

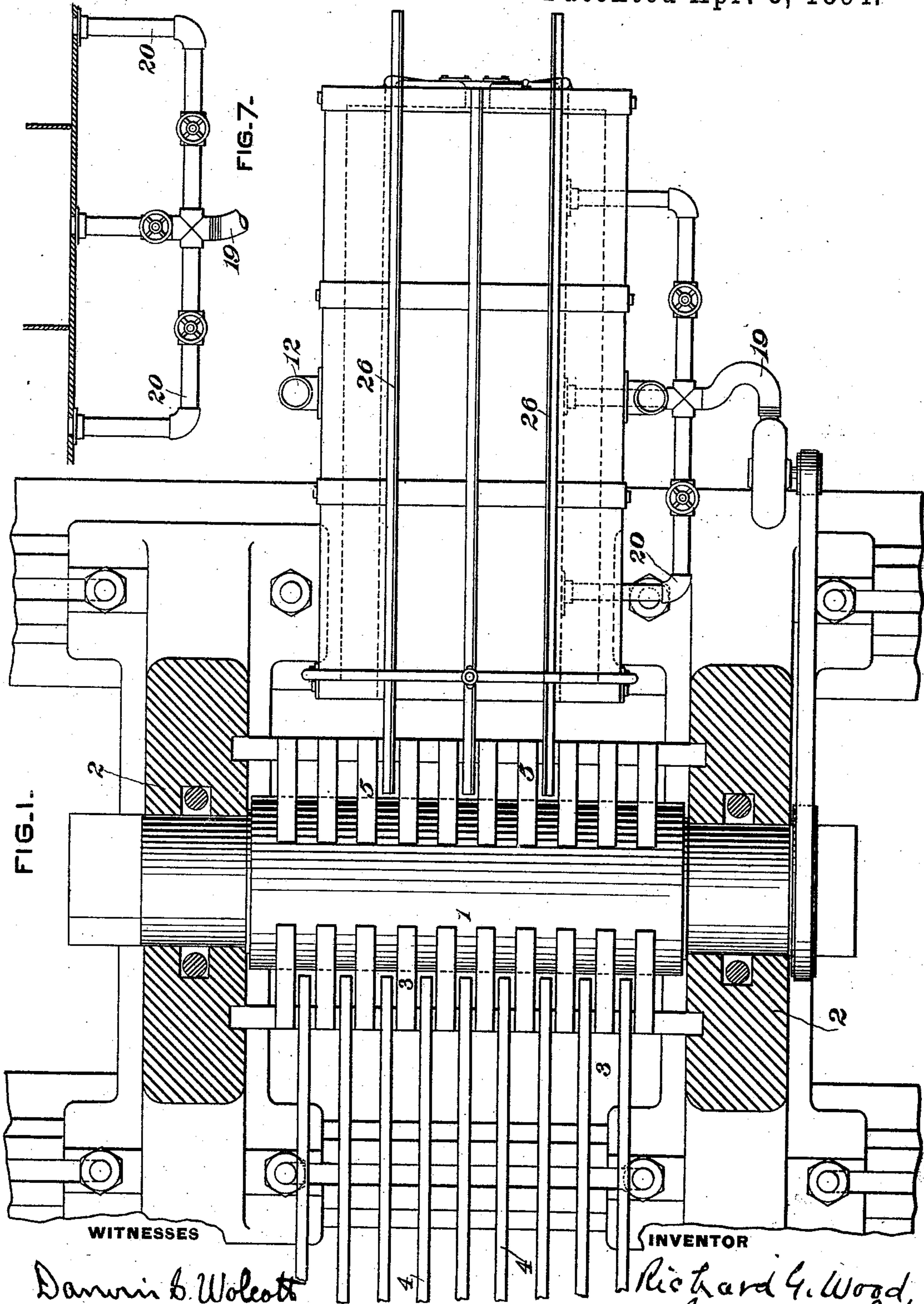
(No Model.)

3 Sheets—Sheet 1.

R. G. WOOD.
ROLLING MILL.

No. 517,716.

Patented Apr. 3, 1894.



Witnesses
Darius B. Wolcott
C. E. Hunt.

INVENTOR
Richard G. Wood,
by George H. Christy
Att'y

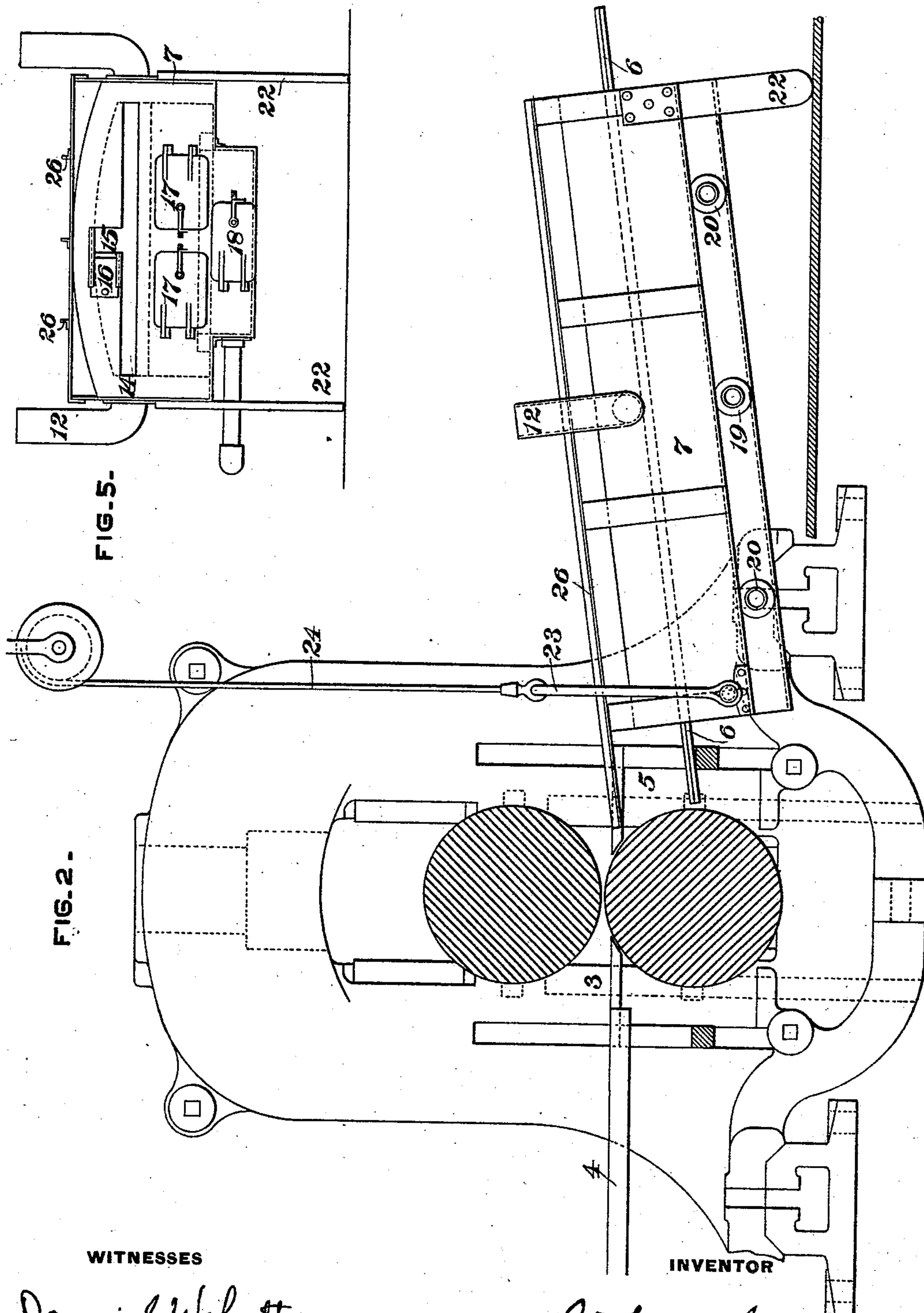
(No Model.)

3 Sheets—Sheet 2.

R. G. WOOD.
ROLLING MILL.

No. 517,716.

Patented Apr. 3, 1894.



Darwin S. Wolcott
C. Hunt.

Richard G. Wood,
by George H. Christy
Atty

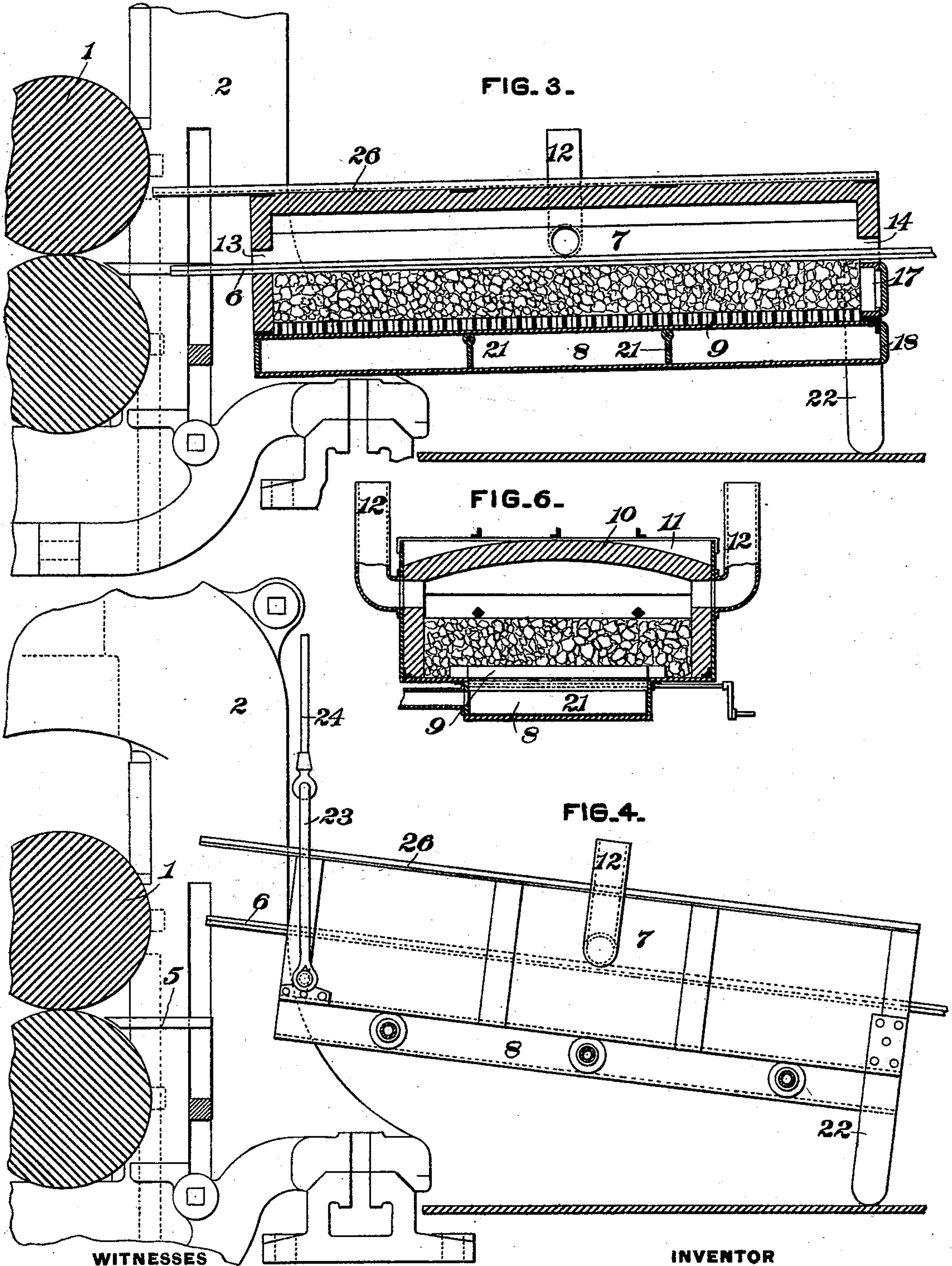
(No Model.)

3 Sheets—Sheet 3.

R. G. WOOD.
ROLLING MILL.

No. 517,716.

Patented Apr. 3, 1894.



WITNESSES

Danville Wolcott
C. E. Hunt.

INVENTOR

Richard G. Wood,
by George H. Christy
Atty

UNITED STATES PATENT OFFICE.

RICHARD G. WOOD, OF ALLEGHENY, ASSIGNOR TO THE W. DEWEES WOOD COMPANY, OF MCKEESPORT, PENNSYLVANIA.

ROLLING-MILL.

SPECIFICATION forming part of Letters Patent No. 517,716, dated April 3, 1894.

Application filed December 20, 1893. Serial No. 494,219. (No model.)

To all whom it may concern:

Be it known that I, RICHARD G. WOOD, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered certain new and useful Improvements in Rolling-Mills, of which improvements the following is a specification.

The invention described herein relates to certain improvements in rolling mills for the production of metal sheets. On account of the plasticity of wrought iron, it is comparatively easy to reduce the sheet bars to sheets of any required gage without re-heating, but it has been found to be nearly impossible to reduce steel sheets to the smaller gages without re-heating at least once during the operation. This re-heating operation has been found to produce an injurious effect upon the metal, and it is the object of my invention to provide for the retention of so much of the original heat of the metal sheets or a partial re-heating thereof, as will permit of their reduction to any desired gage in a continuous operation.

In general terms, the invention consists in the construction and combination substantially as hereinafter more fully described and claimed.

In the accompanying drawings forming a part of this specification, Figure 1 is a top plan view of a sheet mill having my improvements applied thereto, the upper roll of the mill being removed. Fig. 2 is a view partly in section and partly in side elevation, of the mill. Fig. 3 is a sectional elevation of the mill and its co-operating devices, the latter being shown in position for the reception of the sheet as it comes from the rolls. Fig. 4 is a view in elevation, showing the arrangement of the heater or soaking furnace for the return of the metal sheets to the front of the mill. Fig. 5 is a rear end elevation of the heater. Fig. 6 is a transverse section of the same, and Fig. 7 is a sectional detail showing the arrangement of the blast pipes.

In the practice of my invention the mill proper, consisting of the rolls 1 and housings 2, is constructed in the usual or any suitable manner. On the front side of the mill is arranged the fore plate 3, and the bearing rails

4, for supporting and directing these sheets in between the rolls, and on the rear side of the rolls is arranged a plate 5, corresponding to the fore plate 3. In lieu of arranging the rear bearing bars 6 in line with the guide plate 5, and having them fixed as against movement, they are arranged within a furnace 7, and form a supporting bed longitudinal of the furnace on which the sheets may slide, immediately above the bed of fuel, as they are delivered from the rolls, and as they are pushed back over the top roll for another pass. This furnace 7 consists of a plate metal shell lined with firebrick of any desired length, and of a width a little in excess of the widest sheets to be rolled in the mill. The furnace is provided on its lower side with an ash pit 8, and above this ash pit are arranged the grate bars 9, for supporting the coke or other fuel. The roof 10 of the furnace is preferably arched as described, and the sides are held together by tie-bars 11.

The furnace is provided preferably on both sides with chimneys 12, for the escape of products of combustion. At its front end, *i. e.* the end next adjacent to the rolls, the furnace is provided with a horizontal slot 13 of sufficient height to permit of the entrance of one, two, or more sheets, and at its rear end with a similar slot for the passage of the sheets out of the furnace. The rear slot 14 is provided with a lateral notch or opening 15, to permit of the catcher passing his tongs into the furnace, in order to grasp the sheets as they come from the rolls, this notch being closed when desired by a slide 16. The coke or other fuel is charged into the furnace through the doors 17, arranged at its rear end, and the ash-pan is provided at its rear end with a door 18 for the removal of the ashes. In charging fuel into the furnace, care should be taken that it does not rise above the bearing bars 6, which project beyond the ends of the furnace, as shown, affording guides for the entrance of the sheets into and through the furnace.

In order that the sheets may be heated as they pass from the rolls and are slid back over the top roll, it is necessary to maintain a very high degree of heat in the furnace. This is effected by means of a blast which

can be introduced into the ash-pan about mid-way of the length thereof, by a pipe 19, or, and as is preferred, the blast can be introduced at different points, one on each side of the central blast pipe 19, by means of the pipes 20, said pipes being provided with suitable valves, as shown in Figs. 1 and 7, whereby the flow of air can be regulated.

In order to provide for a regulation of the heat of the fuel bed, the ash-pan is divided into compartments by means of doors 21, arranged between the several blast pipes, so as to confine the operation of the blast, as shown in Figs. 3 and 7. These doors 21, are provided at one end with handles whereby they may be turned up in order to permit of the removal of the ashes from each compartment, through the door in the rear end of the ash-pan.

As shown in the drawings, the furnace is provided at or near its rear end with supporting posts 22, resting upon the floor of the mill and at its front end the furnace is supported by a yoke 23, and a chain or rope 24, passing over a pulley and adapted to be operated by hand or by any suitable mechanism. The posts 22 form a pivotal support for the furnace, whose front end is raised and lowered to receive the sheets from the rolls, and to permit of their being returned to the front side of the mill, by means of the rope 24, or any other suitable mechanism adapted to raise and lower the front end of the furnace.

As the sheets are improved by being rolled while in a cold state during the finishing passes, bearing bars 26 are arranged on top of the furnace to receive and support the sheets during this cold rolling, and the front end of the furnace is given a sufficient range of movement to permit of the bearing bars 26 being brought into line with the plate 5, so as to receive the sheets when they come from the mill.

In operating my improvement the front end of the furnace is lowered until the iron bars 6 are in line with the plate 5, so that the sheet will enter into the furnace as it comes from the rolls, and the catcher stands at the rear end of the furnace, and grasping the sheet with his tongs, pulls the rear end of the sheets being rolled, into the furnace so soon as it is

free, from the bite of the rolls. The front end of the furnace is now raised until the sheet, when pushed back by the catcher, will strike above the center of the top roll, and the catcher pushes the sheet back through the furnace and over the top roll, when the sheet is again fed in between the rolls, the furnace being lowered so as to receive the same as hereinbefore described. During the last passes, the furnace is lowered sufficiently to permit the sheets passing onto the bars 26, in lieu of upon the bars 6, so that the sheet will not be re-heated.

It will be readily understood by those skilled in the art that the furnace can be shifted to one side when the larger gages are being rolled, and a preservation of the heat for a re-heating is not necessary.

The term furnace is used herein generically, as other suitable forms of furnaces and means for heating the sheets may be employed.

I claim herein as my invention—

1. The combination of a pair of reducing rolls and a furnace for heating the article, and means for shifting the furnace, whereby it may be adjusted for the reception and return of the article, substantially as set forth.

2. The combination of a pair of reducing rolls, a furnace provided with guides for directing the article being rolled into and out of the furnace, and means for moving the furnace vertically, substantially as set forth.

3. The combination of a pair of reducing rolls, a pivotally mounted furnace adapted to receive the article as it comes from the rolls, and means for raising the furnace for the return of the article to the front of the rolls, substantially as set forth.

4. The combination of a pair of reducing rolls, a furnace provided with guides for directing the article being rolled into the furnace, means for moving the furnace, and guides for receiving the article from the rolls when the furnace is shifted out of the line of feed of the rolls, substantially as set forth.

In testimony whereof I have hereunto set my hand.

RICHARD G. WOOD.

Witnesses:

DARWIN S. WOLCOTT,
F. E. GAITHER.