No. 709,753. Patented Sept. 23, 1902.

F. DITCHFIELD.

METAL BENDING MACHINE.

(Application filed July 1, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

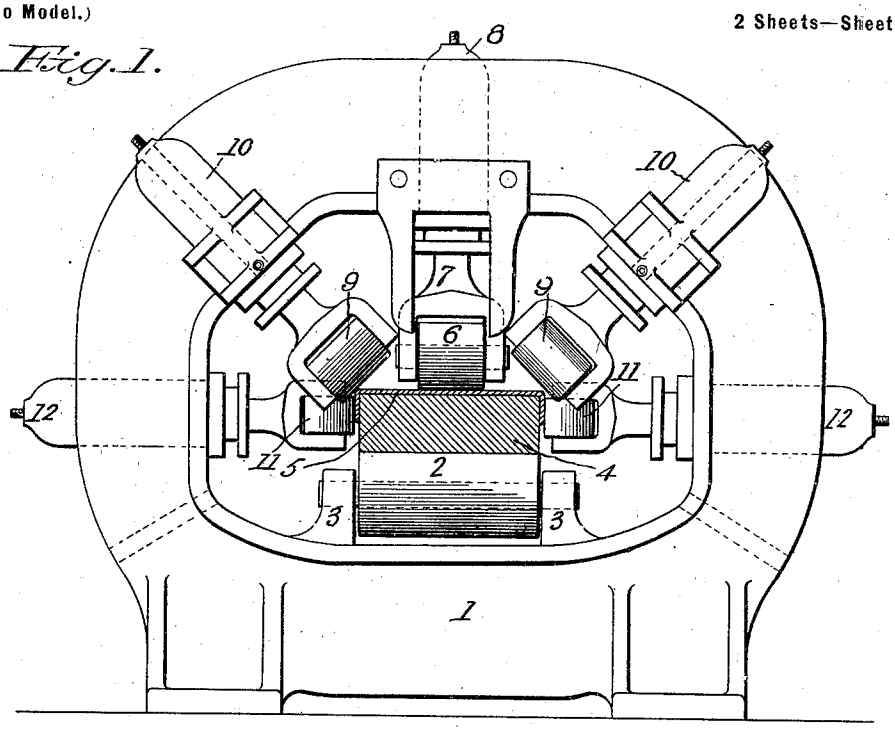
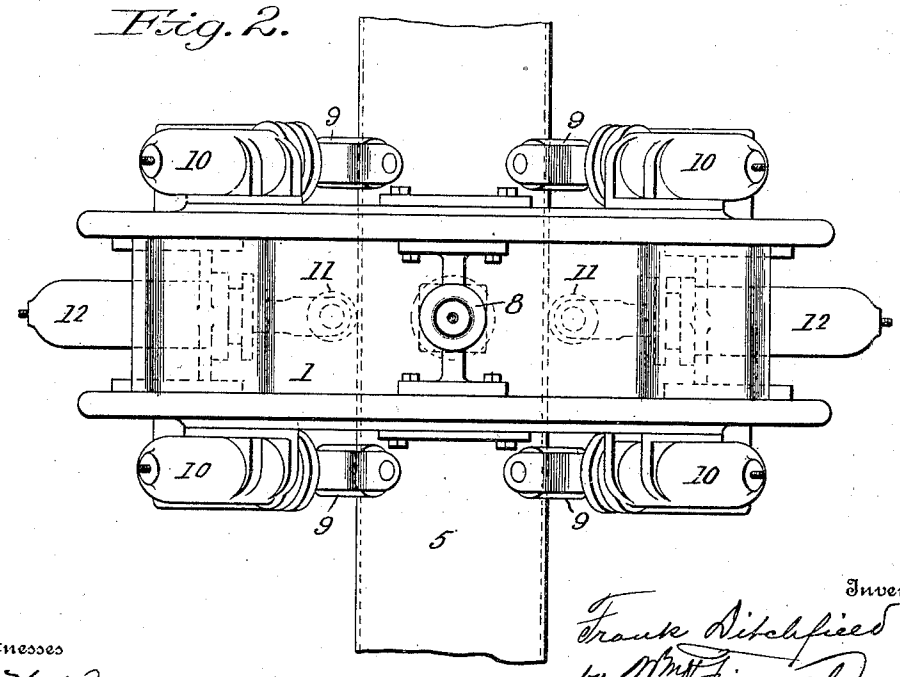


Fig. 2.



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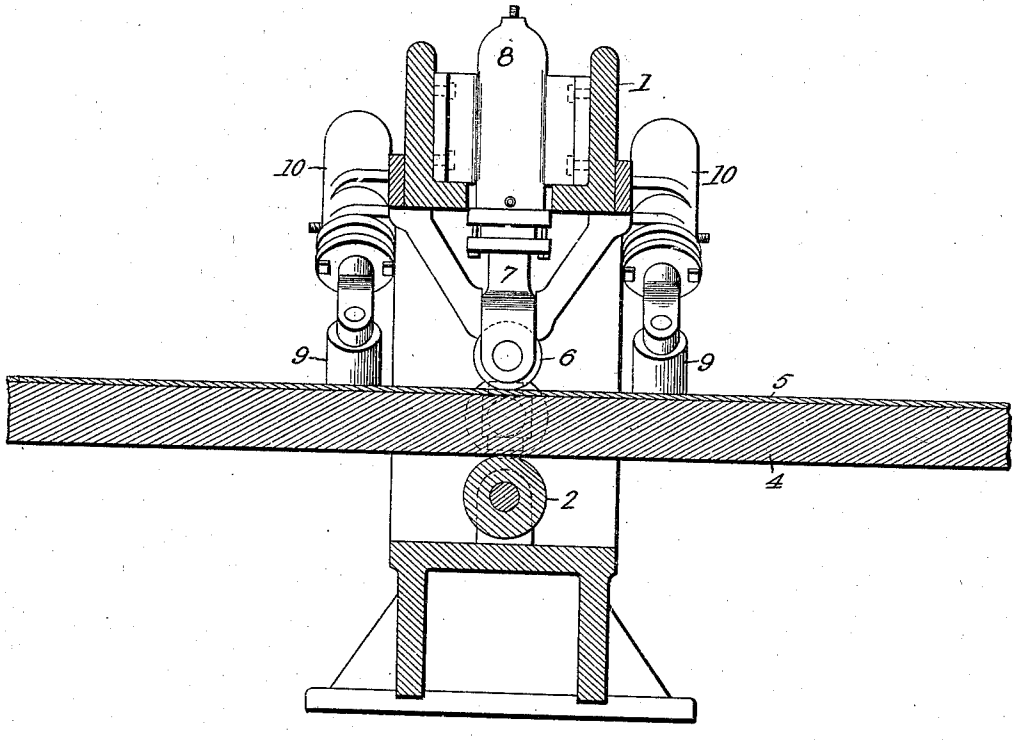
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Fig. 3.



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UNITED STATES PATENT OFFICE.

FRANK DITCHFIELD, OF AVALON, PENNSYLVANIA, ASSIGNOR TO PRESSED STEEL CAR COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

METAL-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 709,753, dated September 23, 1902.

Application filed July 1, 1902. Serial No. 113,961. (No model.)

To all whom it may concern:

Be it known that I, FRANK DITCHFIELD, a subject of the King of Great Britain, residing at Avalon, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Metal-Bending Machines, (Case A,) of which the following is a full, clear, and exact description.

The object of this invention is to provide an apparatus for bending heavy plates of metal, such as steel, into useful shapes, and I have illustrated the invention as applicable to forming long flanged shapes, such as car-sills.

Heretofore car-sills of steel plate have been bent to shape by means of die-presses; but great care has to be taken by reason of the fact that the operation is very severe on the metal, since the formation of the flanges is commenced at the root and the width of the flange acts as a resistance during formation, because it has to be jammed into and between the dies. In the manufacture of pressed shapes by means of dies separate dies must be used for each size of work, and in any case the length of the work is limited to the size of the press-table and is restricted.

In the present invention the bending of the flanges begins at the edges of the plate. Moreover, one machine can by changes of formers be used to make a variety of sizes, and finally the length of work is unlimited.

In carrying out my invention I use a former of substantially the contour of the work and upon which the work is held and combine it with rolls which turn and flange the edges as the work progresses through the machine, all as I will proceed now more particularly to set forth and finally claim.

In the accompanying drawings, illustrating my invention, in the several figures of which like parts are similarly designated, Figure 1 is a front elevation with the former in cross-section. Fig. 2 is a top plan view. Fig. 3 is a longitudinal cross-section.

A frame 1 is erected stationarily upon a suitable base and is supplied with a roller 2 or any number of similar rollers mounted in bearings 3. The roller supports the former 4, and any suitable means (not shown) may be used for moving the former longitudinally upon the roller 2. The blank 5 is laid upon the former and held in contact therewith by a hold-down roll 6, mounted in the end of the stem or plunger 7 of a vertical hydraulic cylinder 8 or other power appliance. Edge-turning rolls 9 in pairs are arranged upon opposite faces of the frame 1 and operated by hydraulic cylinders or other power apparatus 10, and these rolls are set at an oblique angle to the former and adjacent its upper corners. Between the rolls 9 and on opposite sides of the frame are arranged the flanging-rolls 11, whose axes are parallel to the sides of the former, and these flanging-rolls are actuated by hydraulic cylinders 12 or other appropriate power appliances.

The rolls 9 and 11 may be mounted in or upon the stems or plungers of their respective power appliances, as in the case of the roll 6, and are herein so shown, and in every case the preferred construction, as shown, is to mount the power appliances for these several rolls upon the frame 1.

A flat blank having been laid upon the former, with its edges projecting over the corners of the former a distance equal to the width of flanges desired upon opposite edges, the former is drawn toward the edge-turning rolls 9, which nip the edges of the blank and bend them into their own planes, and these bent edges are next nipped by the flanging-rolls and turned and flattened out, as shown in Fig. 1, to complete the flanging.

By this apparatus any size, length, and contour or profile of flanged shapes, such as car-sills, may be easily, economically, and efficiently made with little or no liability of straining or cracking the metal.

Since the machine is alike in front and rear, the work may be fed from either point.

The invention is not limited to the details of construction and arrangement of parts, and in another case of even date herewith I have shown one example of a variation permissible within the principle of the invention and wherein the former is stationary and the frame carrying the rolls is movable,

the alternative constructions being herein broadly claimed and that one with the movable former being herein specifically claimed, while the specific claim for the machine having the stationary former and the traveling frame is reserved for the concurrent case.

What I claim is—

A metal-bending machine, comprising essentially a stationary frame, a power-actuated holddown-roll, power-actuated edge-turning rolls arranged in pairs upon opposite faces of the frame, flanging-rolls arranged upon opposite sides of the frame and between the edge-turning rolls, and a movable former mounted upon the frame between said rolls.

In testimony whereof I have hereunto set my hand this 27th day of June, A. D. 1902.

FRANK DITCHFIELD.

Witnesses:
A. H. MERCER,
RICHARD T. GRIFFITHS.