in the machine by a continuous motion.

It also consists in providing a machine with means for supplying igniting-heads to match-splints, comprising a roller adapted to revolve in a composition-vat and an auxiliary roller for further agitating the composition and assisting in supplying the said composition to the match-splints.

It also consists in certain other novel constructions, combinations, and arrangements of parts, as will be hereinafter more fully described and claimed.

In the accompanying drawings, Figure 1 represents a side elevation of a match-machine embodying my invention. Fig. 2 represents an enlarged detail plan view showing a portion of the carrier-chain and a set of worms for feeding the same forward. Fig. 3 represents a similar view, but showing the worms arranged differently; and Fig. 4 represents a detail top plan view of the composition-vat and the rollers operating therein.

A in the drawings represents a match-machine; B, a carrier-chain for receiving and carrying match-splints. C C represent worms for moving the main portion of said carrier-chain forward.

D represents a paraffin-vat.

E represents a composition-vat, and F represents a drier-frame.

In machines of this character the match-

splints are usually formed by means of a suitable cutter which is adapted to engage blocks of wood and cut the splints therefrom and deposit them in a carrier-chain. The chain then carries the splints forward and passes them through a suitable device for paraffining the ends thereof, thence carrying the said splints to a composition-vat for receiving suitable igniting-heads. From that point the chain carries the matches back and forth in a drying-frame for a suitable length of time to permit the heads to become thoroughly dried and hardened, when they are ejected from the machine by any suitable or well-known means.

While means have been hitherto provided for moving the body portion of a carrier-chain in similar machines, yet these means have proven unsatisfactory and not necessarily continuous. I therefore conceived the idea of employing continuous worms for engaging the body portion of the chain and moving it by a continuous motion, while the intermittent worms are employed at the cutter and at the discharge ends of the machine for imparting an intermittent movement at those points to the chain, there being a sufficient slack left in the chain where it passes through the splint-cutting mechanism to permit this action. For this purpose I mount the worms C C at suitable points in the frame of the machine. One set of worms C C are mounted, as at *c*, upon horizontal shafting, as *c'*, having at one end beveled gearing, as at *c''*, which is adapted to engage corresponding beveled gears, as *c'''*, mounted upon vertical shafting, as *c''''*. Motion may be applied to the said shafting *c''''* by belt and pulley or any other suitable means from any source of power. (Not shown in the drawings.) Other sets of worm-gears C C may be located in the frame of the machine, as at *c<sup>5</sup>*, *c<sup>6</sup>*, and *c<sup>7</sup>*. These may be connected to the shafting *c'* by means of beveled gearing similar to that already described, as shown in the drawings; but it will be apparent that any other means may be employed for revolving the worms C and thus enabling them to impart a continuous motion to the carrier-chain. The worms C may be adapted to engage any form of carrier-chain, but are preferably used, as shown in Fig. 2 of the drawings, in connection with a

carrier-chain composed of splint-receiving slats, as *b b*, the ends of the said slats being engaged by the worm-gears, as illustrated in the said Fig. 2. The worms *C C*, as shown in Fig. 2 of the drawings, may be made as right and left hand worms, in which case they should be revolved in opposite directions. As shown in Fig. 3 of the drawings, however, both of the worms may be right or left hand gears, in which case the gearing will be so arranged as to revolve both worms in the same direction. Any suitable or well-known means may be used for operating the chain at the part where it receives the match-splints and also at the point where it discharges the completed matches. I prefer, however, to use intermittent worms, as at *a*, for giving the chain an intermittent movement where the cutter deposits splints therein, and also to employ intermittent worms, as at *a'*, to impart a like movement to the chain at the point where the completed matches are discharged. Thus the main portion of the chain is fed at a uniform continuous speed, while the splint receiving and discharging portion is fed with an intermittent movement. A sufficient slack is allowed in the chain where it passes to and from the splint-cutting mechanism to permit of this varied feed. After the splints have been deposited in the carrier the said carrier is uniformly fed forward by means of the worms *C C*, the splints next passing to a paraffining and heating device, as *D*, which may be of any usual and well-known construction. Thence the splints are carried to the composition-vat *E*. The composition-vat *E* is composed, preferably, of an inner vat or receptacle, as *e*, adapted to hold a suitable igniting material. An exterior inclosing vat or receptacle, as *e'*, is also provided which is adapted to hold water or other liquid, which may be heated in any well-known manner for keeping the material in the interior vat in a warm and liquid condition. A roller, as *G*, is mounted upon the vat *E* in such a manner as to revolve in the composition contained in the inner vat *e*, the shaft of the said roller extending beyond the said vat and being provided with a pulley *g* or any other suitable means, whereby power may be communicated to the roller for revolving the same. The roller *G* upon being revolved is adapted to carry up upon its periphery a portion of the composition material and deposit it upon the ends of the match-splints supported in the carrier-chain *B*. In order to assist in the operation of carrying up the composition material I preferably mount in the vat a second roller, as *g'*, which is also adapted to rotate in the composition contained in the vat. The roller *g'* is preferably mounted, so as to be in close proximity to the roller *G*, but not so as to touch the same nor so as to touch the match-splints, the distance between the two rollers being regulated according to the amount of composition it is desired to carry up upon the pe-

riphery of the roller *G*. The shaft of the roller *g'* is preferably extended over the side of the vat *E* and may be provided with a pulley, as *g<sup>2</sup>*, for receiving power from any suitable means, as in the case with the roller *G*. A scraper, as *g<sup>3</sup>*, is also preferably mounted in the vat *E*, it being so disposed as to rest lightly upon the roller *g'*, as illustrated in the drawings. This scraper may be allowed to rest directly upon the roller or may be supported a little above it, if desired, accordingly as it may be required to throw more or less of the composition material back upon the roller *G*. The scraper *g<sup>3</sup>* may extend beyond the sides of the vat and be mounted thereon in any suitable or desired manner. In using the vat the rollers *G* and *g'* are revolved in opposite directions from each other. The auxiliary roller *g'* not only assists in agitating the composition in the vat, but also assists in carrying up the said composition upon the roller *G*, which alone comes in contact with the match-splints, so that it is not necessary to use as thick a composition as would be required where only one roller is employed. It will thus be seen that a thinner composition or one of less consistency may be used, which greatly lessens the liability of the said composition being ignited. This difficulty is experienced in machines which use a composition which is of necessity quite thick, as the friction is often sufficient to ignite the said composition. The splints after receiving their igniting-heads are carried back and forth in the drying-frame *F*, suitable rollers or pulleys, as *f*, being mounted thereon to support and carry the said chain.

It will be apparent from the above description that by the use of my improved worms the body portion of the splint-carrier can be fed continuously and without intermission thereby. This is a great advantage in that it prevents the liability of skipping, by which the splints are oftentimes injured or broken and an uneven or jerky movement caused in the chain. My improved composition-vat is also particularly well adapted for supplying heads to the splints, as has been heretofore described.

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

1. In a match-machine, the combination with a match-splint carrier, of continuous worms for imparting motion to the main portion of the said carrier for feeding it at a uniform speed, and intermittent worms also engaging said chain where it passes through the splint-cutting mechanism, for imparting to it an intermittent movement at that point, sufficient slack being allowed in the chain to permit of the varied feed, substantially as described.

2. In a match-machine, the combination with a splint-cutting mechanism and a drying-frame, of a match-splint carrier, adapted

to pass through the same, uniform continuous worms mounted in the drying-frame for imparting motion to the greater portion of the chain and giving a uniform movement thereto, intermittent worms mounted upon the splint cutting and discharging mechanism and engaging a small portion of the chain for imparting to it an intermittent movement at that point, sufficient slack being left in the chain between the splint-cutting mechanism and the drying-frame to accommodate this movement, substantially as described.

3. In a match-machine, the combination with a match-splint carrier, of a series of uniform continuous worms for imparting motion to the greater portion of the said carrier to feed it at a uniform speed, intermittent worms engaging a small portion of the chain for feeding it intermittently at that point, sufficient slack being left in the carrier to allow this varied feed, and gearing for actuating all of the uniform worms simultaneously, substantially as described.

4. In a match-machine, the combination with a splint-carrier, of a composition-vat for applying igniting-heads to the said splints comprising in its construction a roller adapted to revolve in a suitable composition for applying it to the splints, an auxiliary roller also adapted to revolve in the said composition to one side of the main roller and so as not to come in contact with the splints, the said auxiliary roller assisting in feeding the composition to the applying-roller, and means for revolving the said rollers, substantially as described.

5. In a match-machine, the combination

with a splint-carrier, and means for applying the igniting-heads to the splints, comprising a vat for holding a suitable composition, an applying-roller mounted thereon and rotating in the said composition, an auxiliary roller also mounted in the vat and adapted to be rotated in the composition, the said auxiliary roller being arranged so as to assist in feeding and grading the composition upon the applying-roller, but not touching the match-splints, and a scraper interposed between the rollers and adapted to throw the composition from the auxiliary roller upon the applying-roller, substantially as described.

6. In a match-machine, the combination with a suitable splint-carrier, of a composition-vat for applying the igniting material to the splints, an applying-roller and auxiliary roller mounted upon the vat so as to rotate in the composition, the said auxiliary roller being smaller than the applying-roller so as not to engage the match-splints, a scraper mounted between the rollers and adapted to throw the composition from the auxiliary roller upon the applying-roller, and means for adjusting the scraper to throw a greater or less quantity of composition back upon the said applying-roller, and means for rotating the said rollers, substantially as described.

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

WILLIAM E. COOK.

Witnesses:

A. E. LAUD,  
N. G. LAWRENCE,  
E. L. STRONG.