April 8, 1947. N. BERNARD 2,418,570

RAILROAD TIE FORMING MACHINE

Filed July 9, 1943

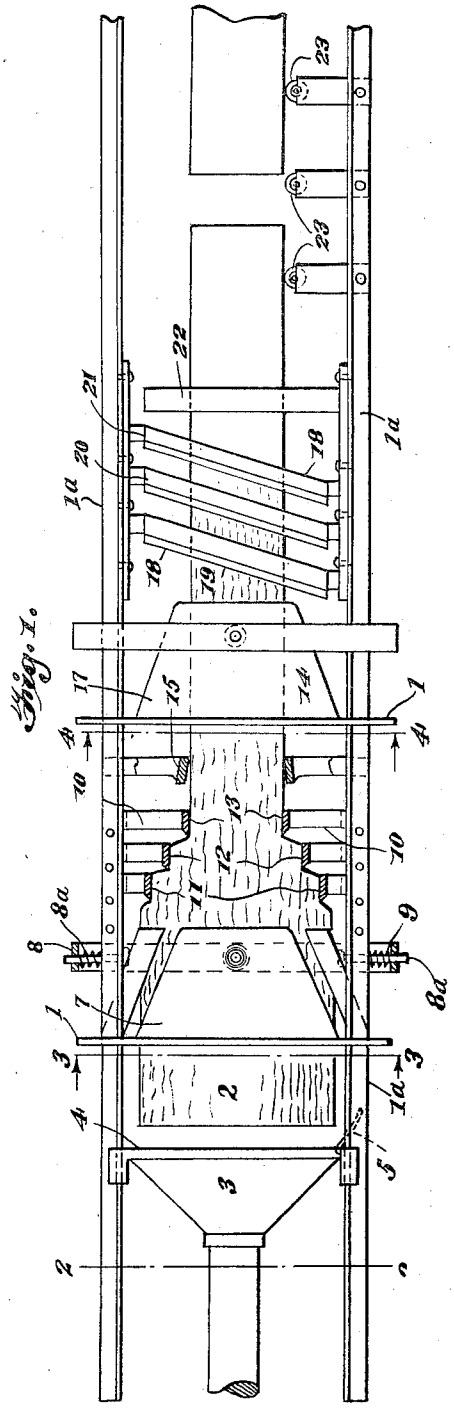


Fig. 1.

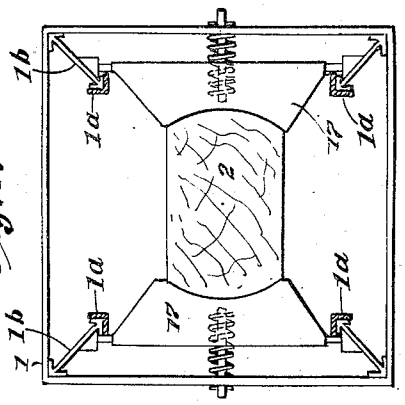


Fig. 4.

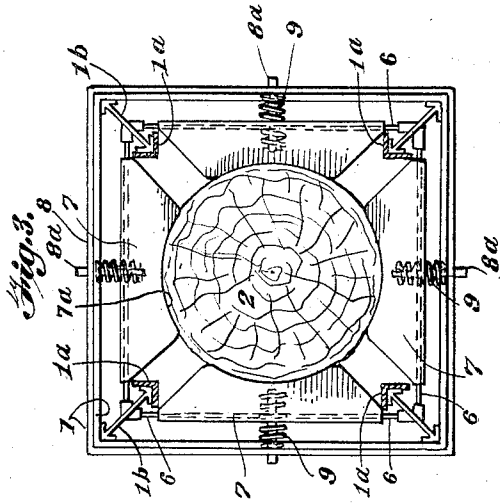


Fig. 3.

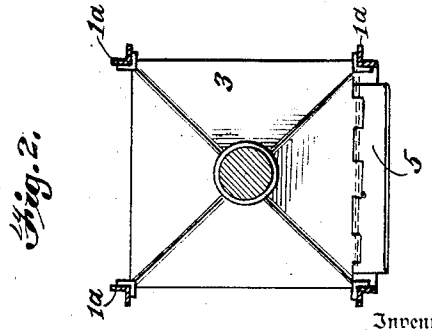


Fig. 2.

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Patented Apr. 8, 1947 2,418,570

# UNITED STATES PATENT OFFICE

2,418,570

## RAILROAD TIE FORMING MACHINE

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Application July 9, 1943, Serial No. 494,061

5 Claims. (Cl. 144—159)

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This invention is directed to a railroad tie forming machine, wherein a rough length of timber is forced, under hydraulic pressure and while properly guided, into cooperation with a plurality of sets of knives for forming the tie as to one dimension, and then submitted to a second group of sets of knives for shaping the tie in the opposite dimension.

The primary object of the invention is the provision of a tie forming machine in which the tie is forced under hydraulic pressure and between adjustable and compensating guides into cooperation with the first set of knives, and then under the same hydraulic pressure forced through an additional set of guides into cooperation with a second set of knives for shaping the timber.

A further object of the invention is the provision of a tie forming machine in which the knives of each set are arranged in successive planes of different distances from the center line of the timber, to thereby cut relatively thin portions of the timber successively from the outer surface to the final plane of the finished tie surface, the successive sets of knives being offset vertically to reduce the cutting stress on each set of knives.

The invention is illustrated in the accompanying drawings, in which,

Fig. 1 is a view inside elevation of the improved tie-forming machine parts being in section.

Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

Fig. 3 is a transverse section on line 3—3 of Fig. 1.

Fig. 4 is a transverse section on line 4—4 of Fig. 1.

The machine of the present invention comprises a number of rectangular frames 1 through which are extended a number of spaced parallel angle beams or rails 1a, here shown as four in number and arranged to define a hollow square. These rails 1a are held in the proper position within the frames 1 by the inwardly directed arms 1b secured in the corners of the frames 1, as shown in Figures 3 and 4, and directed toward the center of the hollow square area, having the rails 1a secured to their other ends as illustrated.

The rough log, designated 2, from which the tie is to be formed, is moved longitudinally through the structure in the center of the area defined or outlined by the rails 1a.

A ram 3 operates in one end of such area and serves to force the log longitudinally of the area during the tie forming operation. The ram, preferably of a hydraulic type, has a square operating face 4, and at the lower edge of the face is provided with an inclined guide plate or apron 5, by which the ends of the rough log are lifted,

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if necessary, and maintained in centered position in the area.

At the end of the machine where the ram 3 is located, the log 2 from which the tie is to be formed, is introduced and it passes initially through the frame 1 which is nearest to the ram, and on the longitudinal center of the machine area as defined by the four guide rails 1a.

Within the frame 1 through which the log first passes, there are pivotally mounted by suitable trunnions 6, here shown as being pivotally coupled with the adjacent brace members 1b, the four spring pressed guide plates 7. These guide plates are arranged, as shown in Figure 3, to define a generally square outline and each has its inner edge of concave form as indicated at 7a to more or less conform to the curvature of the log with which it engages. The plates 7 extend forwardly or in the direction of movement of the log and, as shown in Figure 1, they co-act, because of this forward extension and because of their more or less triangular outline, to form a funnel-like guiding unit.

Upon the side of the frame 1 within which the plates 7 are pivoted, remote from the ram 3, is an auxiliary frame designated 8, within which the forward portions of the plates 7 lie.

Each of the sides of the rectangular auxiliary frame 8 supports for reciprocal movement a press pin 8a which passes through a spring 9, one end of which spring bears against the adjacent side of the frame 8 while the other end of the spring bears against the adjacent plate 7. These springs co-act to force the plates inwardly and the inner curved edges of the plates co-act to maintain the log centered in the machine.

Beyond the guide plates 7, in the direction of timber movement is arranged two sets of knives or other appropriate cutting elements 10. These sets of knives are arranged obliquely of the path of travel of the log to cut away and shape the upper and lower surfaces of the log to tie form in one transverse dimension, and for this purpose each set of knives is disposed in relatively opposite similar action, that is an outer knife 11 of each set will first engage the log near the outer surface thereof and cut the log along this line. The next knives of the sets are offset in an inward plane from the first knives, such knives 12 cutting a predetermined depth from the line of the knives 11. A third knife of each set, as 13, operative successively to the adjacent knife 12, and on an inwardly offset plane. Thus the knives, of which there may be any desired number for the work in hand, successively cut a comparatively thin layer from the log in successive actions to finally bring the log, in one transverse dimension to that desired for the tie.

Immediately beyond the sets of knives de-

scribed, flat guide and supporting strips 14 and 15 are arranged in vertically spaced relation across the structure for co-action with the finished surfaces of the formed tie timber to support and guide the formed tie timber for further operation. As the timber has now been sized and shaped on the upper and lower surfaces in compliance with tie requirements, and is also guided on such surfaces, there is still a tendency for the unfinished side edges, owing to their irregularity, to displace the timber. To overcome this tendency, spring-pressed guide plates 16 are pivotally mounted in the second frame 1 beyond the guides 14 and 15 in the direction of timber travel as illustrated in Figure 4. The guide plates 16 are similar to the spring pressed plates 7, previously described, differing therefrom, however, in that the first set of plates cooperates with all sides of the timber while the plates 16 cooperate only with the unfinished sides as the top and bottom surfaces have been finished.

Beyond the guide plates 16, a second pair of sets of knives 18 is arranged obliquely of the path of travel of the timber to cooperate with and shape the sides of the timber, exactly as the top and bottom surfaces were shaped by the knives 10. The successive knives of each of the second sets, as 19, 20, and 21, are in offset planes successively closer to the center of the timber. These knives will serve to shape and size the sides of the timber, and thus complete the tie. Guides 22 and rolling supports 23 may be mounted in the structure beyond the knives 18 to provide for easy strain resisting movement of the finished tie.

The operation is of course a continuous one, the log being introduced into the frame, the ram caused to engage one end of the log, appropriate power is applied to the ram, and the log is forced through the structure and operated on by the means described to complete the tie.

Of course any desired number of knives may be employed, and the knives may be of any form and, if desired, mounted in any conventional way to be adjustable as to their cutting planes. The structure may be of skeleton or closed form, and the various spring-pressed guides may be adjustable as to initial position to accommodate logs of different diameters, or more particularly timbers of materially different shapes in the line of the cutting planes.

Having thus described the invention, what is claimed as new is:

1. A railroad tie forming machine, including a relatively long material receiving frame forming structure, means for moving the material through the structure, two sets of knives, each set cooperating with one of two opposite surfaces of the material, the knives of each set operating successively in inwardly offset planes, the innermost knife of each set finishing one surface of the tie, means for guiding the material during the knife operation, spring pressed guides cooperating with all sides of the material in advance of the knives, and additional spring guides cooperating with the material in the rear of said knives, the additional spring guides cooperating only with those surfaces of the material not acted on by the knives.

2. A railroad tie forming machine, comprising a horizontally disposed relatively long frame structure, means for moving an unformed log longitudinally through the frame structure, means carried by the frame and encircling the log for guiding the timber in its movement through the frame structure, means for simultaneously cutting opposite pairs of flat surfaces to tie size, the said means for moving the log comprising a member supported for longitudinal movement in the frame structure, and a vertically oscillatable apron carried by said member across the lower side thereof and having sliding contact with adjacent side portions of the frame structure and extending downwardly and forwardly from said member to engage beneath the rear end of a timber to center the timber in the frame structure under the pressure of the moving member.



3. A railroad tie forming machine comprising a horizontally disposed guide structure including longitudinally extending rails, a ram slidably mounted between said rails for forcing an unformed log longitudinally through the structure, a guiding means for the log comprising a plurality of members connected with the sides of the structure for swinging movement inwardly, means normally urging said members inwardly, the members being arranged to engage the log at the top, bottom and sides thereof, a pair of sets of cutting knives disposed at opposite sides of the longitudinal center of the structure and the knives of each set being in offset planes outwardly from the center of the structure and the path of travel of the log therethrough, the outermost knives of the sets being in advance of the other knives to be the first to engage the log, the two sets of knives functioning to reduce the log upon two opposite sides only, a second guide means comprising a pair of oppositely positioned members connected with the structure for relative inward movement, means normally urging the second guide members inwardly, the last mentioned guide members being arranged for engagement with the unreduced sides of the log, and two sets of knives supported by the structure upon opposite sides of the longitudinal center thereof for cutting down the said unreduced sides of the log, the knives of the last mentioned set being arranged in outwardly offset planes from the longitudinal center of the structure and in positions separated longitudinally of the structure whereby they will be successively engaged by the log from the outermost to the innermost knife.

4. A tie forming machine as set forth in claim 3, in which said ram comprises a flat head plate extending transversely of the frame, with an apron hingedly connected to the lower edge of the plate and extending across the lower side of the frame and slidably engaged at its ends upon adjacent rails to be forced by the ram under the lower edge of the back end of a timber to effect the centering of the timber in the frame.

5. A tie forming machine as set forth in claim 3, in which the knives of each of the sets are disposed obliquely to the length of the frame.

NICHOLAS BERNARD.


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