R. MOON.

ROLL BRAKE.

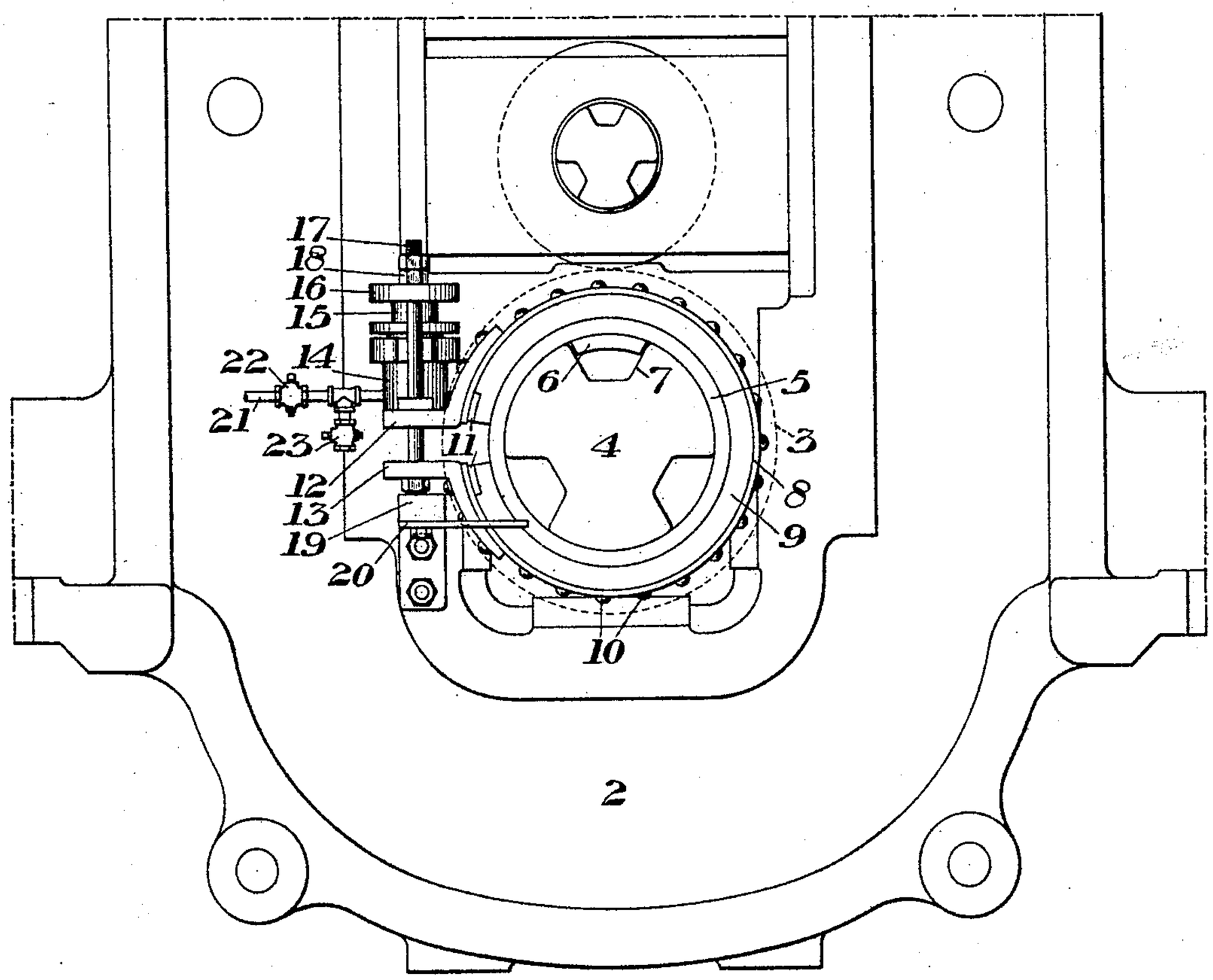
APPLICATION FILED JAN. 5, 1907.

946,252.

Patented Jan. 11, 1910.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES

W. W. Swartz

R. A. Balderson.

INVENTOR

Richard Moon

by Bakewell & Byrnes

his attys

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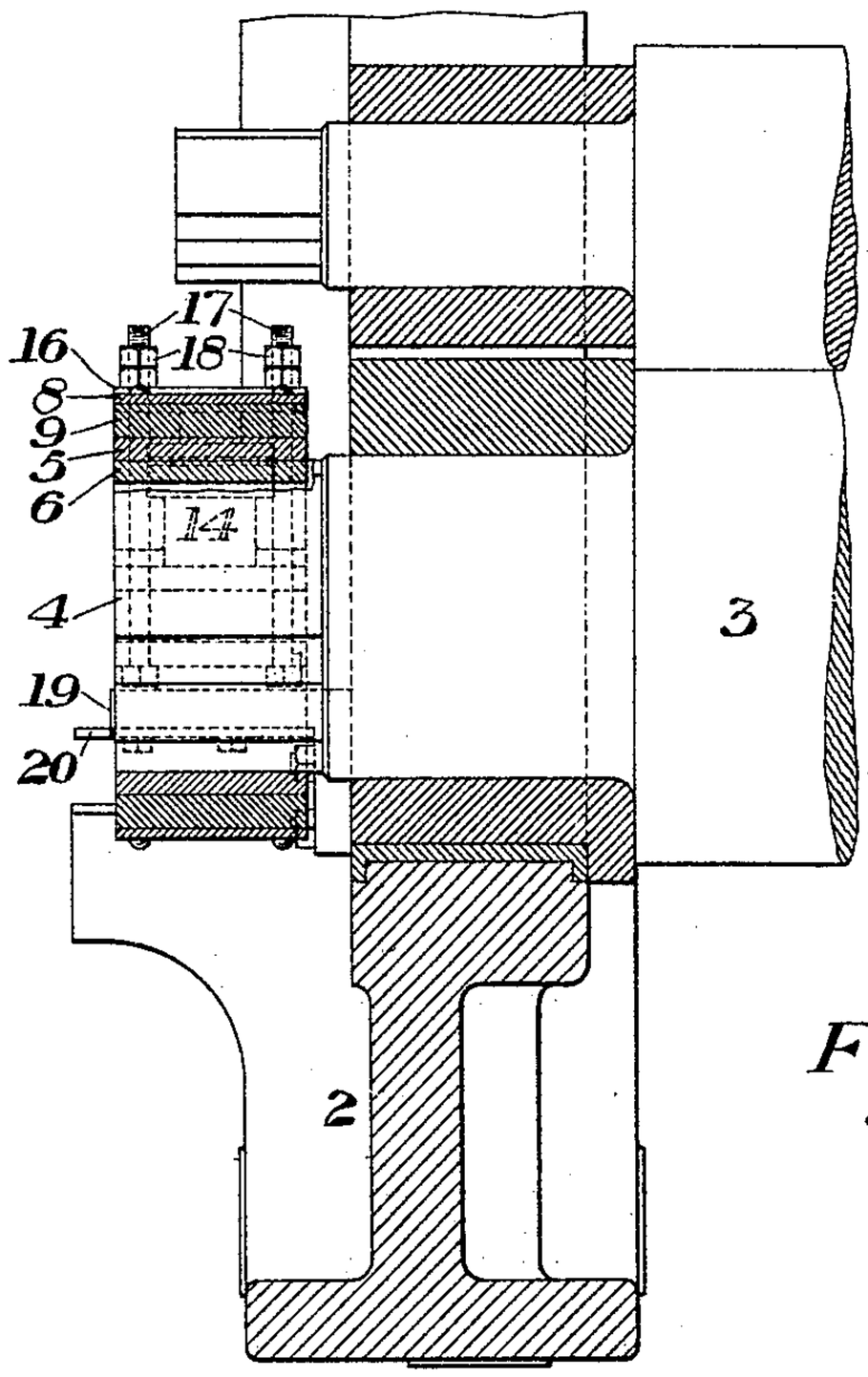

Fig. 2.

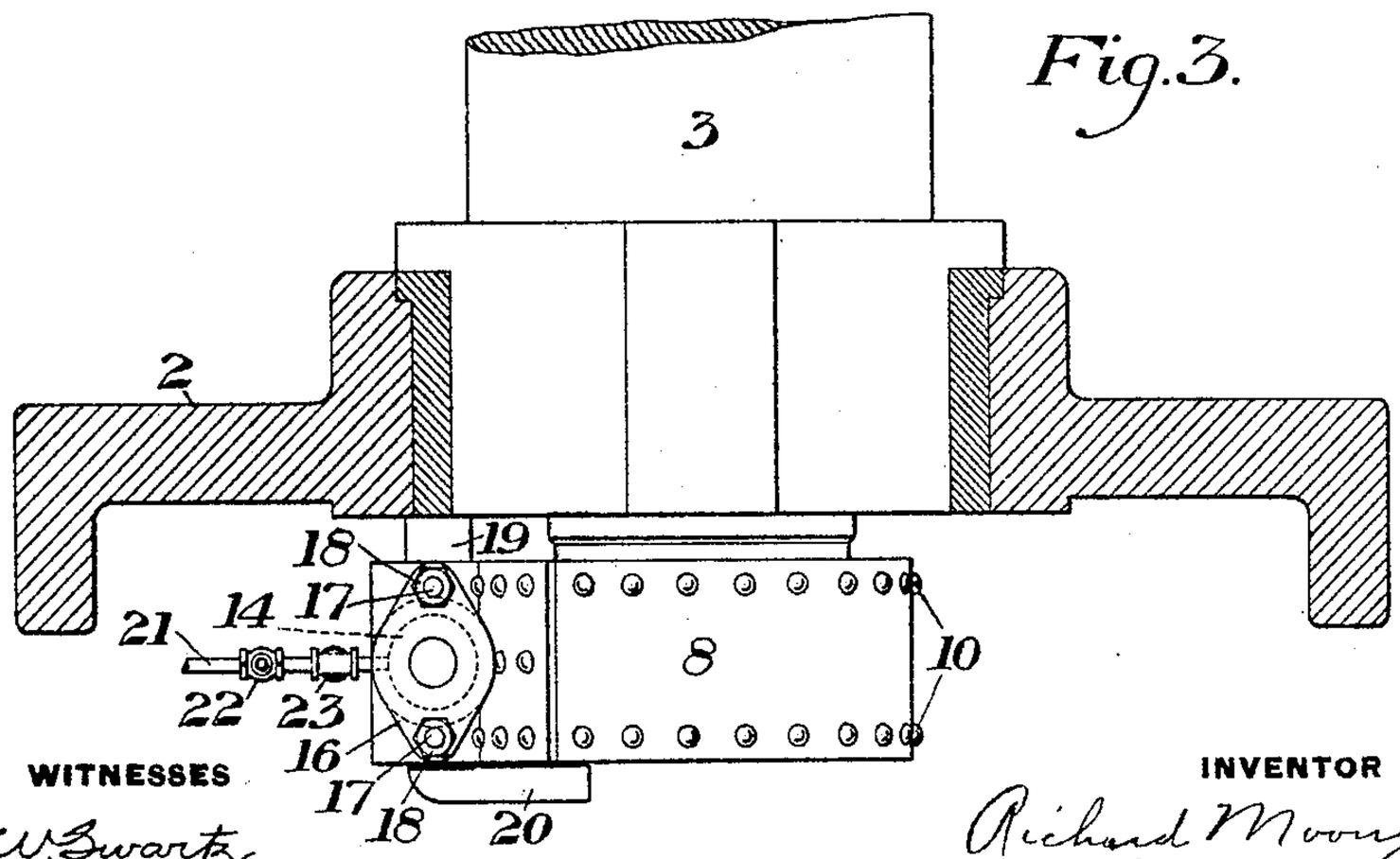

Fig. 3.

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UNITED STATES PATENT OFFICE.

RICHARD MOON, OF HOMESTEAD, PENNSYLVANIA.

ROLL-BRAKE.

946,252. Specification of Letters Patent. Patented Jan. 11, 1910.

Application filed January 5, 1907. Serial No. 351,011.

To all whom it may concern:

Be it known that I, RICHARD MOON, of Homestead, Allegheny county, Pennsylvania, have invented a new and useful Improvement in Roll-Brakes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end elevation of my invention as it is applied to the bottom roll of a three-high plate-mill; Fig. 2 is a sectional side elevation of the same; and Fig. 3 is a plan view.

My invention relates to rolling mills in which the metal is passed between the rolls of the mill in successively opposite directions and in which the rolls are adjusted after each pass, to effect a further reduction of the metal.

In three-high plate-mills such as that to which the apparatus is shown applied, the metal is passed in one direction between the bottom and middle rolls and between the top and middle rolls in the opposite direction. The top and bottom rolls are positively rotated, always revolving in the same direction and the middle roll is frictionally driven by contact with one or more of these positively driven rolls.

Considerable back-lash or lost motion necessarily exists in the connections between the driving spindles and the wabblers on the rolls and the roll driving pinions. As the metal issues from between the rolls, the pressure on the rolls is relieved and, unless the rolls are checked, the momentum of the rapidly revolving rolls will cause them to rotate faster than the roll pinions and the connecting mechanism until the back-lash is taken up and the contacting faces of the driving mechanism are in the position they would assume if the rolls were being employed to drive the roll pinions. When this occurs and the direction of the movement for the metal is reversed, as the metal enters the bite of the rolls the rolls are momentarily prevented from rotating until the back-lash has been taken up and the rolls are again being positively driven by the roll driving mechanism.

The resistance of the metal in entering it between the rolls puts an enormous strain on the rolls and the driving connections and the force of the blow caused by the back-lash frequently breaks the wabblers on the necks of the rolls and the pinions, as well as breaking the spindles and coupling boxes.

The object of my invention is to provide means by the use of which the back-lash is automatically prevented or gradually taken up after the metal issues from between the rolls and before it again enters between the rolls in the opposite direction, and in this way to prevent the liability of breaking the rolls and pinions and the connecting mechanism.

Another object of my invention is to provide means by which constant pressure is maintained upon the friction faces of the brake mechanism and to provide means by which the friction surfaces are automatically adjusted to take up the wear on these surfaces.

In the drawings, 2 indicates one of the roll housings having rolls 3 mounted in suitable bearings therein, the ends of the roll necks being provided with the usual wabblers 4. Removably secured on the wabbler located on the outer end of the neck of the roll 3 is a friction ring 5, this ring being caused to rotate with the rolls by means of the projection or shoulder 6 on the ring, which shoulder engages with the sides 7 forming part of the wabbler on the roll. The friction brake band 8 is provided on the ring 4, this band having a wearing surface 9 which is preferably composed of Babbitt or other anti-friction metal, although wood or other suitable materials may be provided for this purpose. The babbitt 9 is secured to the brake band by means of rivets 10 and strips 11, these rivets and strips being secured in place on the band 8 and the babbitt then poured in place around a mandrel to the diameter of the ring 5. Lugs 12 and 13 are secured to the ends of the brake band 8, the band as shown being made in one piece, although two or more pieces may be hinged or otherwise secured together to form the brake band. A fluid pressure cylinder 14 having a plunger 15 is mounted on the lug 12 and the plunger 15 for this cylinder is provided with the cross head 16, which cross head is secured by means of bolts 17 to the lug 13 on the lower of the two ends of the brake band 8, provision for adjusting these lugs being made by means of the nuts 18 on the ends of the threaded bolts 17.

The brake band is prevented from revolving with the brake ring 5 and roll 3 by means of a knee 19 which is fastened to the

side of the roll housing 2 and endwise movement of the brake band 8 on the ring 5 is prevented by means of the guard 20, this guard being removably secured on the knee 19 so as to permit the ring 5 and brake band 8 to be removed when desired.

Fluid pressure is supplied to the cylinder 14 through the pipe 21 which is connected to the source of pressure supply, the valve 22 being provided to shut off the fluid pressure from the cylinder 14 when desired, the drain valve 23 also being provided for the purpose of draining the cylinder and relieving the pressure therein.

In the operation of my improved apparatus the parts being assembled as shown in the drawings, the engine driving the rolls is started, causing the rolls to rotate. The valve 23 first being closed, the valve 22 is then opened and fluid pressure is admitted to the cylinder 14. This causes the brake band 8 to tighten upon the brake ring 5. The ingot or slab is then passed between the rolls and is partly reduced. As it issues from between the rolls, the frictional pressure of the brake band on the brake ring is sufficient to retard the rotation of the rolls and prevent them from revolving faster than the pinion by reason of their momentum. When the slab is again inserted between the rolls in the opposite direction, the back-lash in the connections between the rolls and pinions has been prevented or taken up by the frictional faces of the brake mechanism and the rolls are being positively rotated. In this way, the blow to the connecting mechanism due to the back-lash is prevented and liability of breakage is greatly reduced.

Considerable pressure is necessary on the brake band in order to overcome the momentum of the rolls and for this reason the faces of the brake band and brake ring become worn rapidly.

Heretofore in apparatus of this kind, the pressure on the brake ring has been maintained by means of screw threaded bolts or by means of springs and on account of the rapid wear frequent adjustments of the apparatus were necessary. By the use of my improved apparatus these difficulties are overcome as the fluid pressure in the cylinder acts to automatically take up the wear between the friction faces of the brake mechanism and keep a constant pressure upon the brake band.

I have shown my invention as applied to the bottom roll of a three-high plate-mill, although the apparatus is intended to be used on both the top and bottom rolls. In attaching the apparatus to the top roll, the means for preventing the brake band from rotating with the brake ring and roll must be secured to the vertically movable bearing in which this roll is mounted instead of on the side of the housing as in the case of the bottom roll. A flexible connection for the fluid pressure supply must be provided for the top roll brake mechanism on account of this mechanism being raised and lowered with the movable top roll.

My invention may be applied to two-high reversing rolling mills in which two rolls are employed to reduce the metal between them, in this case the top roll being adjustable toward and away from the bottom roll and the direction of rotation of the rolls being reversed in order to reverse the direction of feed for the metal. The invention is also adapted for use on the roll pinions and may be applied solely to the pinions or to both the rolls and the pinions when desired.

Modifications in the construction and arrangement of the parts may be made without departing from my invention.

I claim:—

1. In a roll brake for rolling mills, the combination with a brake band arranged to act upon the neck portion of a roll, and mechanism for preventing rotation of the brake band, of a fluid pressure device mounted on the band and arranged to exert a constant pressure on the band against the neck portion, said pressure device being connected to a source of pressure; substantially as described.

2. In a roll brake for rolling mills, the combination with a friction ring adapted to be mounted on the end of a roll and arranged to rotate therewith, a brake band mounted on said friction ring and a stop by which rotation of the brake band is prevented, of fluid pressure means mounted on the brake band and arranged to tighten and maintain a constant pressure on said brake band; substantially as described.

3. In a roll brake for rolling mills, the combination with a friction ring adapted to be secured on a roll, a friction band mounted on the friction ring and an independent guard adapted to engage with and prevent endwise movement of the friction band and ring on the roll, of fluid pressure means arranged to tighten and maintain said friction band at a constant pressure on said ring; substantially as described.

In testimony whereof, I have hereunto set my hand.

RICHARD MOON.

Witnesses:
R. D. Little,
H. M. Corwin.