

(No Model.)

2 Sheets—Sheet 1.

G. L. JAEGER.

MATCH MAKING MACHINE.

No. 273,849.

Patented Mar. 13, 1883.

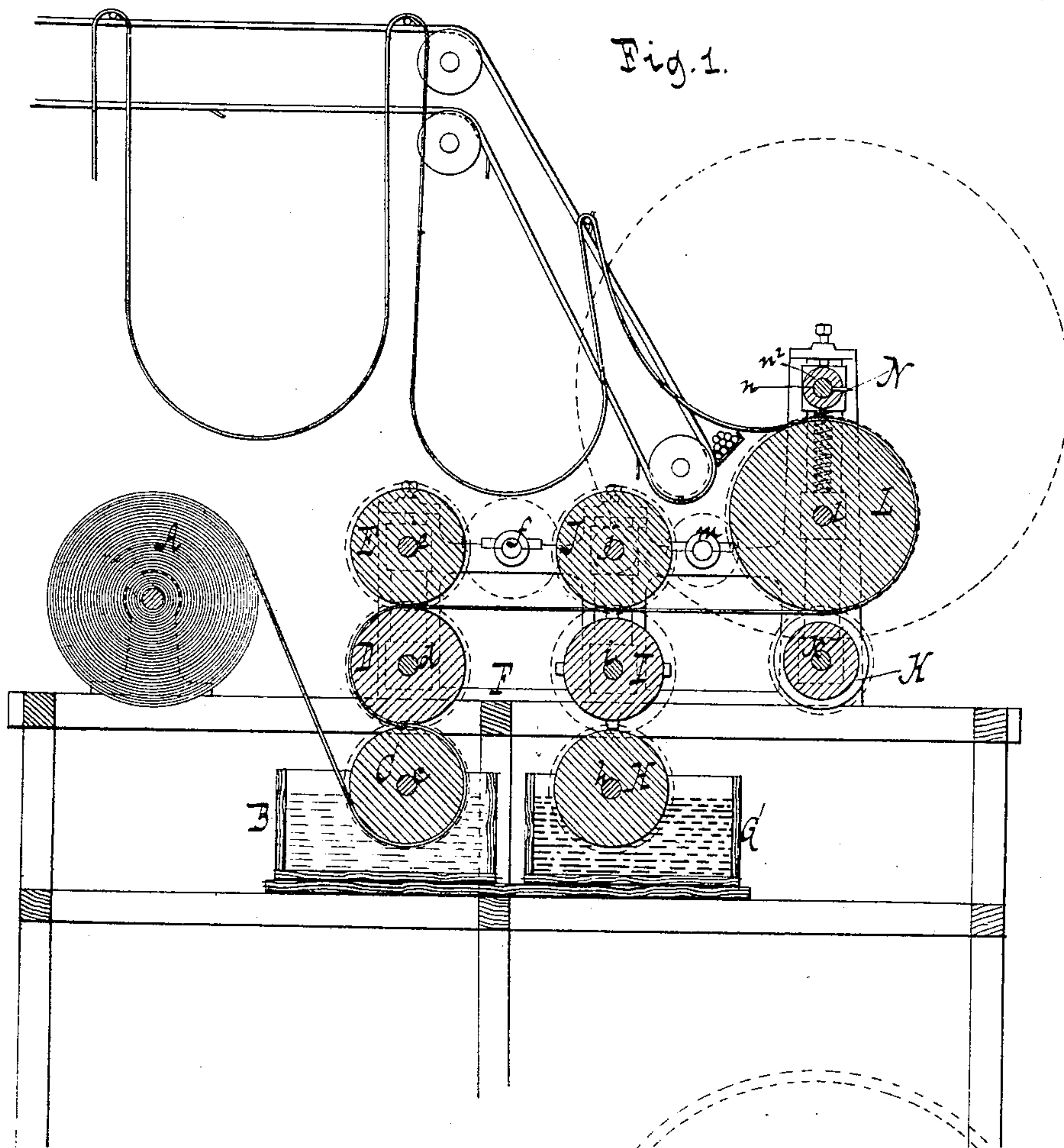


Fig. 1.

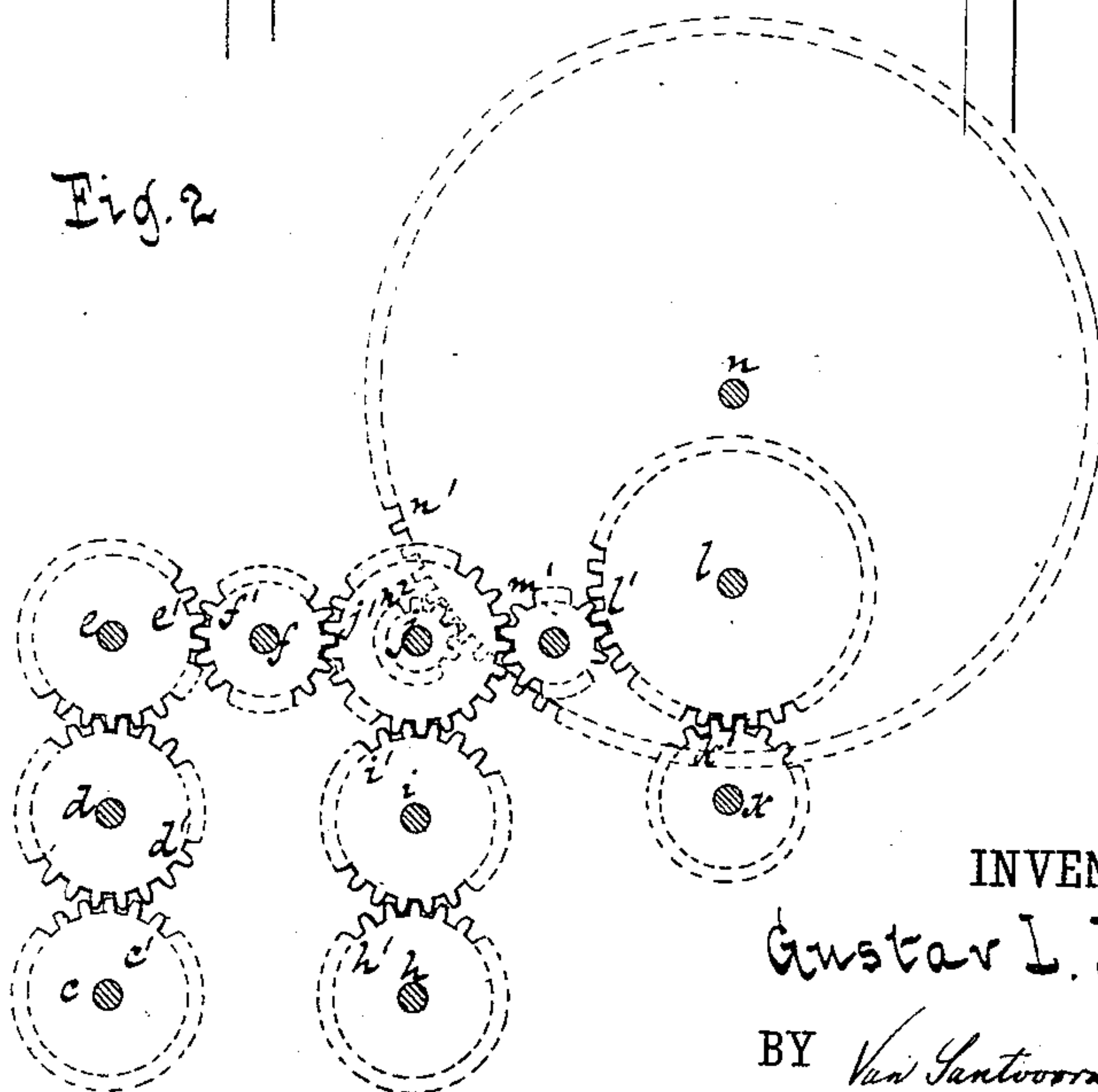


Fig. 2

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Fig. 3.

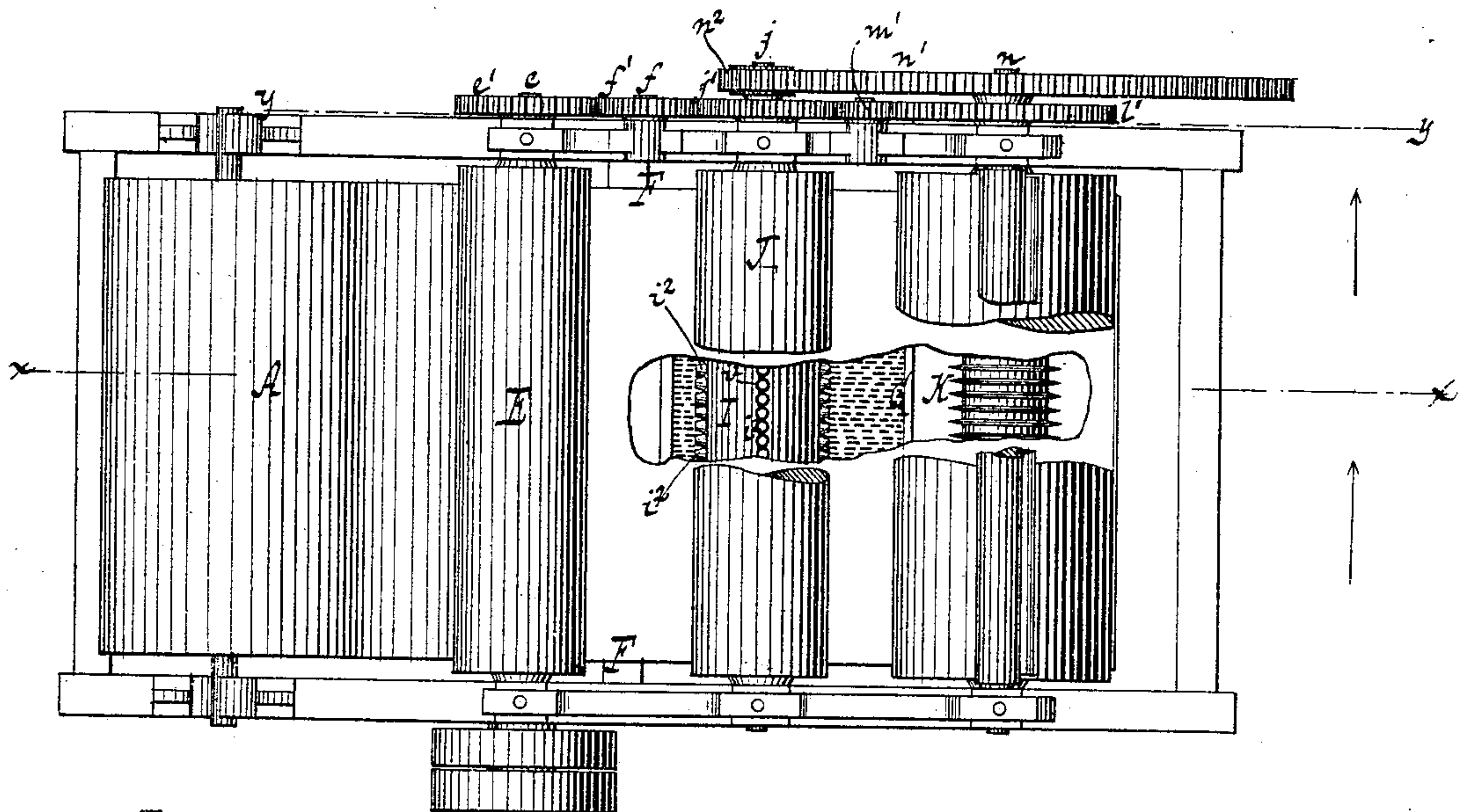


Fig. 7

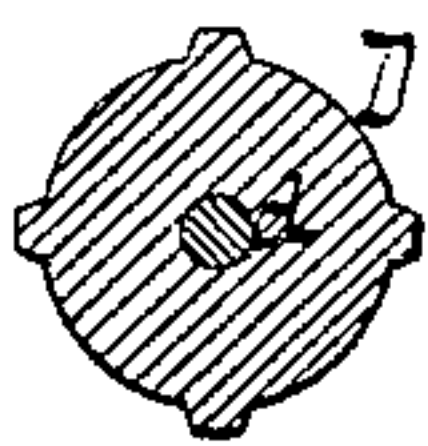


Fig. 4

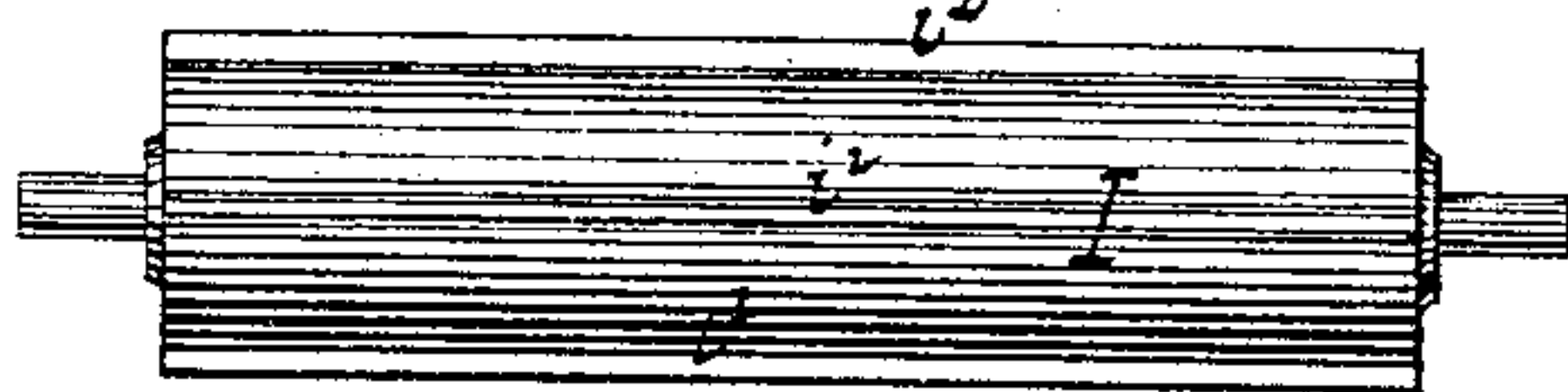


Fig. 8.

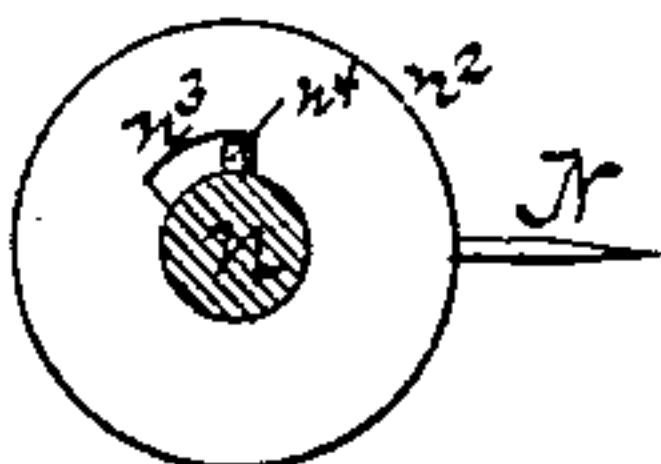


Fig. 5

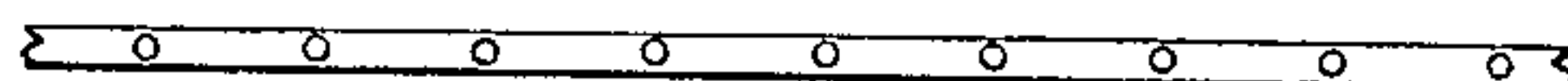
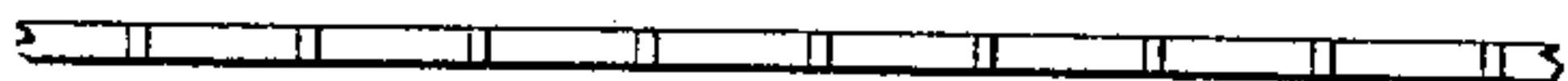


Fig. 6.



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# UNITED STATES PATENT OFFICE.

GUSTAV L. JAEGER, OF NEW YORK, N. Y.

## MATCH-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 273,849, dated March 13, 1883.

Application filed January 24, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, GUSTAV L. JAEGER, a citizen of the United States, residing at New York, in the county and State of New York, have invented new and useful Improvements in Match-Making Machines, of which the following is a specification.

This invention relates to a machine for making matches from a roll of paper, pasteboard, straw-board, or wood-board, or any other equivalent material, and it is designed to saturate or coat the web with oleic acid, then to apply to one surface of the same the lighting composition, either in detached spots or in ridges, then to split the same, and to cut it also transversely, then to dry it.

The peculiar construction of my machine is pointed out in the following specification and illustrated in the accompanying drawings, in which—

Figure 1 represents a longitudinal vertical section in the plane  $xx$ , Fig. 3. Fig. 2 is a section in the plane  $yy$ , Fig. 3, showing the gear-connections of the various parts. Fig. 3 is a plan or top view, partly in section. The remaining figures are details, which will be referred to as the description progresses.

Similar letters indicate corresponding parts.

In the drawings, the letter A designates a roll of paper, pasteboard, straw-board, or other equivalent material suitable for the manufacture of matches. From this roll the web is drawn off and passed successively through an apparatus for coating or saturating the same with oleic acid or equivalent material, then through an apparatus for printing or applying on its surface spots or ridges of a suitable lighting compound, then through a slitting mechanism, and finally through a transverse cutting mechanism.

The apparatus for coating or saturating the web with oleic acid consists of a trough, B, a feed-roller, C, a delivery-roller, D, and a pressing-roller, E. The trough B contains the oleic acid, and the feed-roller C is mounted on a shaft,  $c$ , which has its bearings in the side of the trough, and is geared together by cog-wheels  $c' d'$ , Fig. 2, with the shaft  $d$  of the delivery-roller, which in its turn is geared together, by cog-wheels  $d' e'$ , with the shaft  $e$  of the pressing-roller E. The shafts  $d e$  have

their bearings in the frame F, which supports all the working parts of my machine.

In the example shown in the drawings the web passes beneath the feed-roller C, then through between this feed-roller and the delivery-roller D, and finally over this delivery-roller, and between it and the pressing-roller E, to the printing apparatus. This course is given to the web if it is desired to saturate the same with oleic acid; but if it is desired to coat the same only on one side with such acid the web is carried from the roll directly through between the delivery-roller D and the pressing-roller E, and in this case the delivery-roller is covered with an absorbent material, or made in the form of a series of brushes, which sweep over the surface of the feed-roller and transfer the oleic acid from this surface to the surface of the web. Instead of the oleic acid other suitable materials may be used—such as a solution of resin in turpentine—and such material may be applied to the web in sections, in which case the roller D must have the form shown in Fig. 7.

The printing or composition-applying apparatus consists of a trough, G, which contains the lighting compound in a melted or semi-fluid condition, a feed-roller, H, a printing-roller, I, for transferring the lighting compound from the feed-roller to the web, and a roller, J, for pressing on the web. The feed-roller is mounted on a shaft,  $h$ , which has its bearings in the sides of the trough G, and is geared together, by cog-wheels  $h' i'$ , with the shaft  $i$  of the printing-roller. The shaft  $i$  is geared together, by cog-wheels  $i' j'$ , with the shaft  $j$  of the pressing-roller, and this shaft is geared together with the cog-wheel  $e'$  of the pressing-roller E by an intermediate gear-wheel,  $f'$ , mounted on a shaft,  $f$ . (See Fig. 2.) The shafts  $i, j$ , and  $f$  have their bearings in the frame F. The printing-roller I is provided on its circumference with a series of projections,  $i^2$ , which may be made in the form of continuous ribs, as shown in Fig. 4, or in the form of detached peaks, as shown in Fig. 3. These projections take up the lighting compound from the surface of the feed-roller and transfer it to the surface of the web either in the form of ridges, which extend clear across the web if the projections have the form shown in Fig. 4, or in



the form of detached spots if the projections have the form shown in Fig. 3.

From the printing apparatus the web passes to the slitting mechanism, which consists of a series of knives, K, which are mounted on a common shaft, *k*, and of a smooth roller, L, mounted on a shaft, *l*. The shaft *l* is geared together with the shaft *k* by cog-wheels *l'* *k'*, and with the shaft *j* by the cog-wheels *l'* *j'* and an intermediate cog-wheel, *m'*, mounted on a shaft, *m*. The superficial velocity of the roller L is the same as the superficial velocity of the knives K, and as the web passes through between the knives and said roller L the cutting-edges of the knives produce creases of such a depth that the web can be readily separated into strips whenever it may be desired. I prefer this method of cutting partially through the web to a slitting mechanism which cuts the web into detached strips, because the strips, when still hanging together, can be more readily subjected to the subsequent operations than they can if they are entirely separated. After having been subjected to the action of the slitting mechanism, as above described, the web is acted upon by the transverse cutter N, which is mounted on a shaft, *n*, and geared together with the shaft *j* by a large cog-wheel, *n'*, and pinion *n<sup>2</sup>*, Fig. 2, so that it makes one revolution for ten (more or less) revolutions of the shaft *l*, or of the roller L. By the action of this cutter the web is cut or creased transversely into pieces of the required length. In the example shown in the drawings this cutter is arranged, like the knives K, so that it produces deep creases, only without completely detaching the parts from each other. The superficial velocity of the cutter N being much less than that of the roller L, it is necessary to arrange said cutter so that it can move a short distance independent of its shaft. For this reason the cutter is secured in a roller, *n<sup>2</sup>*, which turns loosely on the shaft *n*, within the limits of a groove, *n<sup>3</sup>*, into which projects a key, *n<sup>4</sup>*, which is firmly secured in the shaft *n*. (See Fig. 8.) After the web has passed the transverse cutting mechanism it is hung up to dry. For this purpose a hanging apparatus may be employed—such as commonly used, for instance, in the manufacture of paper-hangings, and well known in the arts. After the web has dried it can be separated into strips of the desired length, each strip, when coiled up, being fit to be introduced into a match-box of suitable construction, to ignite the pellets of lighting compound deposited thereon as the strip is drawn out. The pellets on the strips, when produced by a printing-roller such as shown in Fig. 3, will have the appearance shown in Fig. 5, and when produced by a print-

ing-roller such as shown in Fig. 4 said pellets will have the appearance shown in Fig. 6.

If desired, the web may be saturated or coated separately, then rolled up and drawn from the roll through the printing mechanism, the slitting mechanism, and the transverse cutter.

The lighting compound which I use is one of the compounds commonly used in the manufacture of friction-matches.

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

1. The combination, in the manufacture of matches from pasteboard or equivalent material, of an apparatus for saturating or coating the web with oleic acid or equivalent material, an apparatus for transferring the lighting compound to the surface of the web, a slitting mechanism, and a transverse cutter, constructed and operating substantially as herein shown and described.

2. A machine for manufacturing matches from a continuous web, combining in its structure the following elements, arranged in the order named, to wit: a receptacle for containing the lighting compound, an apparatus for taking up the lighting compound within the receptacle and transferring it to the surface of the web, and mechanism for slitting the web as it leaves the transferring apparatus, substantially as described.

3. A machine for manufacturing matches from a continuous web, combining in its structure the following elements, arranged in the order named, to wit: a receptacle for containing the lighting compound, an apparatus for taking up the lighting compound within the receptacle and transferring it to the web, mechanism for providing the web with a series of closely-arranged slits as it leaves the transferring apparatus, and a transverse cutter for creasing or slitting the web transversely as it leaves the slitting mechanism, substantially as described.

4. The combination, in the manufacture of matches from a continuous web, of an apparatus for saturating or coating the web with oleic acid or equivalent material, an apparatus for transferring the lighting compound to the surface of the web, and a slitting mechanism, all constructed and operating substantially as hereinbefore shown and described.

In testimony whereof I have hereunto set my hand and seal in the presence of two subscribing witnesses.

GUSTAV L. JAEGER. [L. S.]

Witnesses:

W. HAUFF,

E. F. KASTENHUBER.