No. 607,644.

Patented July 19, 1898.

E. LAGNEAU.

MATCH MAKING.

(Application filed Feb. 28, 1893.)

(No Model.)

3 Sheets—Sheet 1.

Fig. 1.

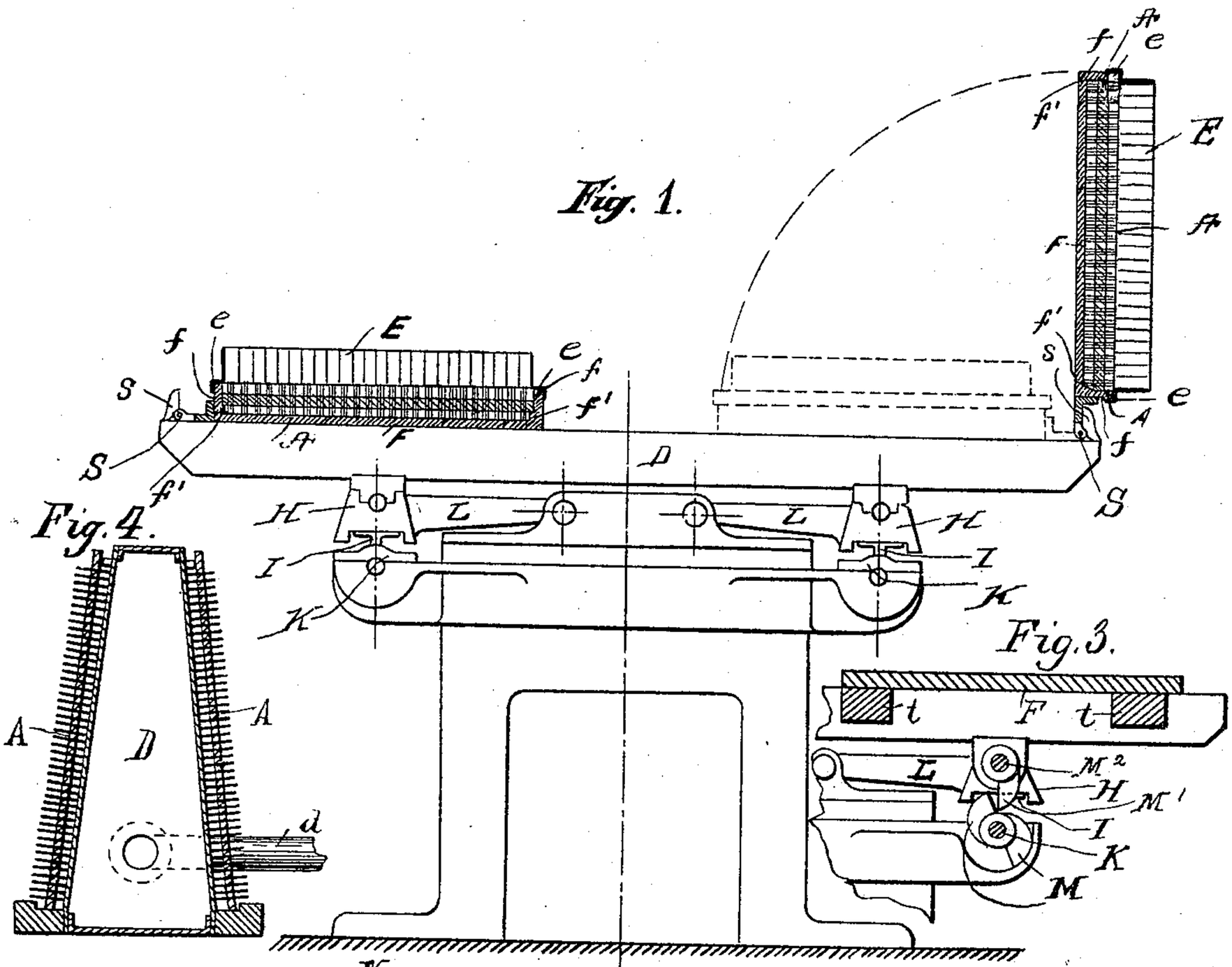
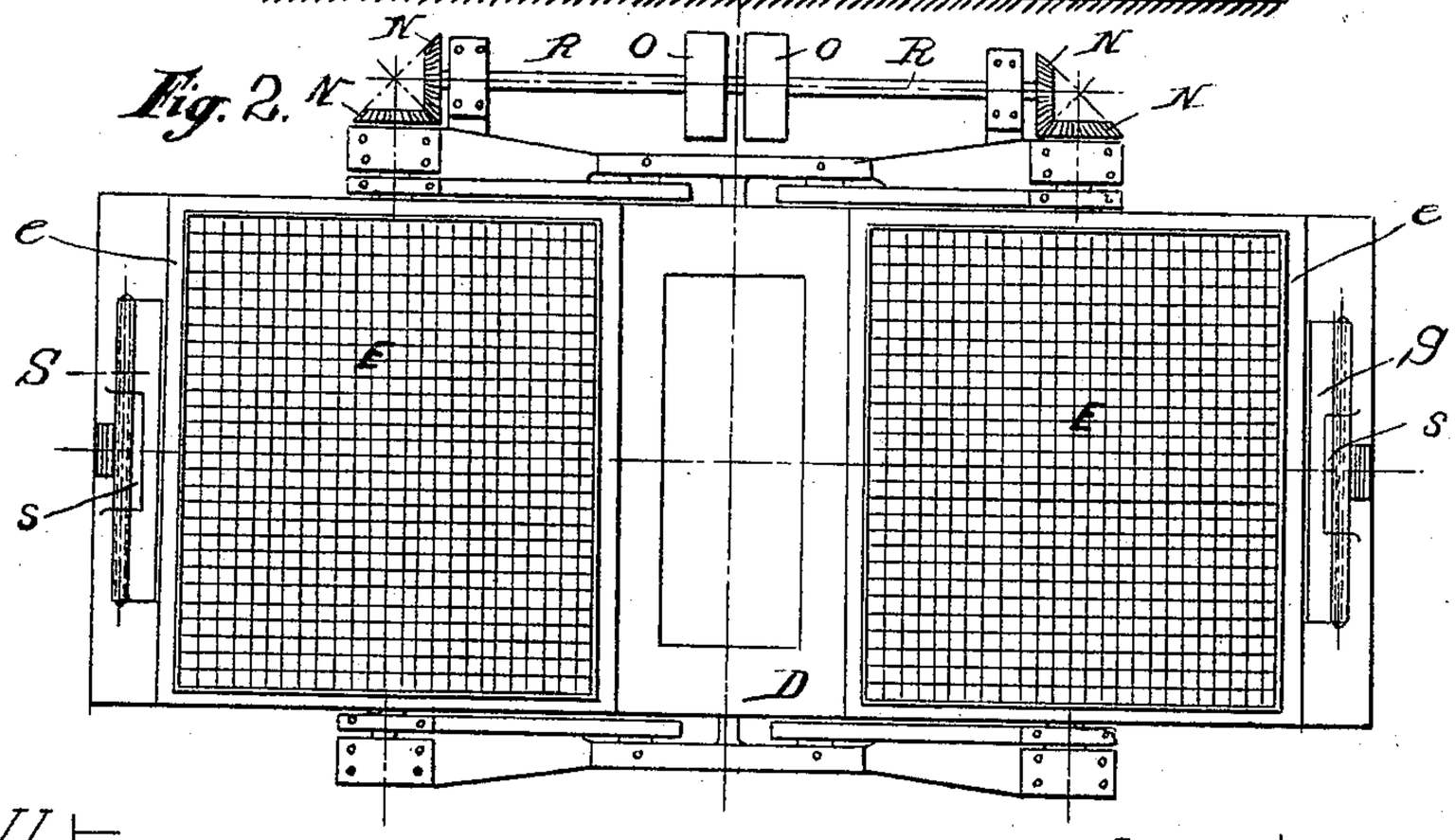


Fig. 4.

Fig. 3.

Fig. 2.



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(No Model.) 3 Sheets—Sheet 2.

Fig. 5.

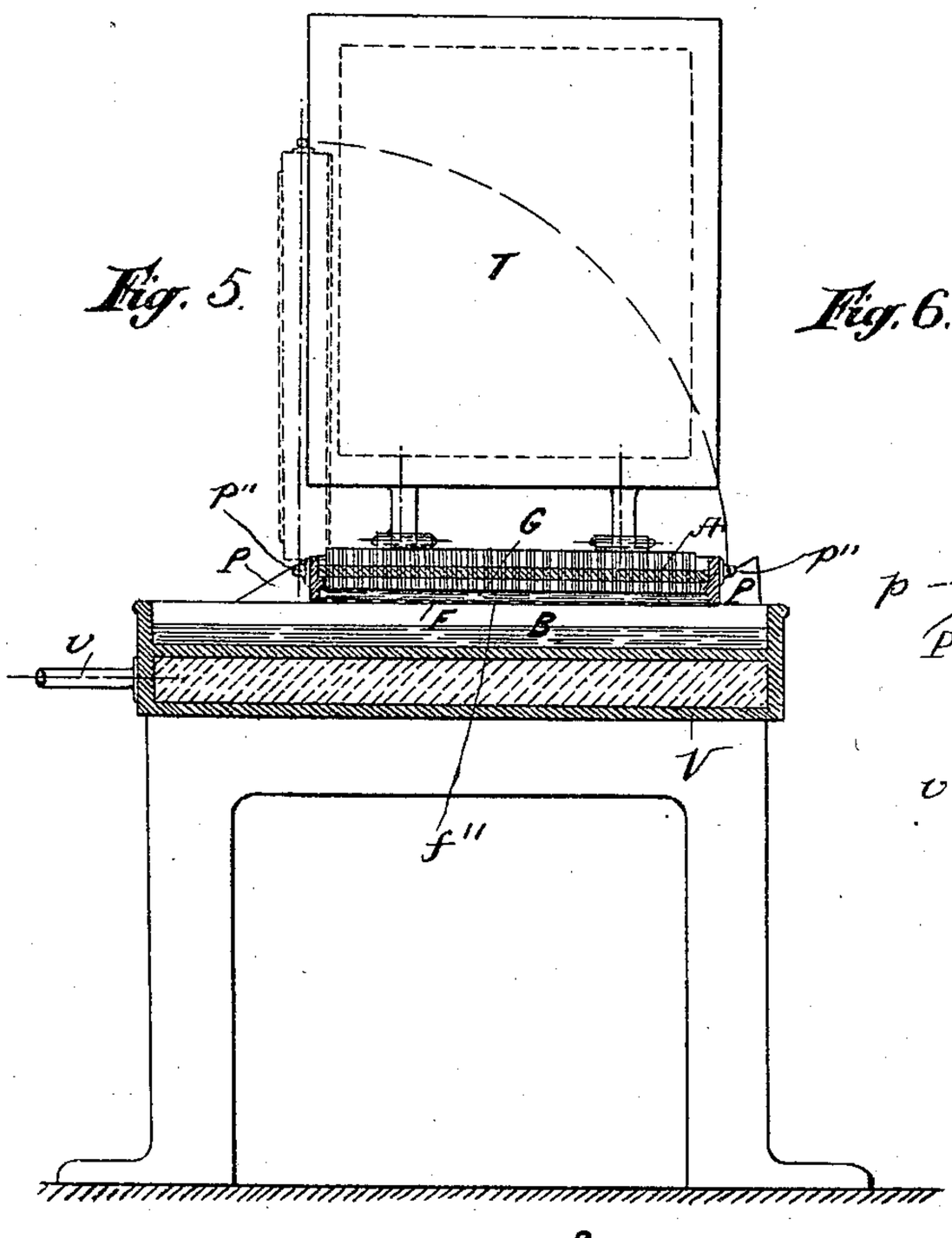


Fig. 6.

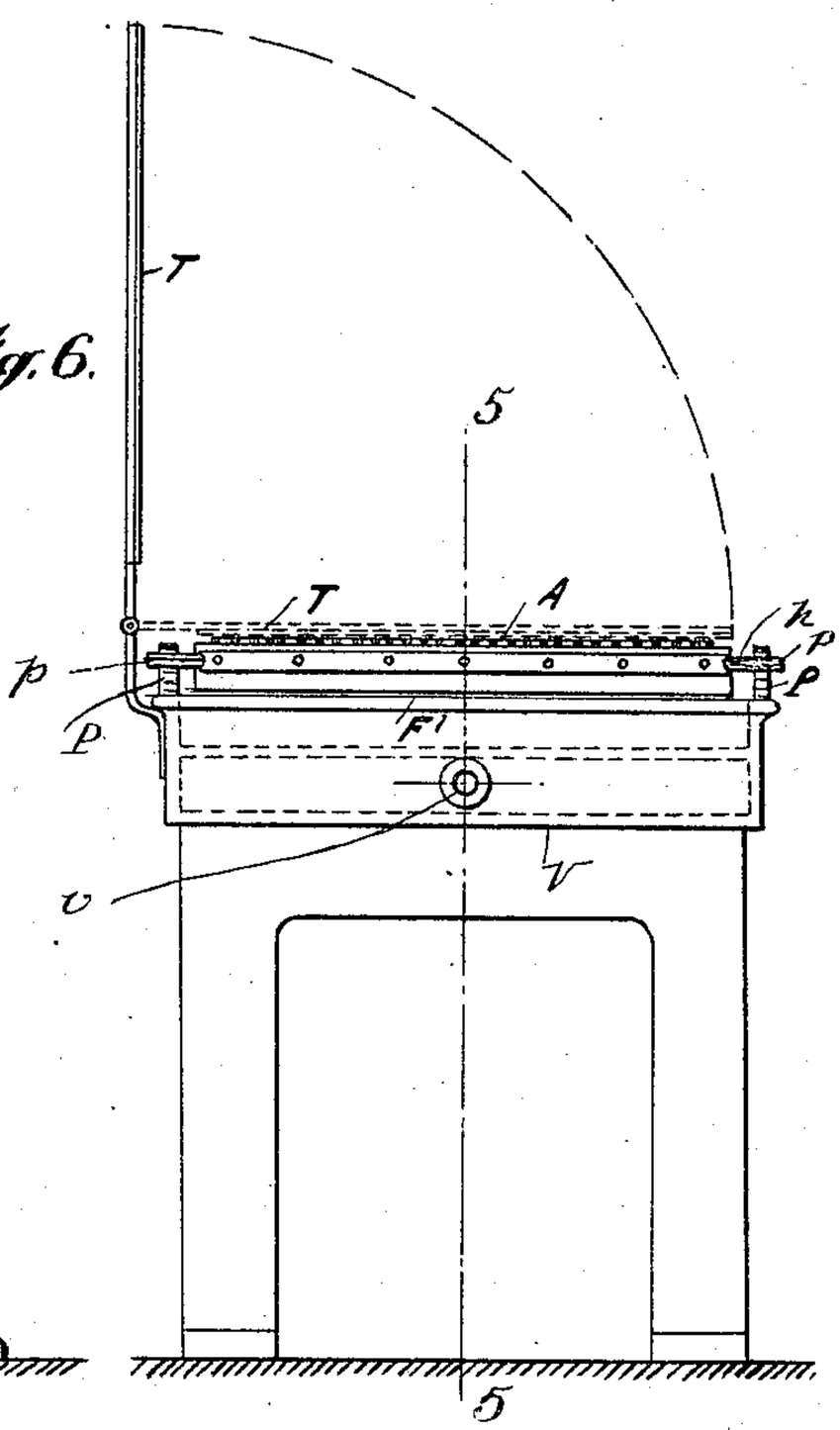


Fig. 9.

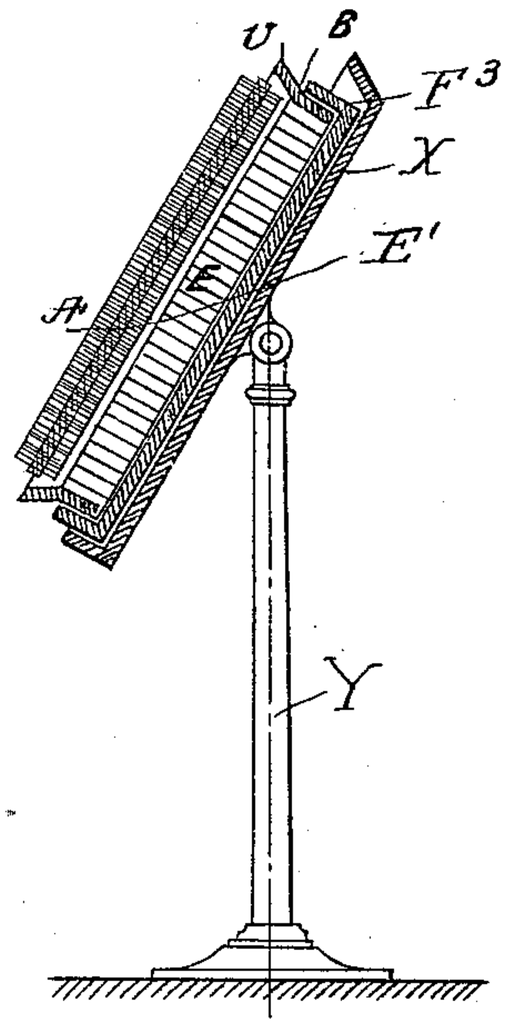
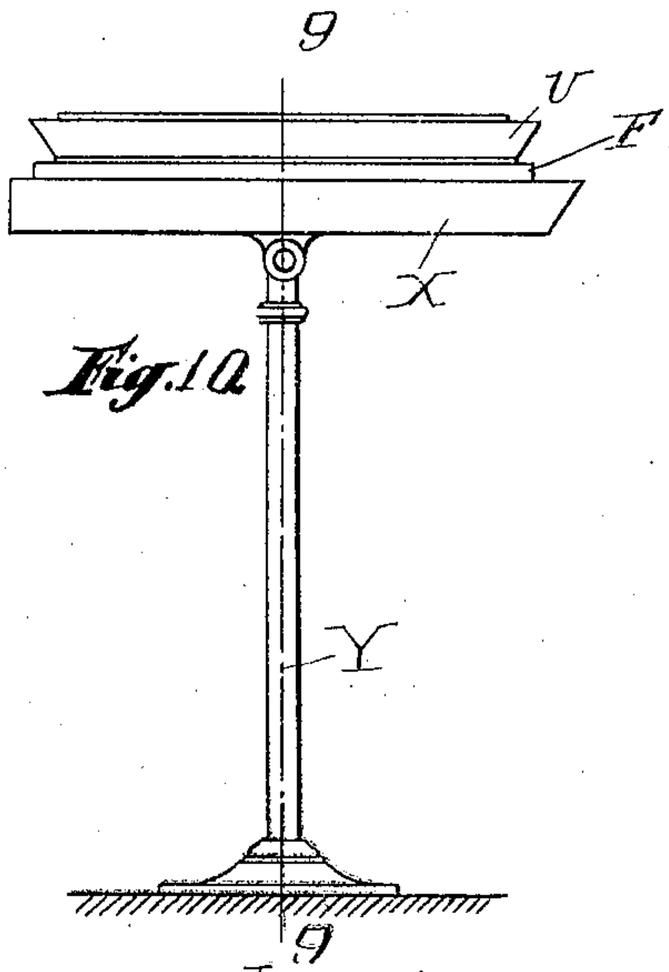


Fig. 10.



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MATCH MAKING.

(Application filed Feb. 28, 1893.)

(No Model.)

3 Sheets—Sheet 3.

FIG. 7.

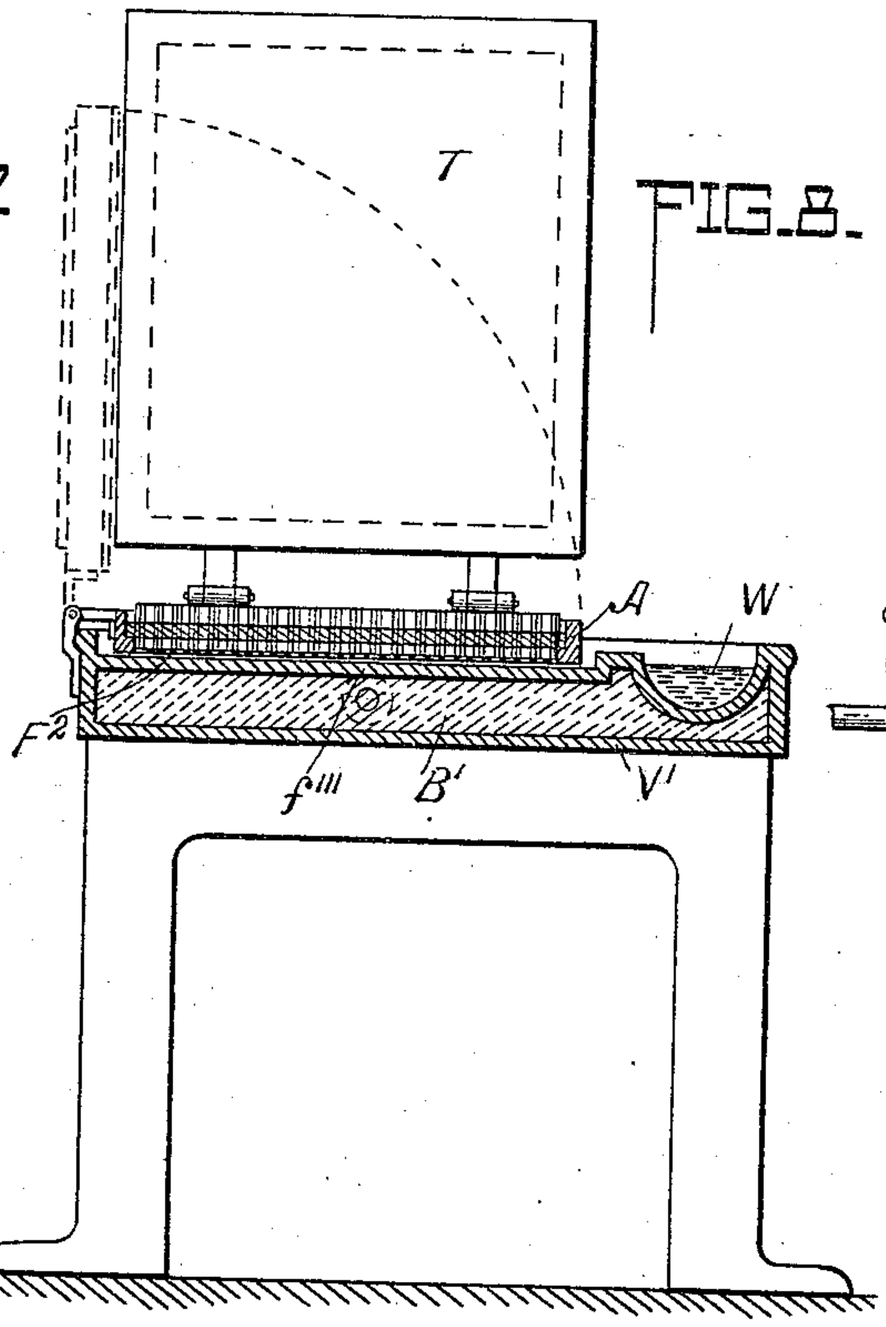


FIG. 8.

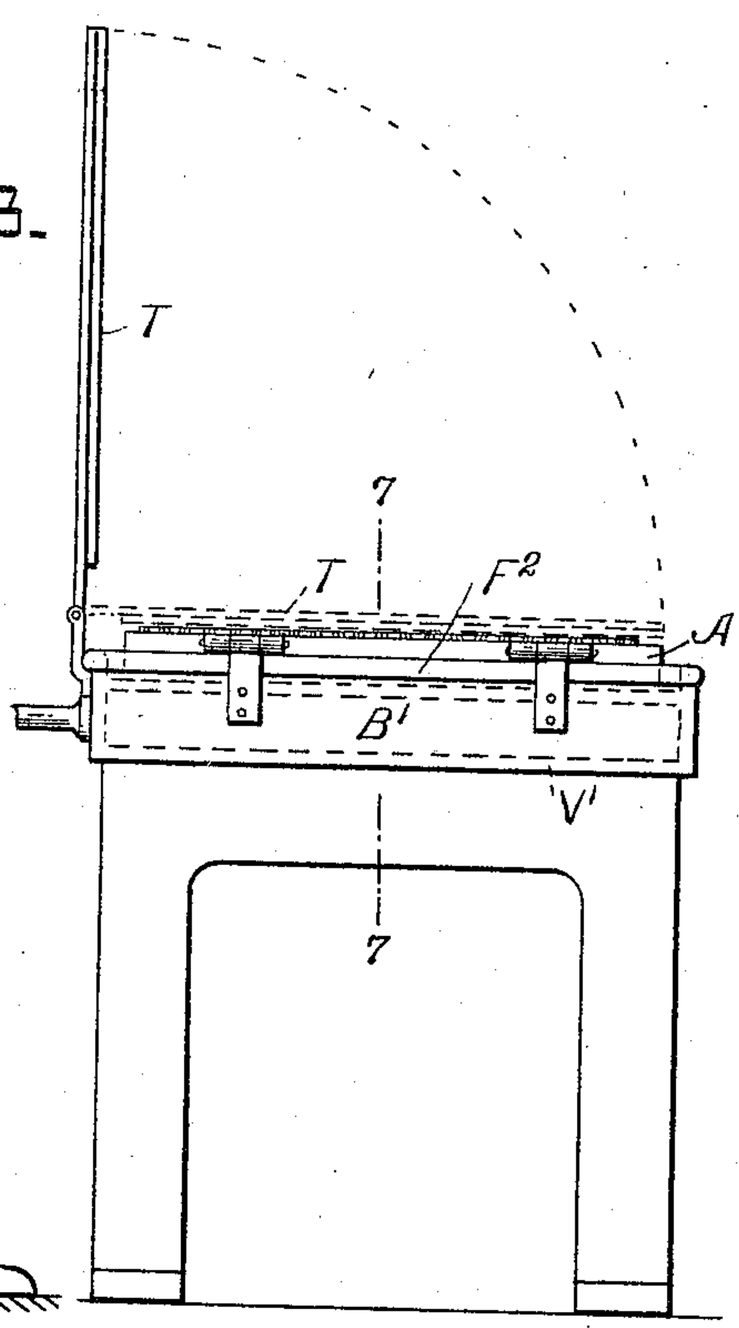


FIG. 11.

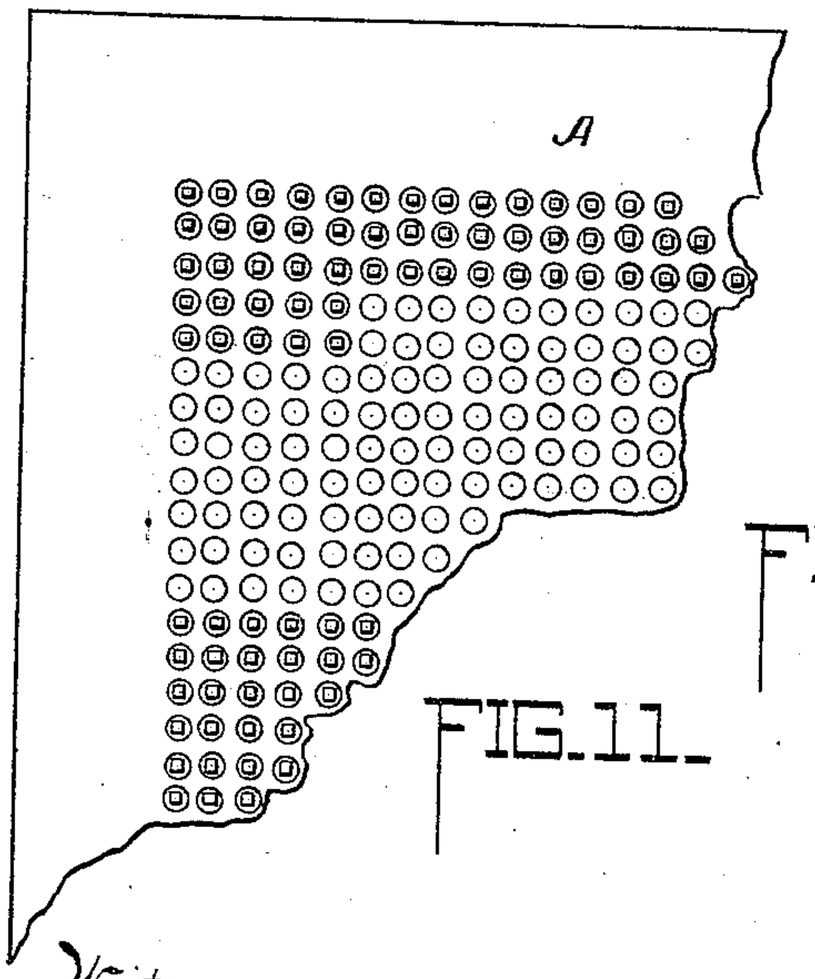
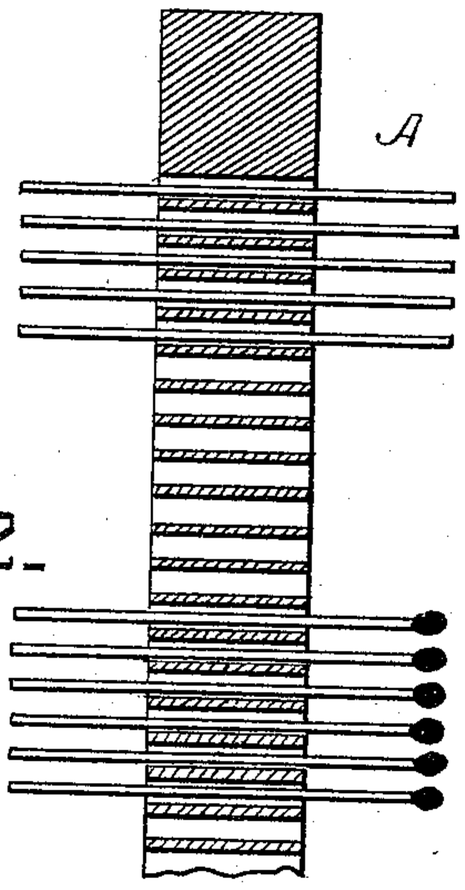


FIG. 12.



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UNITED STATES PATENT OFFICE.

EMILE LAGNEAU, OF LESSINES, BELGIUM.

MATCH-MAKING.

SPECIFICATION forming part of Letters Patent No. 607,644, dated July 19, 1898.

Application filed February 28, 1893. Serial No. 464,025. (No model.) Patented in Belgium December 6, 1892, No. 102,418; in Switzerland December 19, 1892, No. 6,456; in England February 14, 1893, No. 3,267; in France March 27, 1893, No. 228,938; in Germany November 8, 1893, No. 73,450; in Norway December 4, 1893, No. 3,540; in Sweden December 7, 1893, No. 5,562; in Italy December 7, 1894, No. 37,774/130, and in Denmark March 3, 1897, No. 1,594.

To all whom it may concern:

Be it known that I, EMILE LAGNEAU, match-manufacturer, a subject of the King of Belgium, and a resident of Lessines, in the Department of Hainant and Kingdom of Belgium, have invented certain new and useful Improvements in Match-Making Apparatus, (for which I have obtained patents in Belgium, No. 102,418, dated December 6, 1892; in Switzerland, No. 6,456, dated December 19, 1892; in Great Britain, No. 3,267, dated February 14, 1893; in France, No. 228,938, dated March 27, 1893; in Germany, No. 73,450, dated November 8, 1893; in Denmark, No. 1,594, dated March 3, 1897; in Norway, No. 3,540, dated December 4, 1893; in Sweden, No. 5,562, dated December 7, 1893, and in Italy, No. 37,774/130, dated December 7, 1894,) of which the following is a specification.

The apparatus for making matches hereinafter described allows of the green splints being inserted just as they come from the cutting apparatus, either directly or after the usual drying, into the frames, which are each formed of a plate perforated with holes, in which the splints are inserted and held loosely—that is to say, without any compression or gripping—in order when the splints are suspended under these conditions in the holes of the frames to undergo successively all the necessary operations for their manufacture, so that when the splints are once inserted in the frames they are not removed therefrom except for the purpose of being boxed.

By treating the splints while loosely suspended in the frames without the necessity of any fixing devices a great saving is effected in the manufacture, so that larger quantities of matches may be made in less time than by the processes of manufacture at present adopted, because the loose suspension of the splints allows of all the operations of dipping and withdrawing being effected more rapidly, while the said dipping is still effected in such a way that all the match-heads are uniform and shapely and each splint receives an equal quantity of paraffin and chemical paste.

My invention consists in the construction hereinafter described and claimed.

In order that my invention may be fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 represents a front elevation of the apparatus employed for filling the frames with splints, the frames and trays being shown in vertical section and one of the trays being turned up into vertical position in order to permit of the frame being removed with the splints, which are loosely held therein. Fig. 2 is a plan of the apparatus shown in Fig. 1. Fig. 3 is a detail vertical section of one end of the table, showing a suitable shaking device. Fig. 4 is a vertical transverse section of a suitable drying apparatus. Figs. 5 and 6 are respectively a vertical section and an end elevation of the apparatus employed for dipping the splints in paraffin, the plane of section in Fig. 5 being taken on the line of 5 5 of Fig. 6. Figs. 7 and 8 are respectively a vertical section and an end elevation of the apparatus for dipping the ends of the splints into the match composition, the plane of section of Fig. 7 being taken on the line 7 7 of Fig. 8. Figs. 9 and 10 are respectively a vertical section and an elevation of the apparatus employed for transferring the matches from the frame in which they are contained during the entire process of manufacture into the distributing-frame, whence they are delivered to the boxing apparatus, the plane of section of Fig. 9 being taken on the line 9 9, Fig. 10. Fig. 11 is a detail view, on a large scale, of a portion of a perforated frame or plate for supporting the splints loosely. Fig. 12 is a vertical section thereof.

The match-splints are taken directly from the cutter while in a green state and introduced into a charging-frame E, Figs. 1 and 2, which preferably consists of a group of square pockets formed of sheet metal and of sufficient size to admit the splints with ease.

They may be introduced into this frame E in any suitable way. From the frame E the splints pass into the manipulating-frame A, in which they remain and by which they are manipulated until the process of manufacture is complete. To facilitate the charging of the frame A from the frame E, frame A is contained within a tray F, having flanges *f*, shouldered at *f'*, to permit the frame A to rest therein at a suitable height from the bottom, while the frame E has a flange *e*, which engages the flange *f* of the tray F, and thus holds the frame E in proper relation over the frame A. In order to cause the splints to enter perforations formed in the frame A to receive them, the table D, upon which the trays F are mounted, is supported in seats H, carried by rocking standards I, mounted on horizontal axes K, while pitmen L are connected with the seats H. The horizontal axes K carry cams M, which raise and drop corresponding lugs M', mounted on the rods M^2. The axes K receive rotation from the gearing N, driven by pulleys O upon the shaft R. By this means a rapid shaking movement can be imparted to the filling apparatus to greatly facilitate the dropping of the splints into the manipulating-frame A.

The openings in the frame A are of such size that the splints are supported loosely therein, though each splint is completely isolated from the others, and the position of the frame A in the tray F is such that the splints will enter the frame far enough to be balanced therein when the frame assumes a vertical position and the splints rest horizontally. Each time that the splints are to be moved from one apparatus to another the frames are simply brought to a vertical position, when they may be moved at will without danger of displacing the splints. To bring the frames A to vertical position, the trays F are mounted upon hinges S, so that they may be swung up into vertical position against stops *s*, after which the charging-frame E is removed and the frames A removed for the next step in the process. The frames A are next passed to a suitable drying apparatus, which preferably employs hot air, and after being dried they are removed while hot to the paraffining apparatus shown in Figs. 5 and 6. The drying apparatus may consist of a trough or tank heated by steam, (see Fig. 4,) forming a closed trapezium, of sheet metal, in which steam is admitted to the interior by means of a steam-pipe *d* of suitable length. The frames A rest against the sheet-metal walls by reason of the inclined shape of the latter, and the ends of the splints in contact with the said walls are rapidly heated.

The paraffining apparatus consists of a tray F', having a perforated bottom *f''*, and with a sheet of felt G. The tray is provided with trunnions *p*, which rest upon inclined blocks P, the trunnions being adapted to swing upon said blocks by resting in notches *p''*, formed therein. To introduce the frames A into the trays F', said trays are swung into vertical position upon their trunnions, as shown by dotted lines in Fig. 5, and the frames A inserted, after which the trays are laid down in horizontal position.

The paraffin-vat B has a double bottom V, into which steam is introduced through a pipe *v* for the purpose of keeping the paraffin hot. The tray F' is slid by its trunnions down the inclined blocks P until it enters a sufficient depth into the melted paraffin and there remains until the paraffin passes evenly up through the perforated bottom and soaks through the sheet of felt, upon which the ends of the splints rest. A swinging cover T is then forced down upon the upper ends of the splints, and, by applying pressure thereto, embeds the lower ends of the splints into the felt until the proper amount of the paraffin is absorbed, which takes place in a short time, owing to the fact that the splints have been introduced directly from their drying operation while in a hot condition. The tray is then drawn up and again rests, with its trunnions, in the notches and the tray allowed to drip, if desired, the cover T being turned up to remove the pressure from the splints, after which the tray is again brought to vertical position shown, (in dotted lines in Fig. 5,) when the manipulating-frame A is removed and passed on to the apparatus for applying the match composition, which is shown in Figs. 7 and 8. This apparatus consists of a tray F^2, having a perforated bottom *f'''*, but employing no sheet of felt. The manipulating-frames are introduced into the tray in the same manner as before, and the tray is then swung down into the composition-vat. This consists of a floor B', in which the match composition is always kept at the same level by means of a surrounding reservoir W, in which the material is also kept at a certain level. This apparatus has a similar steam-heating bottom V' to that heretofore referred to and a depressing top T. The match composition rises uniformly through the perforated or wire-gauze bottom and supplies the same amount of composition to all the splints, so that an extremely uniform effect is produced.

The manipulating-frame, with its contained splints, is removed from the apparatus for applying match composition in the same manner as from the other apparatus and is then passed to the discharging apparatus shown in Figs. 9 and 10. This consists of a discharging-frame E', into which the manipulating-frame A may be introduced, and a tray F^3 for holding the frame E', which is in turn supported by a tilting table X, mounted on a standard Y. The table, with its tray and frame, is brought to the position shown in Fig. 9 for receiving the manipulating-frame A, after which it is moved to the position shown in Fig. 10, when the matches all drop from the manipulating-frame into the discharging-frame E'. The frame A and the frame E are

then removed, and the matches remain in the tray F^3, in which they may be conveyed to any suitable charging apparatus.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a machine for making matches, the combination of a vat to contain the material to be applied to the splints, a perforated tray hinged to swing from vertical position down into said vat, a frame in which the splints are loosely supported, when said frame is in vertical position and which enters the tray when the latter is in vertical position, and a hinged cover adapted to hold the splints down into the composition which enters through the perforated bottom, substantially as set forth.

2. In a machine for making matches, the combination of a vat for holding the material to be applied to the splints, a tray formed with a perforated bottom and a sheet of felt, a frame for carrying the match-splints, having openings in which the splints are loosely supported, and means for forcing the splints down till their ends are embedded into the felt, substantially as set forth.

3. In a machine for making matches, the combination of a suitable frame carrying the match-splints, a vat B having a double-bottom trough V, a hinged flap T, the inclined supports P, and trunnions on the frame adapted to rest on the inclined supports, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

EMILE LAGNEAU.

Witnesses:

GREGORY PHELAN,

AUG. JOERISSEN.