Nov. 25, 1952 M. J. DOYLE 2,619,030

ADJUSTABLE STAMPING MACHINE

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FIG. 1.

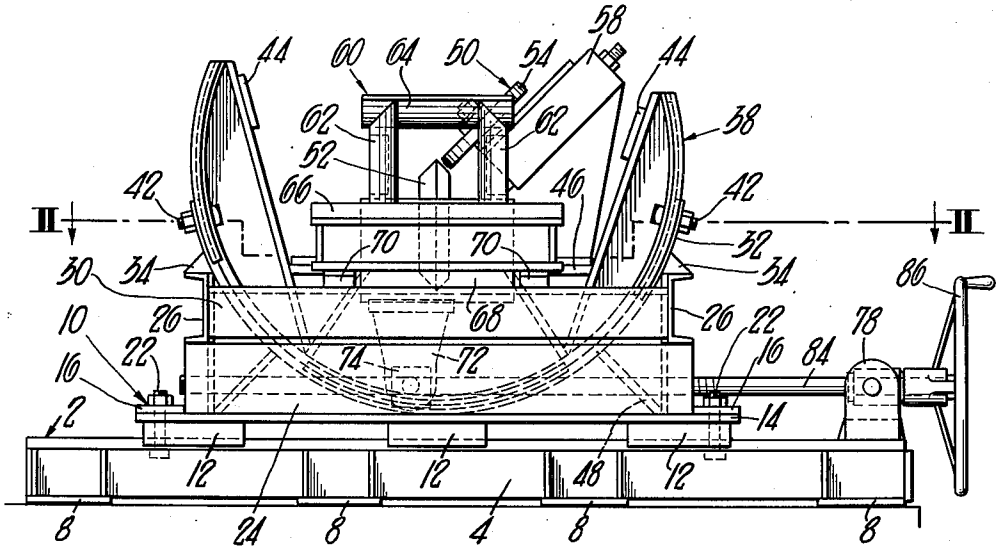
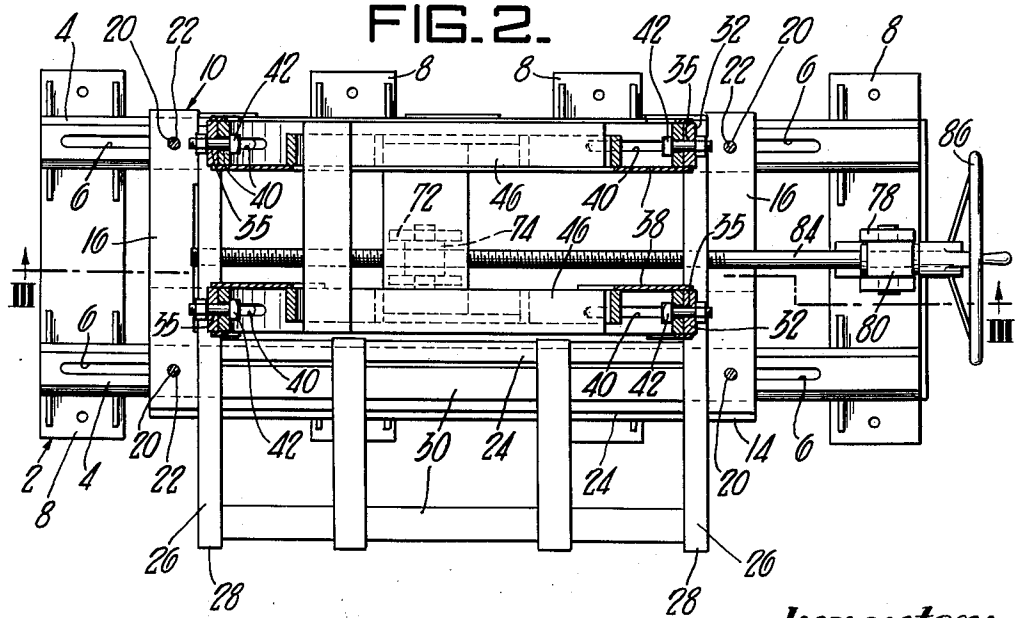


FIG. 2.



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FIG. 3.

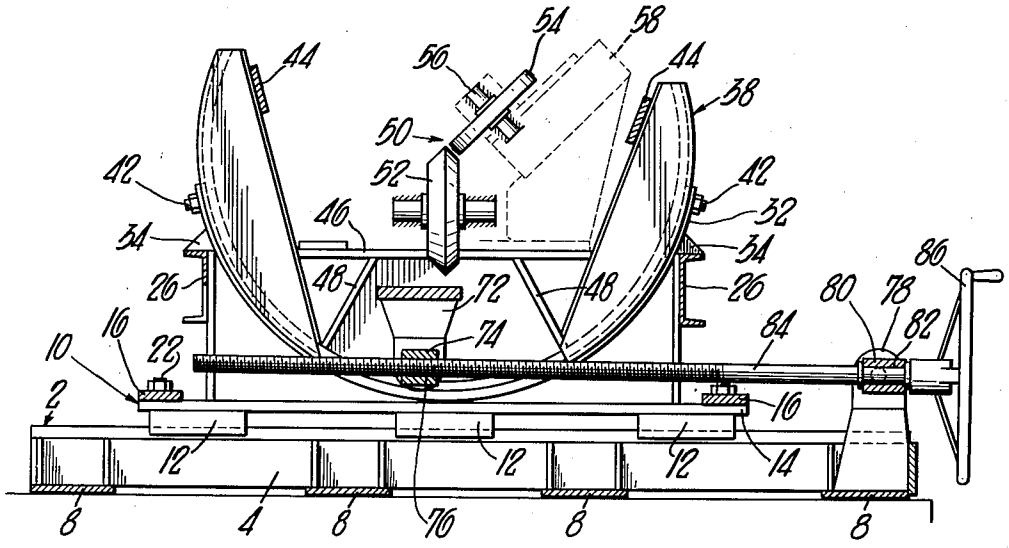
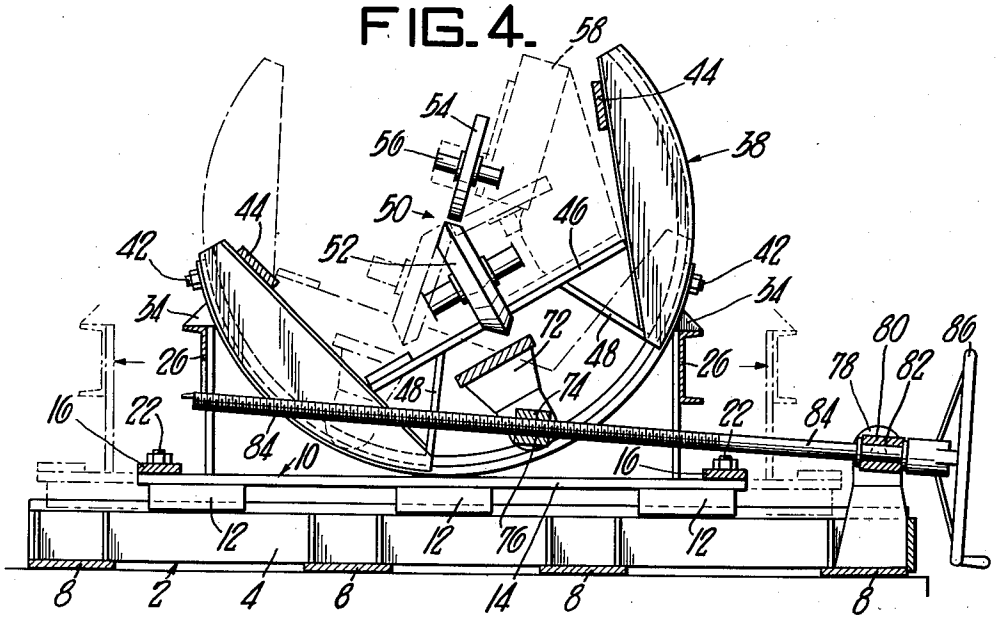


FIG. 4.



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FIG. 5.

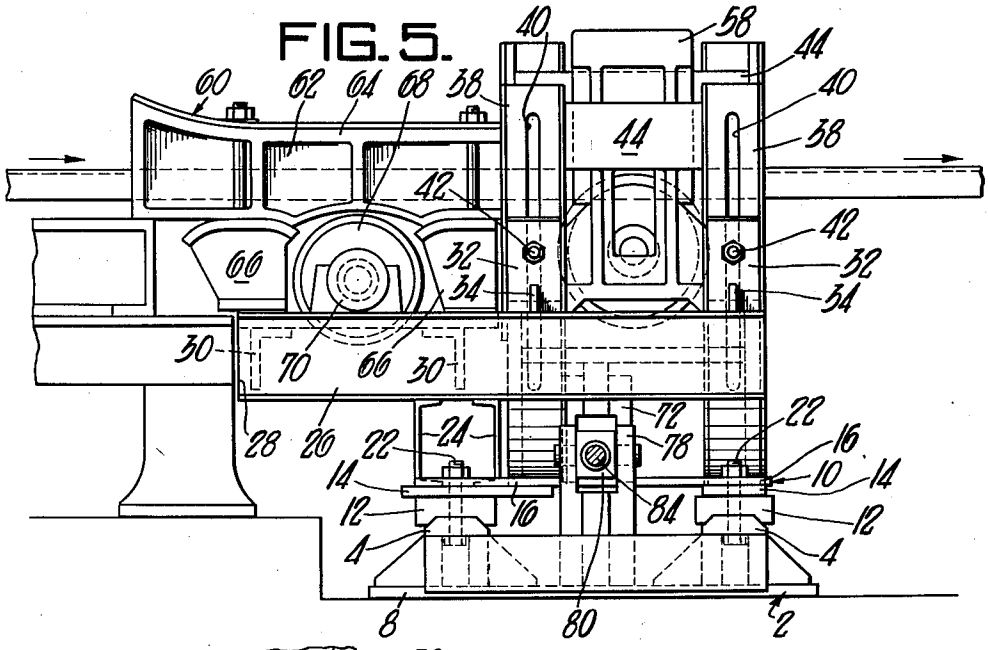


FIG. 6.

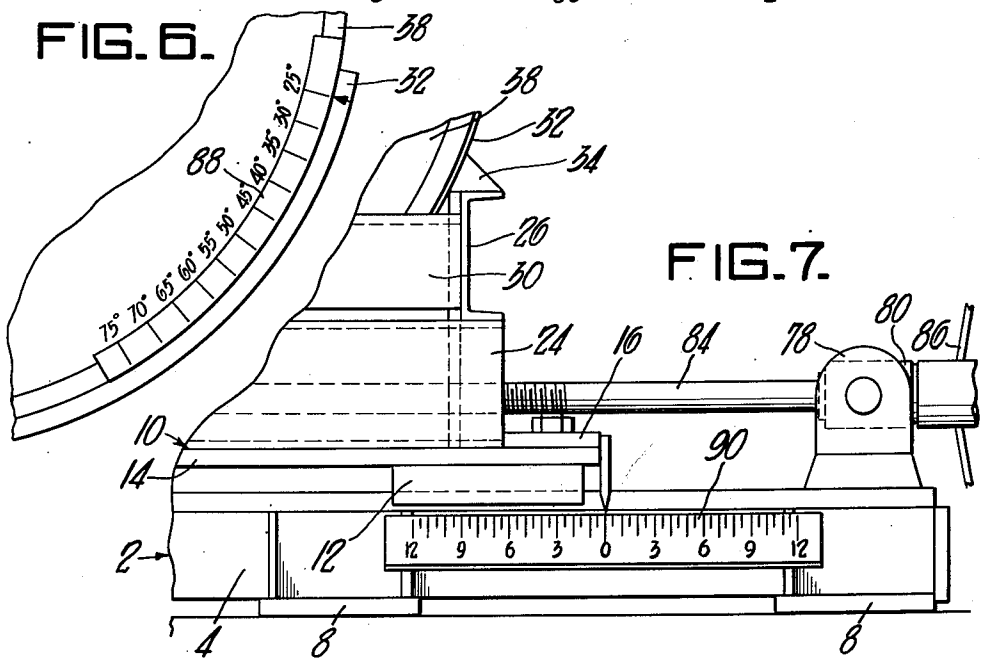


FIG. 7.

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ADJUSTABLE STAMPING MACHINE

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FIG. 8.

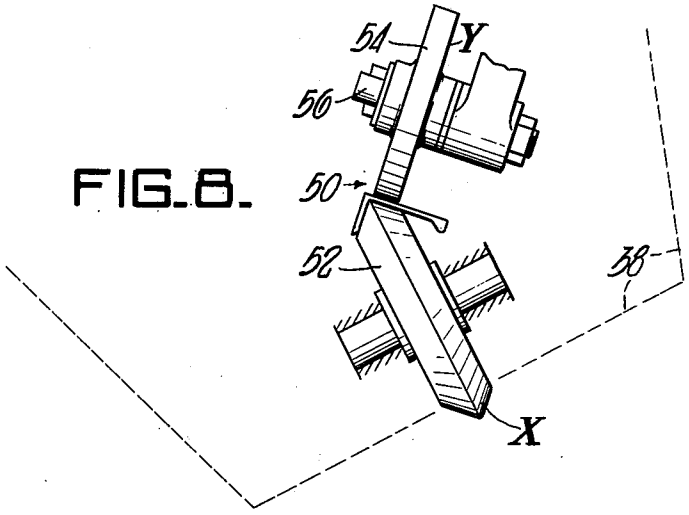


FIG. 9.

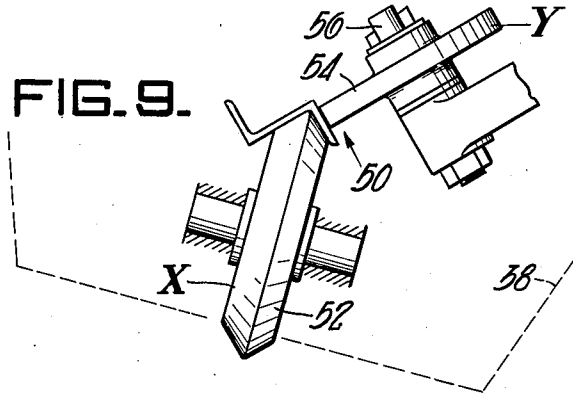
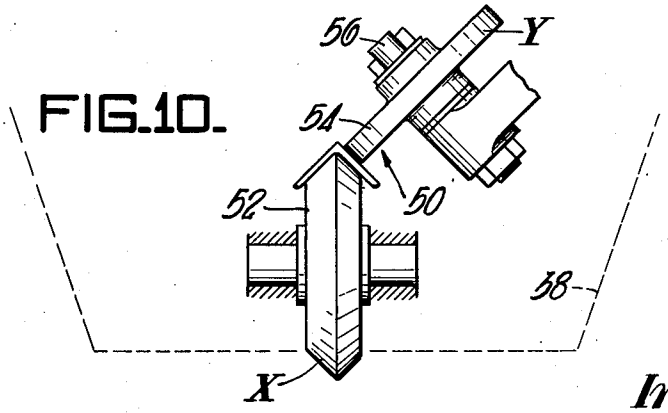


FIG. 10.



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UNITED STATES PATENT OFFICE

2,619,030

ADJUSTABLE STAMPING MACHINE

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Application May 4, 1950, Serial No. 160,020

9 Claims. (Cl. 101—6)

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The present invention relates to an adjustable stamping machine and more particularly to a stamping machine especially suitable for marking elongated hot-rolled products such as angular structural sections and the like.

Each section rolled on a structural shape-rolling mill is stamped with a series of numbers, letters or symbols to identify the product as to source, heat number, etc. This is ordinarily done by passing the rolled section through a continuous stamping couple as it leaves the finishing stand of the rolling mill. The conventional stamping couple used for this purpose consists generally of a back-up wheel which functions as an anvil and an adjustably mounted stamping wheel which is disposed at an angle to the vertical above the back-up wheel. The position of the stamping wheel in relation to the back-up wheel is determined by the type of shape being rolled.

Standard angle sections such as bulb angles, Z-bars, equal-leg angles, etc., have an inside apex angle of 90 degrees, however, the angle formed by their outstanding legs and the center line of the conventional finishing roll pass varies from less than 45 degrees to approximately 75 degrees depending on the shape being rolled. The stamping couple must be so adjusted that the delivery angle of the shape being rolled matches the face angle of the back-up wheel as it passes through the couple. If the delivery angle of the shape is at variance with the face angle of the back-up wheel, the stamping wheel will not make a flush contact with the leg surface of the angle and an incomplete or illegible marking will result. This precludes the possibility of using one fixed stamping couple for all shapes rolled. Prior to my invention, therefore, it was necessary to maintain several stamping units in order to cover the wide range of delivery angles of sections rolled on a modern shape-rolling mill. Each of these units was built with the stamping couple rigidly adjusted in a position suitable for one type of section. Each stamping couple performed satisfactorily when the delivery angle of the section leaving the finishing stand matched the face angle of the back-up wheel of the unit, but as these angles varied, and the greater the variance, the less legible the markings. As a result, it was necessary to remove the stamping unit and install another in its place each time the mill was set up to roll a different type section.

The rolls used in the finishing stand of a shape-rolling mill contain three or more passes and each pass is used until the product rolled exceeds the tolerances for that shape or section, at which time

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a new pass is used or the rolls changed. Prior to my invention, when a new pass was used, it was necessary to manually reposition the stamping couple and reset the guides in line with the new pass, a labor and time consuming operation.

It is, accordingly, an object of my invention to provide a rolled-shape stamping apparatus which is adapted to be permanently installed in the line of a shape-rolling mill and there be susceptible of adjustment to mark any shape rolled on the mill.

It is a further object of my invention to provide an adjustable rolled-shape stamping apparatus which after installation in the line of a shape-rolling mill can be easily and quickly positioned before any pass of the finishing rolls.

These and other objects will be more apparent after referring to the following specification and attached drawings, in which:

Figure 1 is an end view looking toward the entrance end of the stamping machine;

Figure 2 is a view taken on the line II—II of Figure 1;

Figure 3 is a view taken on the line III—III of Figure 2;

Figure 4 is a view similar to Figure 3 but showing the cradle of the stamping machine adjusted in two different positions illustrated by solid and dotted lines;

Figure 5 is a side elevational view;

Figure 6 is a partial view of the rockers and cradle support showing a gage for facilitating adjustment of the machine;

Figure 7 is a partial end view showing a gage attached to the base to facilitate transverse adjustment of the stamping machine;

Figure 8 is a detailed view showing the proper position of the stamping couple for marking a bulb-angle section;

Figure 9 is a view similar to Figure 8 but showing the proper position of the stamping couple for marking a Z-bar section; and

Figure 10 is a view similar to Figures 8 and 9 but showing the proper position of the stamping couple for marking an equal-leg angle section.

Figures 8, 9 and 10 illustrate schematically the delivery angles of the finishing roll passes used in rolling three common types of shape sections. Figure 8 illustrates a bulb-angle section; Figure 9, a Z-bar section; and Figure 10, an equal-leg angle section. These figures are included particularly to illustrate the variations in the position of the outstanding legs of each type, as discussed above. It will be noted that the angle between the center line of the roll pass and the

outstanding leg to be marked, which is on the right as viewed in the figures, varies from approximately 30 degrees in the case of the Z-bar shown in Figure 9, to approximately 75 degrees in the case of the bulb-angle, shown in Figure 8. It may readily be seen that in order to obtain a perfect mark in each instance it is necessary to shift the position of the stamping couple so that the delivery angle matches the face angle of the back-up wheel, indicated by X, and the stamping wheel, indicated by Y, makes a flush contact with the leg of the section as it passes through the couple.

Reference numeral 2 indicates a base having two parallel spaced beveled runners 4. Each runner is provided with a pair of elongated slots 6 therethrough extending lengthwise of the runner. Cross plates 8 which are bolted to the mill floor support the runners in fixed position raised from the floor. A frame platform 10 is mounted on the base 2 for lengthwise movement along the runners 4. The platform 10 is made up of two spaced parallel rows of aligned shoe members 12; an elongated plate 14 welded on each row of shoe members lengthwise thereof; and a cross plate 16 welded across the ends of the two elongated plates 14 to connect the two rows. A bolt hole 20 is provided through the cross plate, elongated plate and shoe member at each of the four corners of the platform 10 to register with the two spaced parallel rows of aligned shoe members 12 are shaped to conform with the bevels of the runners 4 so as to fit securely on the runners and yet be slidable therealong. Bolts 22, which are inserted in the bolt holes 20 and the slots 6, hold the platform 10 in fixed position on the base 2.

Spaced elongated structural supporting members 24 are attached to and extend upwardly from the platform 10. The members 24 are disposed with their long direction parallel to the long direction of the runners 4. A pair of spaced elongated beam members 26 is mounted transversely across the top of the supporting members 24. One end 28 of the paired beam members extends beyond the width of the platform 10. The space between the projecting ends is spanned by two spaced cross beam members 30 which are attached by their ends to the inner sides of the beam members 26.

A pair of spaced arcuate trackways 32, each having a bolt hole 35 adjacent the ends thereof, is positioned transversely between the beam members 26 and is supported thereon by means of braces 34 which are welded to the outer surfaces of the trackways and project therefrom to engage the top surface of the beams 26 to which they are welded or otherwise fastened. A pair of flanged arcuate cradle rockers 38, each having an open center portion or slot 40, is slidably disposed on the trackways 32 with the flanged edges of the rockers in sliding engagement with the edges of the trackways as best shown in Figures 2 and 5. The slots 40 cooperate with the bolt holes 35 to receive bolts 42 which function to hold the rockers 38 against arcuate movement within the cradle support formed by the trackways 32. A stabilizing plate 44 welded across their ends connects the two rockers so as to insure their movement as a unit. The rockers which form a cradle may be readily adjusted arcuately on the trackways when the bolts 42 are loosened as will be explained hereinafter. A chordal platform 46 is supported within the cradle formed by rockers 38 by means of braces 48 which are welded to the inner faces of the rockers. A stamping couple 50 is mounted on the platform 46. The stamping couple consists essentially of a rotatable back-up wheel 52 and a rotatable stamping wheel 54. The stamping wheel is so positioned that its plane of rotation is offset approximaely 45 degrees from the plane of rotation of the back-up wheel. The stamping wheel 54 is rotatably mounted on a shaft 56 which in turn is adjustably mounted on a casting 58. Casting 58 is provided with conventional means for adjusting and maintaining the required clearance between the stamping wheel and the back-up wheel to permit passage of material between the same and yet exert the pressure required to make a legible mark on the material being rolled.

A guide 60 having side walls 62 and a roof portion 64 is provided between the finishing stand (not shown) and the stamping couple 50 to keep the sections traveling in a straight path as they emerge from the finishing pass. The guide 60 is supported by a pair of apron plates 66. A table roller 68 supported in bearings 70 is positioned between the apron plates to facilitate the movement of the products passing through the guide. The apron plates and the bearings supporting the roller are rigidly attached to and are supported by the cross beams 30.

A clevis 72, having a trunnion 74 pivotally mounted therein, is attached by welding or otherwise to the under surface of the chordal platform 46 and depends therefrom. Trunnion 74 is provided with a threaded bore 76. Another clevis 78 is mounted in fixed upright position on the end cross plate 8 of base 2 intermediate the runners 4 and in line with clevis 72. A trunnion 80 having a smooth center bore 82 is pivotally mounted in clevis 78. An adjustable screw shaft 84, being threaded along a substantial portion of its length, is positioned with its smooth portion passing slidably through trunnion 80 and its threaded portion engaging and extending through trunnion 74. A handwheel 86 is rigidly affixed to the free end of the shaft adjacent clevis 78 to permit adjustment of the shaft 84.

In operation, the apparatus of my invention is installed adjacent the exit end of the finishing stand of a shape-rolling mill with the runners 4 of base 2 extending transversely to the path of the products emerging from the mill. In order to position the stamping couple 50 before the roll pass desired, bolts 22 are loosened and the handwheel 86 is rotated to turn shaft 84. Rotation of shaft 84 causes the trunnion 74 to move along the threaded portion of the shaft in a straight line which movement causes platform 10 to slide along the runners 4. Handwheel 86 is turned until the stamping couple 50 and guide 60 are aligned with the roll pass being used. When this point is reached, platform 10 is locked in position by tightening the bolts 22. Bolts 42 are then loosened and handwheel 86 is rotated to turn screw shaft 84. The rotative movement of shaft 84 is transmitted by means of trunnion 74 to the rockers 38 to cause them to move arcuately on the trackways 32. Rotation of shaft 84 is continued until the face angle of the back-up wheel 52 matches the delivery angle of the roll pass. When the stamping couple has attained the position desired, rotation of shaft 84 is stopped and the bolts 42 are tightened. The stamping apparatus is then ready to function with the stamping couple fixed in proper position. The pivotal mountings of trunnions 74 and 80 enable the shaft 84 to swing upwardly as the rockers 38 move within the cradle support formed

by the trackways 32, as shown in Figure 4. When it is necessary to use another roll pass, the stamping apparatus may be moved into proper position by again loosening the bolts 22 and rotating the handwheel 86 as explained above. If the mill is changed to roll another shape, the position of the stamping couple may be quickly and easily readjusted to suit the delivery angle of the new roll pass as explained above. The stamping apparatus of my invention may thus be permanently installed in the line of any shape-rolling mill and need not be removed to make adjustments to compensate for a change in section shape. As described above, the machine is easily and quickly adjusted to suit any shape rolled.

As shown in Figures 6 and 7, gages 88 and 90, respectively, may be provided on the machine to facilitate and simplify even further the making of adjustments.

If desired, handwheel 86 may be eliminated by connecting screw shaft 84 to a reversible motor through suitable gearing.

While one embodiment of my invention has been shown and described it will be apparent that other adaptations and modifications may be made without departing from the scope of the following claims.

I claim:

1. Apparatus for marking elongated hot-rolled products while in motion lengthwise comprising a base, an arcuate cradle support mounted on said base, said support being disposed in a plane transverse of the path of said products with said path at the approximate center thereof, said arcuate cradle support including a frame platform, a plurality of spaced vertical support members attached to and extending upwardly from said platform, the longitudinal axis of said members extending transverse of said path, a pair of parallel elongated structural members fixedly mounted in spaced relation across the top of said vertical support members astride and parallel to said path, and a pair of spaced parallel arcuate trackways disposed between and supported by said elongated structural members, a cradle rotatably carried on said support for adjustment about said path, means for rotating said cradle, and a marking couple on said cradle, said marking couple including a pair of spaced wheels disposed with their peripheries astride the path of said products.

2. Apparatus for marking elongated hot-rolled products while in motion lengthwise comprising a base, an arcuate cradle support mounted on said base, said support being disposed in a plane transverse of the path of said products with said path at the approximate center thereof, a cradle rotatably carried on said support for adjustment about said path, said cradle including two parallel arcuate rockers disposed in spaced relation in said cradle support, and a chordal platform supported by said arcuate rockers, means for rotating said cradle, said rotating means consisting of a pair of clevises disposed in aligned spaced relation, one of said clevises being mounted on the under surface of said chordal platform and depending therefrom, the other clevis being mounted in upright position spaced from said cradle support, an internally threaded trunnion pivotally mounted in the depending clevis, a trunnion having a smooth center bore pivotally mounted in the upright clevis, a screw shaft having a threaded portion on one end thereof extending through and connecting said trunnions, the threaded portion of said shaft being engaged by said threaded trunnion, and a handwheel affixed to the free end of said shaft adjacent said upright clevis, and a marking couple on said cradle, said marking couple including a pair of spaced wheels disposed with their peripheries astride the path of said products.

3. Apparatus for marking elongated hot-rolled products as defined in claim 1 in which the means for rotating said cradle includes a pair of clevises disposed in aligned spaced relation, one of said clevises being mounted on the under surface of said chordal platform and depending therefrom, the other clevis being mounted in upright position spaced from said cradle support, an internally threaded trunnion pivotally mounted in the depending clevis, a trunnion having a smooth center bore pivotally mounted in the upright clevis, a screw shaft having a threaded portion on one end thereof extending through and connecting said trunnions, the threaded portion of said shaft being engaged by said threaded trunnion, and a handwheel affixed to the free end of said shaft adjacent said upright clevis.

4. Apparatus for marking elongated hot-rolled products while in motion lengthwise comprising a base, a cradle support mounted on said base, said support being disposed in a plane transverse to the path of said products, said cradle support consisting of a frame platform, a plurality of spaced vertical support members attached to and extending upwardly from said platform, a pair of parallel elongated structural members fixedly mounted in spaced relation across the top of said vertical support members, and a pair of spaced parallel arcuate trackways disposed between and supported by said elongated structural members in a plane transverse to the path of travel of said products with said path at the approximate center thereof, said trackways having a bolt hole therethrough adjacent each of the extremities thereof, a cradle rotatably carried on said cradle support for adjustment about said path, said cradle including two arcuate rockers, each of said rockers having elongated slots therethrough extending along the length thereof, said rockers being slidably disposed on said trackways, and a chordal platform supported by said arcuate rockers, the slots in said rockers being in communication with the bolt holes in said trackways, fastening means inserted through said bolt holes and said slots to hold said rockers on said trackways, means for rotating said cradle, and a marking couple on said chordal platform.

5. Apparatus for marking elongated hot-rolled products as defined in claim 4 in which the means for rotating said cradle includes a pair of clevises disposed in aligned spaced relation, one of said clevises being mounted on the under surface of said chordal platform and depending therefrom, the other clevis being mounted in upright position spaced from said cradle support, an internally threaded trunnion pivotally mounted in the depending clevis, a trunnion having a smooth center bore pivotally mounted in the upright clevis, a screw shaft having a threaded portion on one end thereof extending through and connecting said trunnions, the threaded portion of said shaft being engaged by said threaded trunnion, and a handwheel affixed to the free end of said shaft adjacent said upright clevis.

6. Apparatus for marking elongated hot-rolled products while in motion lengthwise comprising a base made up of a pair of elongated parallel spaced runners having slots therethrough extending along a substantial portion of the length

thereof, an arcuate cradle support slidably mounted on said base for movement transverse to the path of travel of said hot-rolled products, said cradle support being normally disposed in a plane transverse to the path of said products, said arcuate cradle support including a rectangular frame platform having bolt holes in the corners thereof, said frame platform being disposed on said base with the bolt holes positioned over the slots in said runners, fastening means inserted through said bolt holes and said slots to hold said platform on said base, a plurality of spaced vertical support members attached to and extending upwardly from said platform, a pair of parallel elongated horizontal members fixedly mounted in spaced relation across the top of said vertical support members, said horizontal members extending in a plane parallel to the path of travel of said products, and a pair of spaced parallel arcuate trackways disposed between and supported by said elongated horizontal members in a plane transverse to the path of travel of said products with said path at the approximate center thereof, a cradle rotatably carried on said cradle support for adjustment about said path, means for rotating said cradle and moving said cradle support along said runners, and a marking couple on said cradle.

7. Apparatus for marking elongated hot-rolled products as defined in claim 6 in which said cradle includes two parallel arcuate rockers disposed in spaced relation in said cradle support, and a chordal platform supported by said arcuate rockers.

8. Apparatus for marking elongated hot-rolled products as defined in claim 6 in which the means for rotating said cradle includes a pair of clevises disposed in aligned spaced relation, one of said clevises being mounted on the under surface of said chordal platform and depending therefrom, the other clevis being mounted in upright position spaced from said cradle support, an internally threaded trunnion pivotally mounted in the depending clevis, a trunnion having a smooth center bore pivotally mounted in the upright clevis, a screw shaft having a threaded portion on one end thereof extending through and connecting said trunnions, and a handwheel affixed to the free end of said shaft adjacent said upright clevis.

9. Apparatus for marking elongated hot-rolled products while in motion lengthwise comprising a base made up of a pair of elongated parallel spaced runners having slots therethrough extending along a substantial portion of the length thereof, a cradle support slidably mounted on said base for adjustable movement transverse to the path of travel of said hot-rolled products, said cradle support being normally disposed in a plane transverse to the path of said products with said path at the approximate center thereof, said cradle support including a rectangular frame

platform having bolt holes in the corners thereof, said frame platform being disposed on said base with the bolt holes positioned over the slots in said runners, fastening means inserted through said bolt holes and said slots to hold said platform on said base, a plurality of spaced vertical support members attached to and extending upwardly from said platform, a pair of parallel horizontal members fixedly mounted in spaced relation across the top of said vertical support members, said horizontal members extending in a plane parallel to the path of travel of said products, and a pair of spaced parallel arcuate trackways disposed between and supported by said elongated horizontal members in a plane transverse to the path of travel of said hot-rolled products with said path at the approximate center thereof, said trackways having a bolt hole therethrough adjacent each of the extremities thereof, a cradle rotatably carried by said cradle support for adjustment about said path, said cradle including two arcuate rockers, each of said rockers having elongated slots therethrough extending along the length thereof, said rockers being slidably disposed on said trackways, and a choral platform supported by said arcuate rockers, the slots in said rockers being in communication with the bolt holes in said trackways, fastening means inserted through said last named bolt holes and slots to hold said rockers on said trackways, means for rotating said cradle and moving said cradle support along said runners, said last named means including a pair of clevises disposed in aligned spaced relation, one of said clevises being mounted on the under surface of said chordal platform and depending therefrom, the other clevis being mounted in upright position spaced from said cradle support, an internally threaded trunnion pivotally mounted in the depending clevis, a trunnion having a smooth center bore pivotally mounted in the upright clevis, a screw shaft having a threaded portion on one end thereof extending through and connecting said trunnions, the threaded portion of said shaft being engaged by said threaded trunnion, and a handwheel affixed to the free end of said shaft adjacent said upright clevis, and a marking couple on said chordal platform.

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