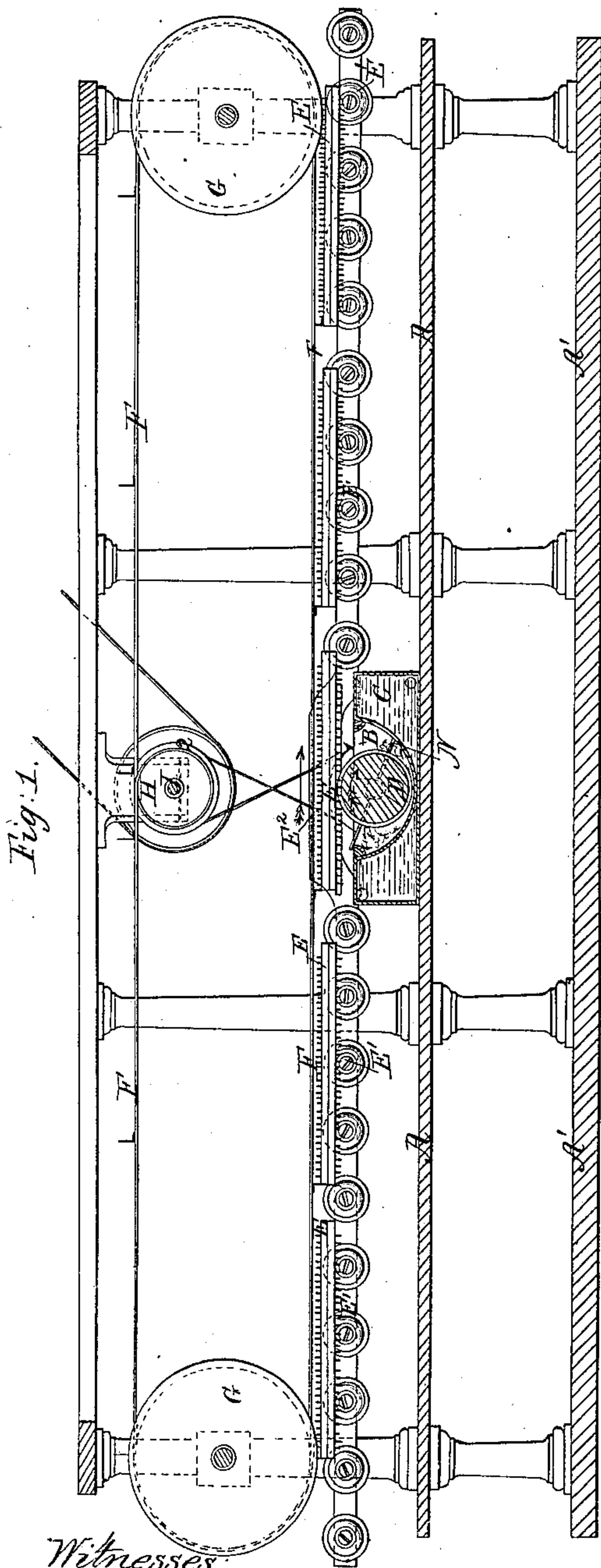


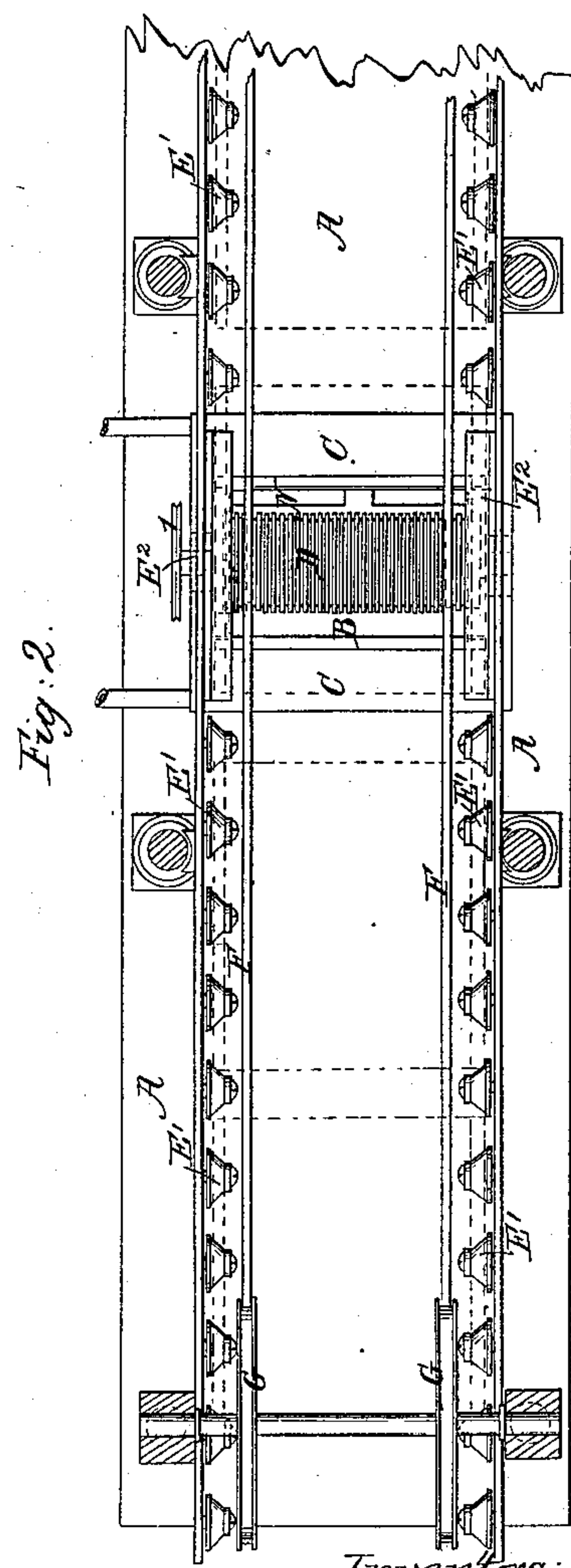
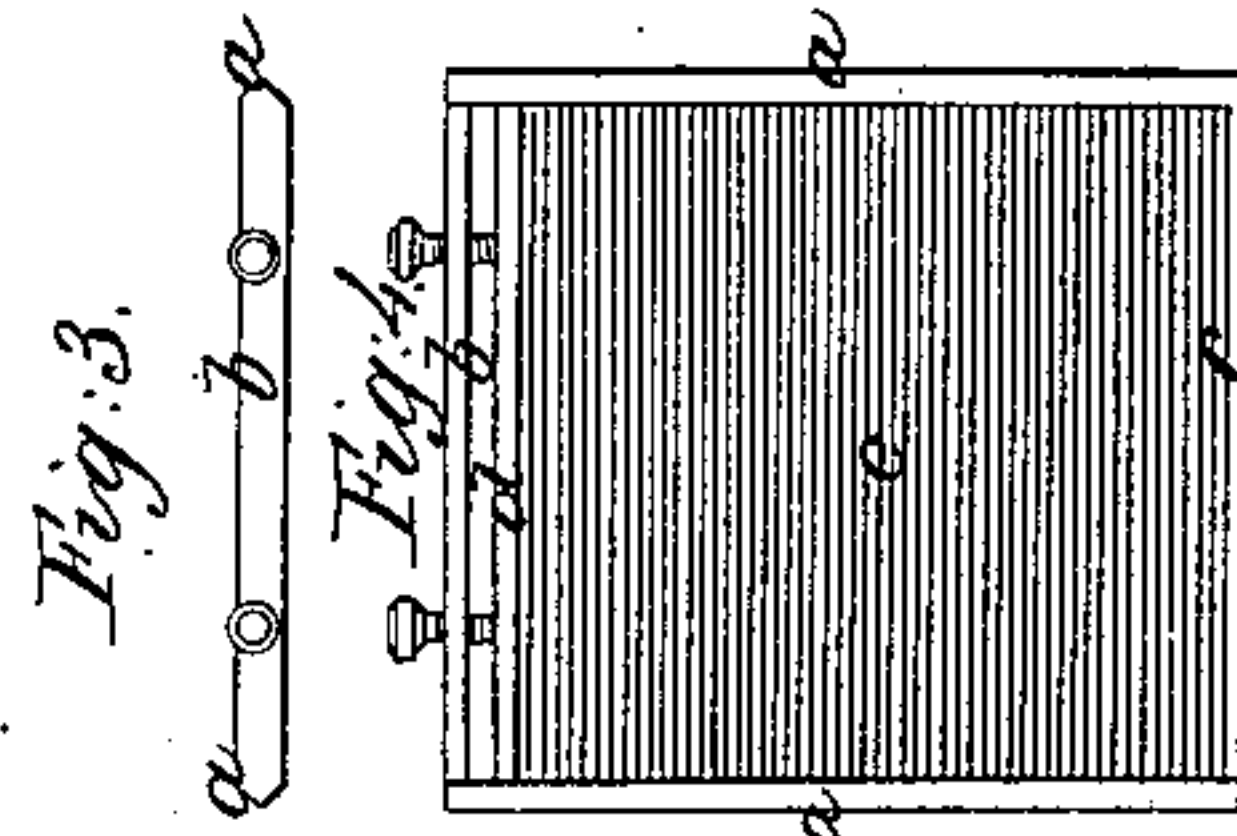
S. A. BELL & T. HIGGINS.  
 APPARATUS FOR DIPPING LUCIFER MATCHES.

No. 38,878.

Patented June 16, 1863.



Witnesses,  
 J. W. Cramb,  
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# UNITED STATES PATENT OFFICE.

SAMUEL A. BELL, OF EPPING VILLAS, STRATFORD, AND THOMAS HIGGINS,  
OF CARRIACO TERRACE, BOW, ENGLAND.

## IMPROVED APPARATUS FOR DIPPING LUCIFER-MATCHES.

Specification forming part of Letters Patent No. 38,878, dated June 16, 1863.

*To all whom it may concern:*

Be it known that we, SAMUEL ALEXANDER BELL, of Epping Villas, Stratford, lucifer-match manufacturer, and THOMAS HIGGINS, of Carriaco Terrace, Bow, in the county of Middlesex, Tornographer, have invented an Improved Apparatus for Dipping Lucifer-Matches; and we do hereby declare that the following is a full and exact description of the said invention.

This invention relates to improved means for effecting what is known as the "dipping" of lucifer-matches—that is, the coating the ends of splints or matches with the compound that ignites by applying friction thereto.

The chief object of the invention is to present the matches or splints (while contained in a traversing clamp or frame) endwise to a continuous supply of phosphorus or other like ignitable compound evenly laid upon or covering a containing surface, and thereby to enable the matches as they are passed through the machine to take up upon their ends a suitable supply of the compound. By this arrangement we not only facilitate the dipping operation, but also remove the liability which at present exists of the workman contracting the disease which is now common among lucifer-match makers in consequence of manipulating the phosphorus compounds.

In the accompanying drawings, Figure 1 represents in longitudinal sectional elevation our improved apparatus for coating the ends of matches with the igniting-compound, and Fig. 2 is a partial plan view of the same. Figs. 3 and 4 show in plan and edge view a novel construction of frame for holding the clamping-boards between which the splints or matches to be dipped are suitably arranged.

These frames we construct of metal and in the following manner: The sides *a a* are made of rolled iron of V-shaped section, and they are connected together at their opposite ends by cross-bars *b b*. The cross-bar *b* is tapped to receive clamping-screws, which are intended to act upon a follower, *d*, and hold the clamps firmly in position in the frame. The sides of the frame form guides for receiving and retaining the clamping-boards *c*, the ends of which are shaped to correspond with the V-shaped guides. When a suitable number of these boards, filled with the splints or

matches, are inserted in the frame, the follower or pressing-bar *d* is brought down upon them by means of the clamping-screws, and they are then firmly secured in the frame. An advantage consequent on this sectional form for the sides of the frame is that there will be little tendency for the phosphorus or other ignitable composition to accumulate in the clamp-frame.

We will now proceed to describe the construction of the apparatus, whereby the splints or matches, thus arranged and secured in clamping-frames, are coated at their ends with the ignitable composition.

A A, Fig. 1, is a table carried by suitable supports rising from the bed plate A'. At about the middle of this table is fixed a vessel, B, for containing the ignitable compound, and within it is mounted a roller, D, for presenting the compound to the matches in the form of an even layer or coating. A pulley, 1, on the spindle of this roller, receiving a belt, 2, from the main driving-shaft, serves to communicate rotary motion thereto.

For the purpose of guiding the clamping-frames E to and from the roller D, the machine is provided with a series of conical rollers, E', and where these are inapplicable by equivalent supports in the form of fixed guides E<sup>2</sup>, which latter overlie the ends of the roller. The clamping-frames being placed on this guideway, a progressive motion is given to them by means of a pair of endless bands or chains, F F, provided with fingers set equidistant from each other, as shown at Fig. 1, and bearing against the rear ends of the clamping-frames. These bands are passed over pairs of pulleys G G, mounted near the ends of the machine, and they are lapped around smaller pulleys, H H, keyed to the main driving-shaft I at the middle of the machine, or the driving-motion may be communicated directly to the shaft of one of the pairs of pulleys G G, which shafts are carried by suitable standards forming part of the main framing. The roller D is formed with annular grooves of a suitable width to receive the ends of the splints or matches to be dipped or coated at their ends with the ignitable composition. These grooves are set at such a distance apart as to suit the arrangement of the splints or matches in the clamps. The



vessel B is of a segmental form, and it is inserted in or forms part of a water-case, U. The lips of this segmental hollow are provided with ledges of porous material kept moist by water, which finds its way thereto through fine holes made in the water-case. The composition is placed in the segmental hollow, and fitted to the vessel B is a gage, N, with indents on its edge corresponding to the periphery of the grooved roller. As, therefore, the roller is rotated in the direction of the arrow, it will equalize the thickness of the layer or coating of the composition taken up by the roller and lying within its grooves. In this way a continuous supply of composition is presented to the matches, which, as they are passed through the machine upon the fixed guides adjusted to a suitable level, will enter the grooves at the most elevated portion of the rotating roller and take up the composition therefrom. It will now be understood that the dipping or coating of the ends of splints or matches will be a continuous and expeditious operation, one clamping-frame

succeeding the other as quickly as it is thought desirable to advance them to the ignitable-compound coating-surface.

Having now set forth the nature of our invention and explained the manner of carrying the same into effect, what we claim as our invention, and desire to secure by Letters Patent, is—

Submitting splints or matches to the dipping operation by presenting their ends to a continuous supply of the phosphorus or other like ignitable compound in the manner above described.

In witness whereof we, the said SAMUEL ALEXANDER BELL and THOMAS HIGGINS, have hereunto set our hands and seals this 4th day of April, 1863.

SAML. A. BELL.  
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