

No. 709,754.

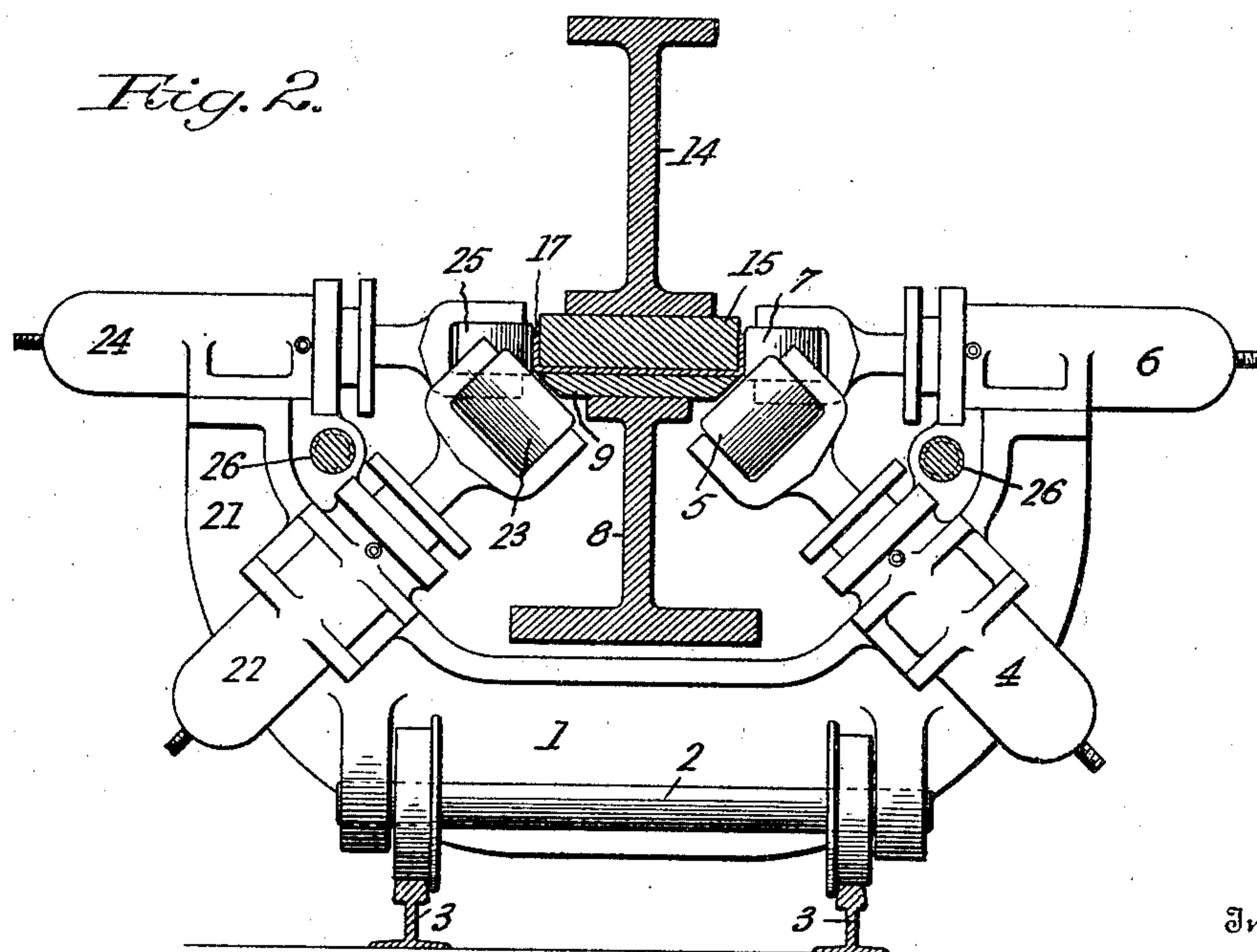
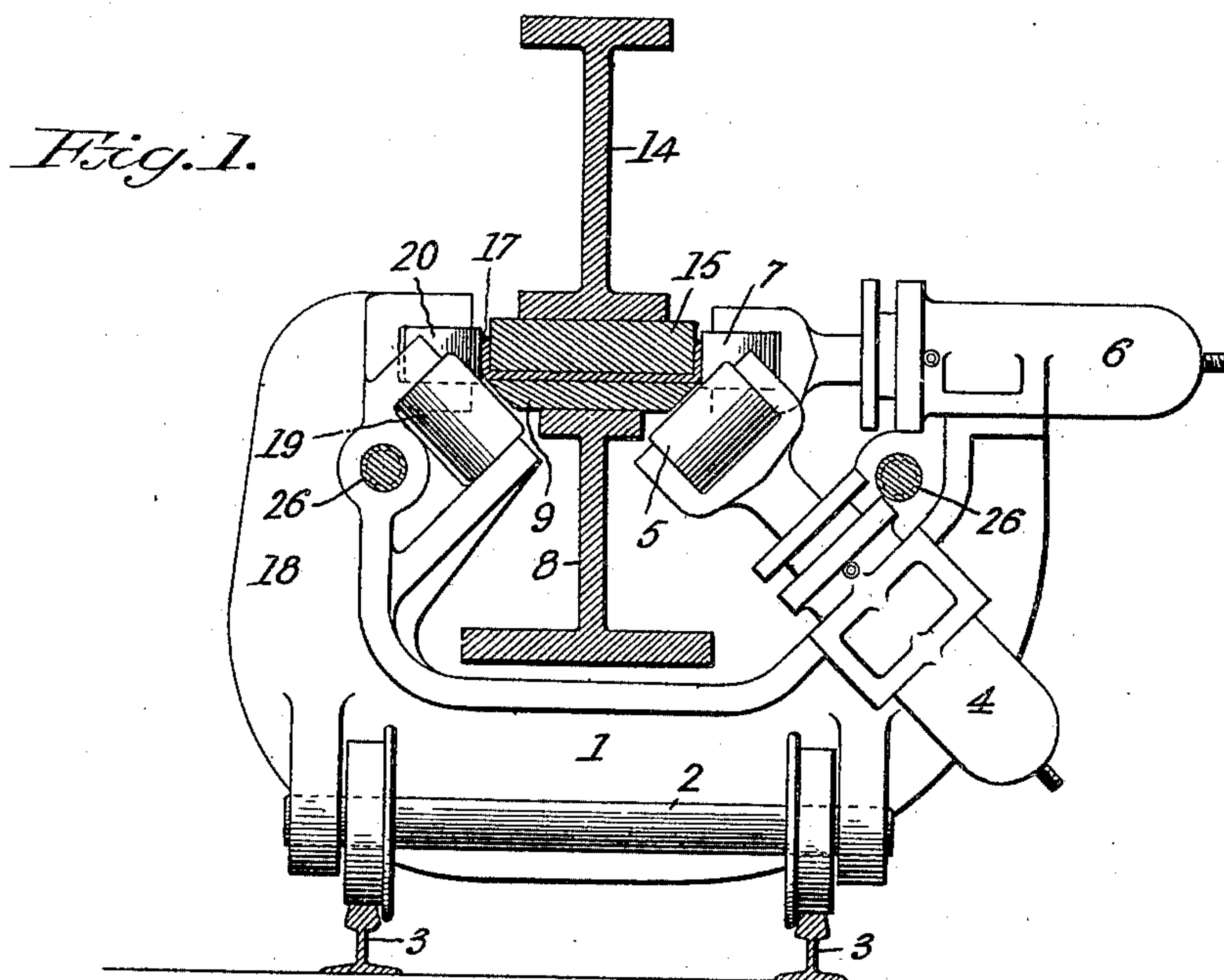
Patented Sept. 23, 1902.

F. DITCHFIELD.
METAL BENDING MACHINE.

(Application filed July 1, 1902.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

C. H. Walker,
E. A. Kinney.

Inventor

Frank Ditchfield
by W. H. Finckel
Attorney

No. 709,754.

Patented Sept. 23, 1902.

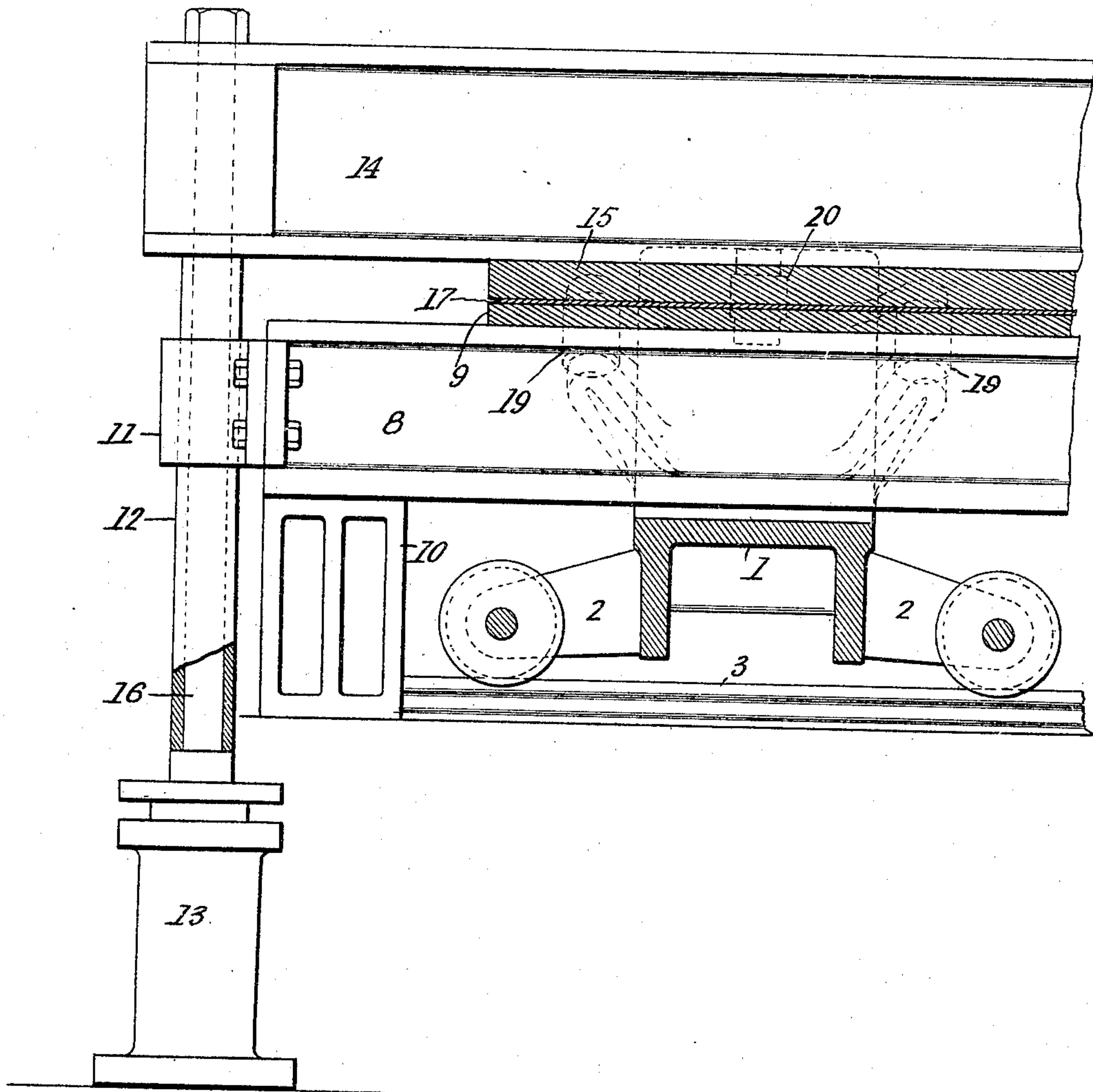
F. DITCHFIELD.
METAL BENDING MACHINE.

(Application filed July 1, 1902.)

(No Model.)

2 Sheets—Sheet 2.

Fig. 3.



Witnesses

C. H. Walker
E. J. Binnell

Inventor

Frank Ditchfield

by Wm. H. Finckel

Attorney

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. 709,754, dated September 23, 1902.

Application filed July 1, 1902. Serial No. 113,962. (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 B,) 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 stationary former, upon which the blank is clamped, and upon a traveling carriage I mount a series of bending-rolls, by means of which the edges of the blank are first deflected obliquely and finally bent or flanged about the former and in conformity to its contour or profile, 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 of one embodiment of the invention. Fig. 2 is a similar view of another, and Fig. 3 is a longitudinal vertical section illustrative of both forms, excepting

as to details of rolls, this figure specifically illustrating the form shown in Fig. 1.

A coved frame 1 in each form of the invention is mounted upon a wheeled truck 2, adapted to run upon track-rails 3. On the right-hand limb of the frame is mounted obliquely hydraulic cylinders or other power appliances 4 for actuating rolls 5 for turning the edges of the blank, and also mounted upon said limb of the frame is a horizontally-disposed hydraulic cylinder or other power appliance 6, which actuates a roll 7 for flanging the blank. Within the cove or hollow of the frame is erected a bed-piece 8, which may be an inverted T girder or beam, upon which is placed a bed-plate 9. This bed-piece is supported at opposite ends upon blocks 10, and its ends are supplied with guide-loops 11, which embrace hollow columns or sleeves 12, erected upon hydraulic cylinders or other power appliances 13. Above the bed-piece 8 is a parallel pressure-piece 14, which may be a section of I girder or beam, and to it is applied the former 15. The piece 14 is supported upon the hollow columns or sleeves 12 and attached to the power-appliance stems 16, which extend through the hollow columns and are capable of longitudinal vertical movement along with the columns 12 to raise and lower the former relatively to the bed-plate 9, respectively, to release and clamp the work 17 between the former 15 and the bed-plate 9.

As shown in Figs. 1 and 3, the left-hand limb 18 of the frame 1 may have fixed oblique rolls 19 and a fixed horizontal roll 20, corresponding in arrangement and ultimate function, respectively, with the opposite rolls 5 and 7; but, as shown in Fig. 2, the left-hand limb 21 of the frame may be complementary in shape to the right-hand limb and provided with a power appliance 22 for actuating each roll of a pair of oblique rolls 23 and also provided with a power appliance 24 to actuate a horizontal roll 25, the rolls 23 and 25 being complementary to the rolls 5 and 7.

The traveling frame may be propelled by any suitable power, and, as illustrating one means of propulsion, I have indicated at 26 two screws passing through the limbs of the

frame and which may be rotated by any suitable means to advance and retract the frame.

By using the rolls 5 and 19 or 5 and 23 in pairs the blank is held firmly for the action of the flanging-rolls 7 and 20 or 25.

The pressure-piece 14 having been raised and a blank sheared to shape having been laid upon the plate 9, said piece 14 is moved down against the blank to clamp it in place, and power having been applied to the frame to propel it upon its track lengthwise of the former the rolls 5 and their complemental rolls 19 or 23 nip the edges of the blank and bend them obliquely to the former, and such bent edges next meeting the roll 7 and its complemental roll 20 or 25 are by them bent up square against the sides of the former, and so the work is provided on opposite edges with right-angled flanges.

I have illustrated and described my invention as applicable to flanging opposite edges of a blank; but obviously it may be otherwise used, and also I have shown the invention utilized in the making of car-sills, but do not limit its applicability to that one use.

In a concurrent application I have shown an apparatus similar in purpose to this wherein the former is movable relatively to a station-

ary frame and have stated that the principle of the invention includes the reverse arrangement herein shown, reserving to that case the broad claim for both forms and specifically claiming the form in which the former is a traveling member, while herein I claim the former as a stationary member.

What I claim is—

1. A metal-bending machine, comprising essentially a traveling frame provided with obliquely-disposed edge-turning rolls and horizontally-arranged flanging-rolls, a stationary former, a bed-piece, and a pressure-beam between which and the former the work is clamped.

2. A metal-bending machine, comprising essentially a traveling frame provided with obliquely-disposed edge-turning rolls and horizontally-arranged flanging-rolls, a stationary former, a pressure-beam upon which it is mounted, and a bed-piece between which and the former the work is clamped.

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.