Sept. 13, 1932. L. HENNINGER 1,877,239

MACHINE FOR THE MANUFACTURE OF MATCH BOXES

Filed June 24, 1930

FIG. 1

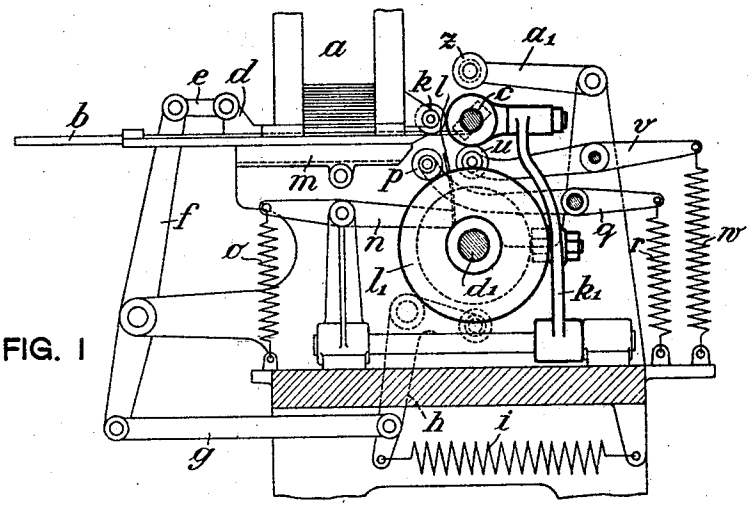


FIG. 2

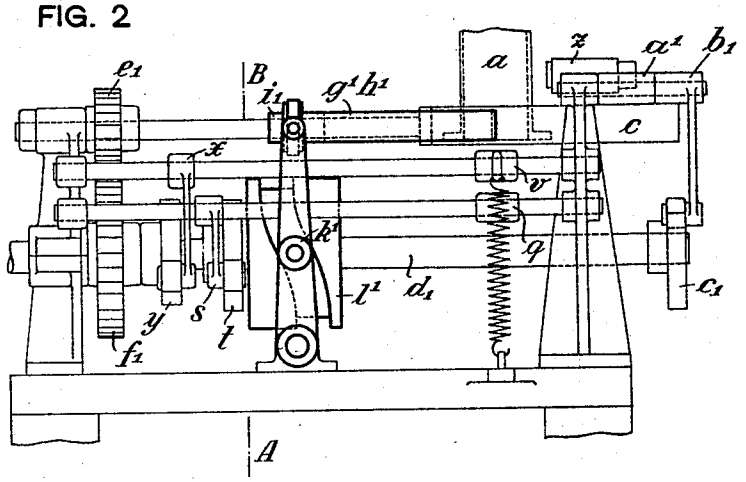


FIG. 3

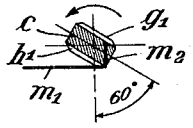
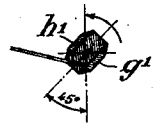


FIG. 4



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UNITED STATES PATENT OFFICE

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MACHINE FOR THE MANUFACTURE OF MATCH BOXES

Application filed June 24, 1930, Serial No. 463,431, and in Germany October 12, 1929.

My invention relates to a machine for the manufacture of match-boxes, and more particularly the outer portion of wooden boxes.

The object of my invention is to improve the output of such machines by increasing their speed.

The speed of such machines was hitherto limited by the fact that the holder for the strip of wood of which the outer box is constructed had to be taken into account. It is necessary to secure the beginning of the strip to the winding mandrel or winder. A pivotally mounted tongue, the strip holder, was used for this purpose controlled by a spring adapted to force the tongue against the winder, the strip holder spring. For ejecting the wound box from the mandrel two plates moved along are employed.

The return stroke of the ejector plates after the discharge of a finished outer box has hitherto been effected so quickly that the plates instantly cleared the path for the introduction of the fresh strip so that the strip holder could get hold of the fresh strip and the strip holding spring could become operative in good time for this purpose. This method has also been retained for winding mandrels with a simple slot for introducing the beginning of the strip, i. e. without strip holder.

The quick withdrawal of the ejector plates calls for a correspondingly concentrated or steep curve on the circumference of the drum cam and it confined the speed range of the machine to such narrow limits as they were observed hitherto.

According to my invention the ejector plates are after the ejection of a finished box withdrawn at a noticeably slower speed, in fact so slowly that they leave the path of the new strip then only, when the second side of the box must be pressed against the mandrel. In this way the decisive curve of the cam becomes flattened out to such an extent that the speed of the machine may be increased by about one third and thus also the capacity of the machine by the same amount. This possibility is still further ensured in the new method of operation that in the moment of introducing the fresh strip into the winder one of the two ejector plates closes the slot in the mandrel at the rear and is thus able to act as abutment.

An embodiment of my invention is illustrated in the drawing affixed to my specification and forming part thereof. In the drawing

Fig. 1 is a cross-section through my improved machine,

Fig. 2 a side-elevation of it, and

Figs. 3 and 4 representations of the two characteristic positions of the mandrel.

Like parts are indicated by like letters of reference in all of the figures of the drawing.

The magazine a contains the pile of strips of wood. A slide b operated by the parts d, e, f, g, h, i pushes during each forward stroke a strip out of the magazine a into the winding or folding mandrel c. A roller k provided with grooves is engaged by a severing knife l in order to cut off the paper introduced by the slide m. The knife l is by the lever n brought under the control of the spring o and against the resistance of the latter moved back from the operative position. A roller p operated by the parts q, r, s, t pastes the beginning of the paper to the underface of the strip, when the latter is fed forward to the mandrel c. The roller u places under the control of the operating parts v, w, y the strip together with the paper against the revolving mandrel c while the roller z driven by the control parts a_1, b_1, c_1 sticks the end of the piece of paper to the box.

The mandrel c is rotated from the main shaft d_1 by means of the gear wheels e_1, f_1. For ejecting the finished box from the mandrel c two plates g_1 and h_1 are employed which are adapted to be reciprocated along the mandrel c and which are mounted on the bushing or sleeve i driven from the cam l_1 by means of the lever k_1. In the method of operation used heretofore the plates g_1 and h_1 are so quickly withdrawn that at the moment of insertion they give the path again free for the new strip. The ejector plates had thus on their return stroke already left the range of the magazine.

According to my invention the plates g_1 and h_1 are to be withdrawn so slowly that

in the moment of the insertion of the new strip into the winding mandrel c they are still within the range of the magazine. They should give the magazine or the path of the strip free then only when the mandrel c has already been turned into the position shown in Fig. 3 of the drawing. In this position the ejector plates should according to my invention just have left the path of the strip m_1, so that during the further rotation of the mandrel c the strip m_1 can be forced against the broad side of the mandrel.

During the introduction of the strip m_1 into the slot m_2 of the mandrel the slot is still closed at the back, as clearly visible in Fig. 4 of the drawing. It is thus impossible that a strip should penetrate too far by reason of excessive acceleration even at the increased speed of the machine.

Figs. 3 and 4 show that the winder c of the new machine can perform a rotation of about $45° + 60° = 105°$ before the ejector plates g_1, h_1 give the path of the strip m_1 free. This means that with the usual dimensions of the parts of the machine the stroke curve of the cam can occupy a portion of the circumference which is about $52\frac{1}{2}°$ longer than in machines used up to now. This means a stretching or reduction of the gradient of the cam which permits of an increase of the speed of the machine and thus its output by approximately one third.

I claim as my invention:—

In a match box machine for forming the outer casings of the boxes from wood strips, the combination of a magazine for the strips and from which the same are ejected, a rotary mandrel to receive the ejected strips and form them into casings, reciprocating ejector plates embracing and stripping the casings from the mandrel, and a cam operating to reciprocate said plates timing their advance movement to first control the advancing strips from the front of the magazine and into the mandrel and causing the plate to clear the magazine on their return movement to strip the mandrel during a rotary movement thereof through an angle of 105° from the point where the succeeding strip is inserted.

In testimony whereof I affix my signature.

LUDWIG HENNINGER.