Sept. 23, 1930. W. W. McBANE ET AL 1,776,444

SCREW-DOWN

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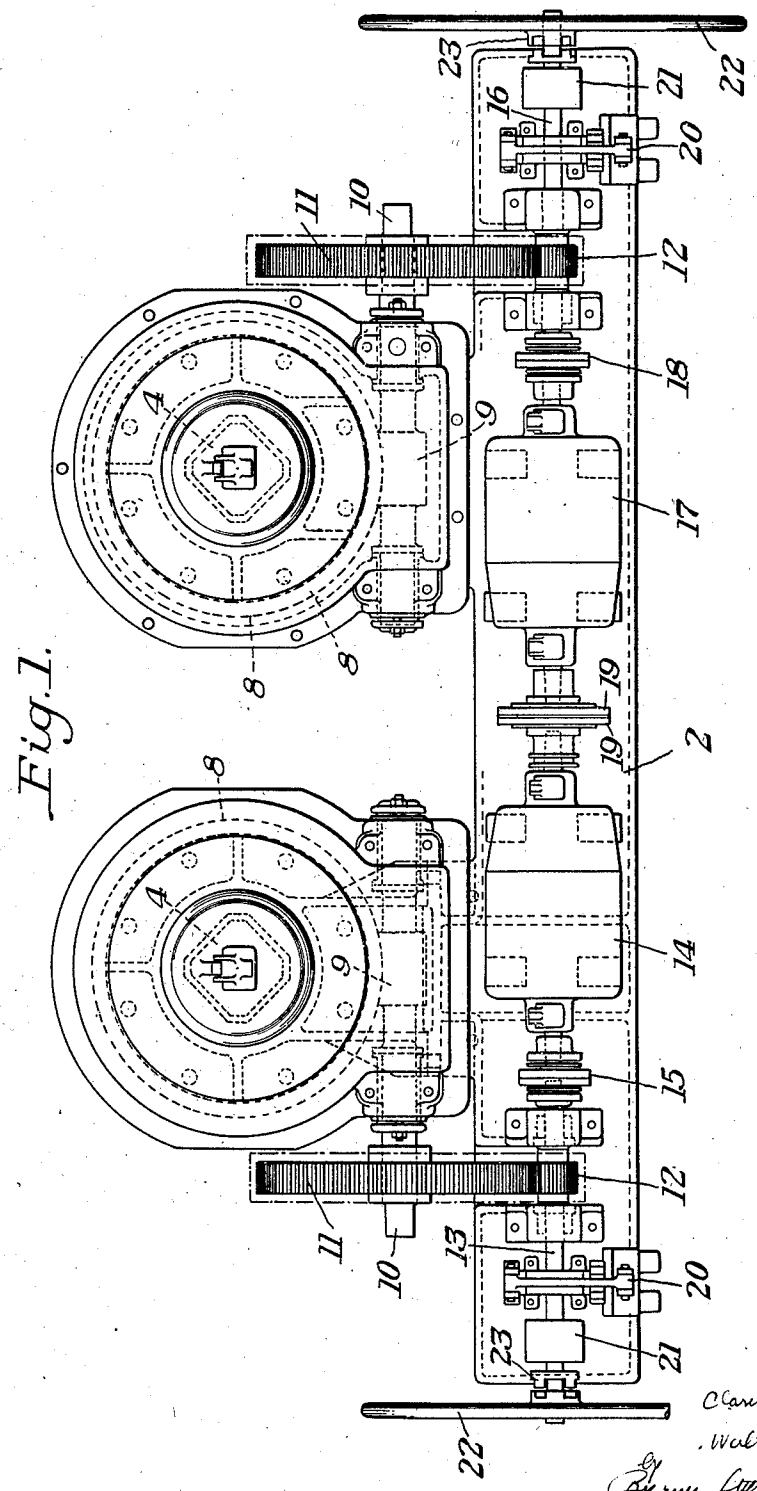


Fig. 1.

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Fig. 3.

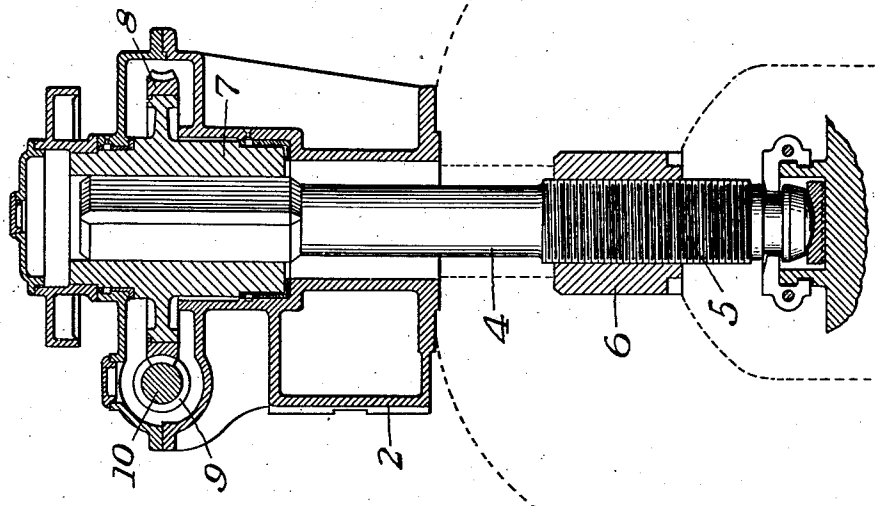
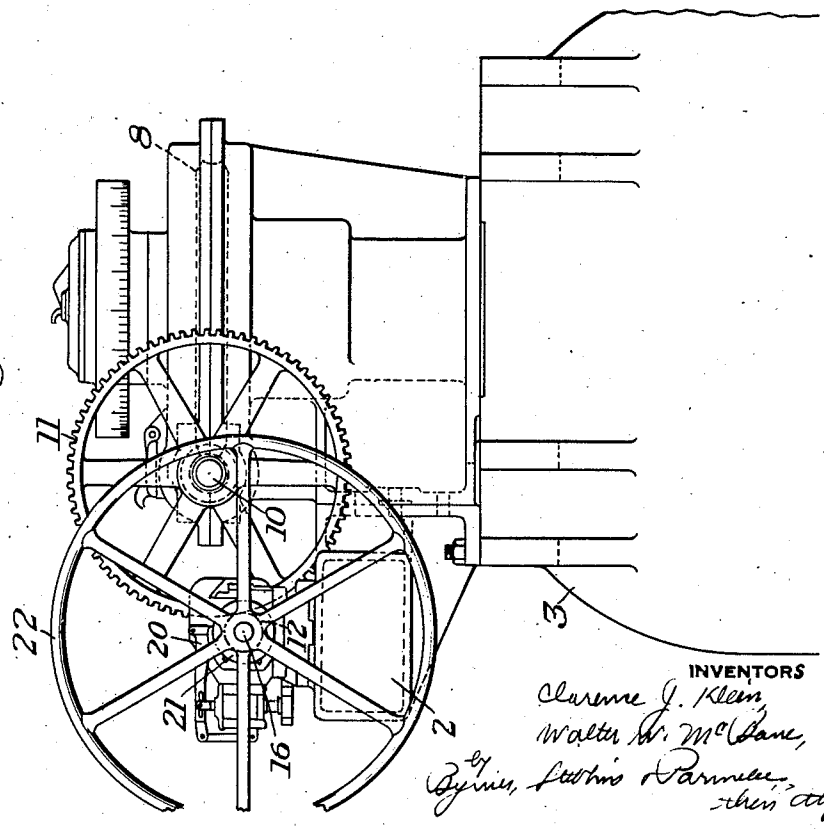


Fig. 2.



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UNITED STATES PATENT OFFICE

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SCREW DOWN

Application filed January 15, 1927. Serial No. 161,387.

The present invention relates broadly to the art of metal rolling and more particularly to an improved form of screw down adaptable for use with rolling mills generally and more particularly for use with sheet or strip mills in which simultaneous or differential adjustment of the ends of a roll is desired or made necessary during the operation of a mill.

In rolling mills, it is customary to provide suitable mechanism for adjusting the rolls vertically during a rolling operation to thereby vary the distance between the rolls or to secure such an adjustment of the rolls as to overcome the tendency of the material being rolled to travel laterally due to the greater resistance afforded to the passage of material adjacent one end of the rolls than adjacent the opposite ends.

The present invention has for one of its objects the provision of an improved screw down mechanism adaptable for use with mills and effective in obtaining a simultaneous or differential adjustment of the ends of one of the rolls either while the mill is in operation or while it is stationary.

Still another object of the present invention is to provide an improved screw down of the character referred to, capable of being controlled from a distance for either simultaneous or differential roll adjustment.

Still another object of the present invention is to provide a screw down which may be operated at will either mechanically or manually as desired.

In the accompanying drawings, there is shown for purposes of illustration only, a preferred embodiment of the present invention, it being understood that the drawings do not define the limits of our invention as changes in the construction, arrangement or assembly of the parts disclosed therein may be made without departing either from the spirit of the invention or the scope of our broader claims.

In the drawings:

Figure 1 is a top plan view of one form of screw down embodying the present invention;

Figure 2 is an end elevation of the construction illustrated in Figure 1; and,

Figure 3 is a vertical sectional view through a portion of the screw down of Figure 1.

The present invention is adaptable for use with mills of any desired type, whether of the two-high, three-high, four-high or cluster type, the particular construction of the mill being immaterial.

The present invention contemplates the provision of a suitable supporting framework 2 adapted to be mounted on the housing 3 of a mill and extend transversely therebetween. Adjacent each end of the framework, there is a vertically extending screw shaft 4 having a threaded portion 5 working through a suitable nut 6 in the housing, the upper end of each of the screws being splined in known manner to receive a hub 7 carrying a worm wheel 8.

It will be apparent that by simultaneously rotating the two shafts 4 at the same speed, the roll controlled thereby will be uniformly raised or lowered, while by effecting a differential movement of the shafts an angular raising or lowering of the roll may be accomplished. For rotating the worm wheels, there are provided worms 9, suitably secured to shafts 10 which shafts at their outer ends carry gears 11 meshing with pinions 12. One of the pinions 12 is arranged on a shaft extension 13 coupled to a motor 14 by a flexible coupling 15 while the other pinion 12 is secured to the shaft extension 16 coupled to the armature of the motor 17 by suitable coupling 18.

The opposite ends of the armature shafts of the motors 14 and 17 respectively, each carry a section 19 of a magnetic or mechanical clutch of any well known construction of such nature that, when energized or operated it will be operative at any rotative position of the motors without delay and/or relative movement between the clutch section such as are normally required to bring clutch teeth into mesh. The two motors will rotate in unison in the same direction and thereby effect a uniform movement of the roll controlled thereby. When the magnetic clutch is de-energized, the motors may operate at different speeds or in different directions to

thereby obtain any desired differential adjustment of the roll.

Cooperating with the shaft extensions 13 and 16, may be brakes 20 of well known construction adapted to check the rotation of the motor armatures when the current thereto is cut off. In some cases, it is desirable to progressively raise or lower a roll by successive increments of movement such as occasioned by a single revolution of the armature shafts of the motors or by a predetermined number of revolutions thereof. Where such is the case, the respective shaft extensions will be provided with limit switches 21 of known construction set to automatically de-energize the motors upon the completion of the desired number of revolutions of their armature shafts. It will be apparent that a suitable control mechanism (not shown) may be provided, whereby the motors may be individually energized in known manner or whereby they may be simultaneously energized with the energization of the magnetic clutch.

As a safety factor, we prefer to provide each of the shaft extensions with a hand wheel 22 adapted to be operatively connected to or disconnected from the shaft extensions by a suitable clutch 23, it being obvious to those skilled in the art that when the adjustment of the rolls is being effected by the motors, the hand wheels should be disconnected.

The present invention enables a roll to be uniformly or angularly adjusted a predetermined or variable amount at will by either mechanical or hand operated means. Certain advantages arise from the provision of a mechanism for accomplishing such a movement, and more particularly from the provision of a plurality of individual adjusting mechanisms adapted to be operatively interconnected for simultaneous movement or disconnected at will for individual movement.

We claim:

1. A screw down mechanism, comprising roll boxes, two vertical screws engaging the tops of said roll boxes, a plurality of motor shafts adapted for simultaneous or individual operation, and hand means on each of said shafts normally operatively disconnected therefrom and adapted to be operatively connected thereto at will.

2. Screw down mechanism for rolling mills comprising in combination two vertical screws mounted in the top of roll housings and each adapted to position vertically one end of a roll, a support extending from housing to housing, two motors on the said support having their shafts in line with each other, an electrically operated friction clutch connecting the said two motors and gearing connecting each of said motors with one of said screws.

3. Screw down mechanism for rolling mills comprising in combination two vertical screws mounted in the top of roll housings and each adapted to position vertically one end of a roll, a support extending from housing to housing, two motors on the said support having their shafts in line and adjacent to each other, a two part magnetic clutch having one of its halves mounted on each of said motor shafts, and gearing connecting each of said shafts with one of said screws.

4. Screw down mechanism for rolling mills comprising in combination two vertical screws mounted in the top of roll housings and each adapted to position vertically one end of a roll, a pair of motors mounted on a support resting on the housings, a countershaft for each of said motors, spur gears connecting each of said motors to its countershaft, a worm on each of said countershafts and a worm wheel operatively mounted on each of said screws and meshing with one of said worms.

5. Screw down mechanism for rolling mills comprising in combination two vertical screws mounted in the top of roll housings and each adapted to position vertically one end of a roll, a detachable support extending from housing to housing, a pair of motors on said support, a friction clutch connecting the said motors, a pinion shaft in line with each of said motors and connected thereto, a brake for each of said pinion shafts, a handwheel on each of said pinion shafts, and power connections between each of said pinion shafts and one of said screws; the said support with the motors, clutch, pinion shafts, brakes and handwheels forming a self contained unit which may be removed from the mill without disturbing other parts thereof.

6. Screw down mechanism for rolling mills comprising in combination two vertical screws mounted in the top of roll housings and each adapted to position vertically one end of a roll, a pair of motors, a clutch connecting said motors, compound spur and worm gearing between each of said motors and one of said screws and an indicating device for each of said screws.

7. Screw down mechanism for rolling mills comprising in combination two vertical screws mounted in the top of roll housings and each adapted to position vertically one end of a roll, a support extending from housing to housing, a pair of motors mounted on the said support and in line with each other, means for operating either of said motors separately, including an individual brake for each motor, a clutch for locking the motors together rotatively, and driving connections between each of said motors and one of said screws.

8. Screw down mechanism for rolling mills comprising in combination two vertical screws mounted in the top of roll housings and each adapted to position vertically one end of a roll, a support extending from housing to housing and secured thereto, a pair of

motors mounted on the said support and symmetrically arranged about the center line of the mill, a magnetic clutch connecting the shafts of the said motors, a pinion shaft in line with each of said motor shafts and coupled thereto and extending from its motor away from the center of the mill, a worm gear casing surrounding the upper end of each of the said screws and secured one to each roll housing, a worm wheel supported in each of said casings and arranged to rotate one of the said screws, a worm and its attached shaft also supported by each of said casings and arranged to drive one of the said worm wheels, a spur gear on each of said worm shafts, a pinion on each of said pinion shafts engaging one of the said spur gears, a brake on each of said pinion shafts and a handwheel on each of said pinion shafts.

In testimony whereof we have hereunto set our hands.

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