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DEVICE FOR BENDING RAILS, PIPES, AND THE LIKE

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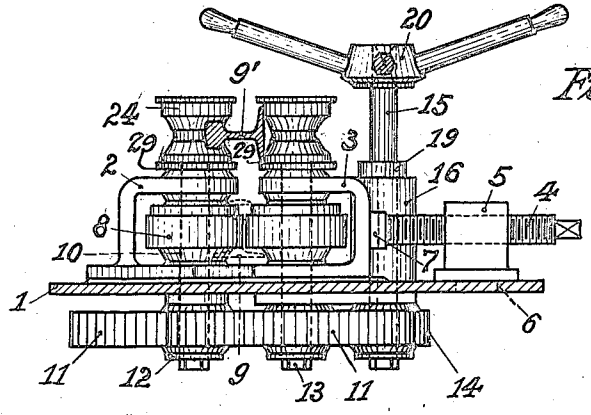


Fig. 1.

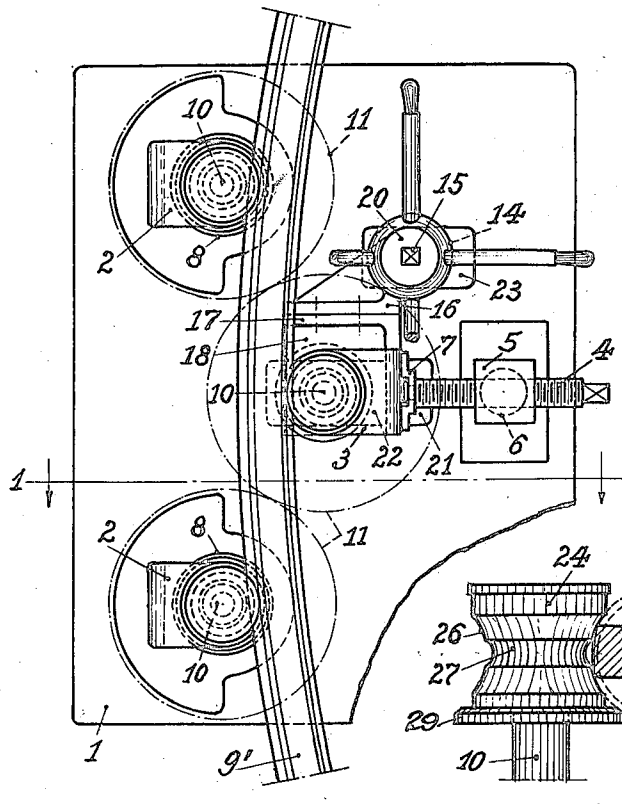


Fig. 2.

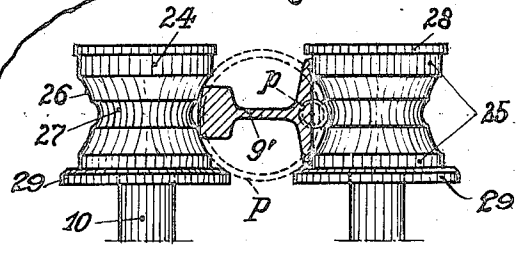


Fig. 3.

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UNITED STATES PATENT OFFICE.

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DEVICE FOR BENDING RAILS, PIPES, AND THE LIKE.

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My present invention relates to a device for bending rails, pipes and the like, and contains three pressure rollers, of which the two stationary terminal pressure rollers and the adjustable intermediate pressure roller are arranged on top of a base-plate within brackets open to receive the rail, pipe or the like to be bent, whereas the gear-wheels provided for the rotation of said pressure rollers are arranged beneath said base-plate. This exceedingly simple arrangement allows the bending of a rail in a horizontal plane whereby the desired curvature of the rail can be obtained with great exactness. But in mines where such rails are used it is very often desirous to bend rails in a vertical plane as for instance in places where the bottom of the galleries follows the wavy formation of the layer of coal, ores and the like, or when it is necessary to renew the original shape of iron cap-beams deformed in a vertical plane by the pressure of the overlying rock.

Rail-benders adapted to bend rails in two planes arranged at right angles to each other are known, but such machines are in the first place intended for bending rails destined for railroads and are of such complicated construction and of such dimensions that they can not be employed in the narrow subterranean galleries of mines. The characteristic of the novel construction of my present invention resides in the fact that the shafts of all the pressure rollers are lengthened and provided with heads adapted to act as pressure rollers when rails are to be bent in a vertical plane. As a rule it is advisable to arrange the pressure rollers intended to bend the rail in a horizontal plane next to the base plate of the device and above this set of pressure rollers the other set of pressure rollers adapted to bend the rail in a vertical plane.

By means of this arrangement an exceedingly light, simple and cheap device is provided readily adapted to bend a rail in two different planes which cross each other at right angles and besides this occupies comparatively little space. The new device further shows means and ways how at a comparatively low cost a rail bender provided with a set of pressure rollers necessary to bend a rail in a horizontal plane can be transformed in a device adapted to bend rails at will either in this plane or in a plane at right angles hereto, to which end it is only necessary to lengthen the shafts of the existing set of pressure rollers and crown them with a second set of pressure rollers.

This additional set of pressure rollers destined to impart a curvature to a rail in a vertical plane can be also profitably employed also to bend pipes of different diameters.

In the accompanying drawing one embodiment of my invention is shown by way of example, wherein:

Figure 1 is a cross-sectional view taken on line 1—1 of Figure 2.

Figure 2 is a plan view of the device and

Figure 3 is a detail of construction on a larger scale.

The base-plate 1 of the device is arranged upon a suitable truck or carriage (not shown). Upon the said base-plate are arranged fixed brackets 2, open toward the longitudinal centre line of the base-plate, and a similar but movable bracket 3 adapted to be advanced and retracted at will by means of a screw 4 arranged in a nut 5 locked by means of a projection 6 in said base plate and attached to the bracket 3 by the aid of an eye-buckle 7. In each of said brackets a pressure roller 8 of such longitudinal section is journalled that the head, web and foot of a rail 9 will come into contact with them simultaneously, as indicated more clearly in Figure 1. These pressure rollers 8 are seated upon vertical shafts 10 of which each finds a double bearing in the bracket wherein the particular shaft is journalled. To the lower end of each shaft 10 a spur-wheel 11 is secured by means of a feather-key, or on a square or polygonal seat arranged at the lower end of said shafts and held thereon in place by a washer 12 and a screw 13. All spur-wheels 11 are held in mesh one with another and set in rotation by means of a pinion 14 which meshes with the intermediate wheel 11, as indicated in Figure 2. This pinion is placed on a vertical shaft 15 seated in a bracket 16 bolted to a rib 17 of the foot plate 18 of the movable bracket 3 and kept therein in a certain vertical position by a shoulder 19 of said shaft 15 or by a collar attached thereto by a set-screw. The shaft 15 is set in rotation by the aid of a four-armed handle 20, which handle may be also utilized for the operation of the screw 4, if it is not preferred to operate the latter by a separate crank-handle or wrench. Instead of the handle 20 shown in Figures 1 and 2 a long handled ratchet-brace may be employed. The forward and backward motion of the movable

bracket 3 is made possible by a recess 21 arranged in the base-plate 1, in which recess the rectangular projection 22, wherein the lower end of shaft 10 appertaining to this bracket is journalled, plays. A similar arrangement is of course necessary in regard to the lower end of the bracket 16 to which end a recess 23 is provided in the base-plate 1 so that the brackets 3 and 16 may simultaneously execute any movement caused by the rotation of the screw 4.

The second set of pressure rollers 24 provided for bending the rail in a vertical plane is keyed or otherwise secured to the upper ends of the shafts 10, or they form an integral part of the latter, as indicated in Figure 1. The configuration of these pressure rollers is such that the upper and lower cylindrical bands 25 are adapted to guide the foot of the rail, whereas the waist 26 of these rollers is curved to offer a sure rest for the head of the rail 9'. These waists of the rollers are also admirably adapted to hold pipes P of a larger diameter while passed through the device, whereas smaller pipes *p* are safely guided by the narrow central grooves 27, as indicated more plainly in Figure 3. The top flange 28 of these rollers rotates with the latter, whereas the rings or washers 29 are loosely interposed between said pressure rollers and the top side of the brackets 2 and 3 to give the foot of the rail an opportunity to pass through the device with the least amount of friction possible.

The operation of my improved device is as follows:—

When the rail is to be bent or curved in a horizontal plane the movable rollers 8 is sufficiently drawn outward to allow the rail to contact with the said rollers as indicated in Figure 1. Hereupon the screw 4 is pressed against the bracket 3 and then the pinion 14 is rotated to operate the spur-wheels 11 which mesh one with another by means of teeth prolongated to such an extent as to keep them in mesh notwithstanding the linear movements of the bracket 3 caused by the screw 4. When, however, the radius of the rail is to be such that it can not be obtained by the aid of said prolongated teeth, one or both of the stationary brackets 2 must be arranged adjustably. After the bending of the rail has been finished the rail shows at all points the same curvature.

When, however, the rail has to be bent in a vertical plane it is passed between the upper set of pressure rollers as indicated in Figures 1, 2 and 3, whereby the shaft 15 and the screw 4 are operated as indicated above. In a similar manner the device is operated when pipes are bent in conformity with a given radius.

When straightening curved rails or pipes the operation of the device must, of course, be executed in the reverse way.

I claim:—

1. A device for bending rails, pipes and the like in galleries of mines, comprising a base-plate, brackets open for the admission of the object to be bent, shafts journalled in said brackets, a set of pressure rollers arranged on said shafts for bending said object in a horizontal plane, a second set of pressure rollers mounted on the same shafts for bending said object in a vertical plane, and means for rotating said shafts simultaneously.

2. A device for bending rails, pipes and the like in galleries of mines, comprising a base-plate, brackets laterally open for the admission of the object to be bent, shafts journalled in said brackets, one set of pressure rollers arranged on said shafts for bending said object in a horizontal plane, another set of pressure rollers mounted on the same shafts for bending said object in a vertical plane, means for rotating said shafts simultaneously, and means for advancing and retracting one of said brackets at will.

3. A device for bending rails, pipes and the like, in galleries of mines, comprising a base-plate, a set of brackets laterally open for the admission of the object to be bent and composed of two stationary terminal brackets arranged at the one side of said object and an intermediate movable bracket arranged at the other side thereof, shafts journalled in said brackets, one set of pressure rollers arranged on said shafts for bending said objects in a horizontal plane, another set of pressure rollers mounted on the same shafts for bending said object in a vertical plane, gear-wheels seated on said shafts and provided with prolongated teeth, means for adjusting said intermediate bracket, and means for rotating said gear-wheels simultaneously.

4. A device for bending rails, pipes and the like in galleries of mines comprising a base-plate, a set of brackets laterally open for the admission of the object to be bent and comprising two terminal brackets arranged at the one side of said object and an intermediate movable bracket arranged at the other side thereof, shafts journalled in said brackets, one set of pressure rollers arranged on said shafts for bending said object in a horizontal plane, another set of pressure rollers adapted to bend said object in a vertical plane and provided with a surface equally well adapted to securely hold said object whether it has the cross-section of a rail or of a pipe, gear-wheels seated on the lower ends of said shafts beneath said base-plate and meshing one with another by means of prolongated teeth, means for adjusting said intermediate bracket, and manually operated means for rotating said gear-wheels simultaneously.

In testimony whereof I affix my signature.

ANTON OSKAMP.