

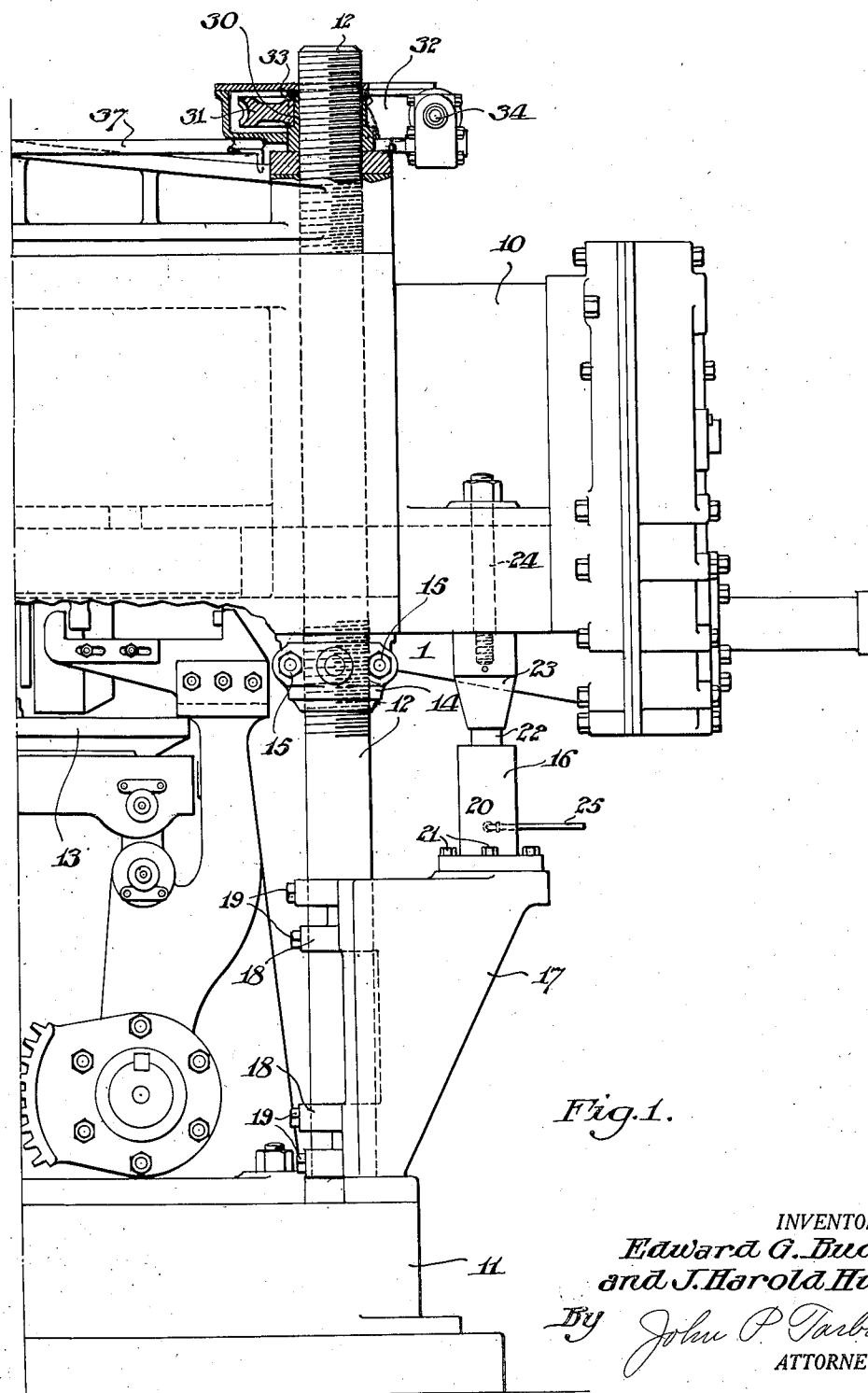
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APPARATUS FOR ADJUSTING ROLLING MILLS

Original Filed April 6, 1926 3 Sheets-Sheet 1



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APPARATUS FOR ADJUSTING ROLLING MILLS

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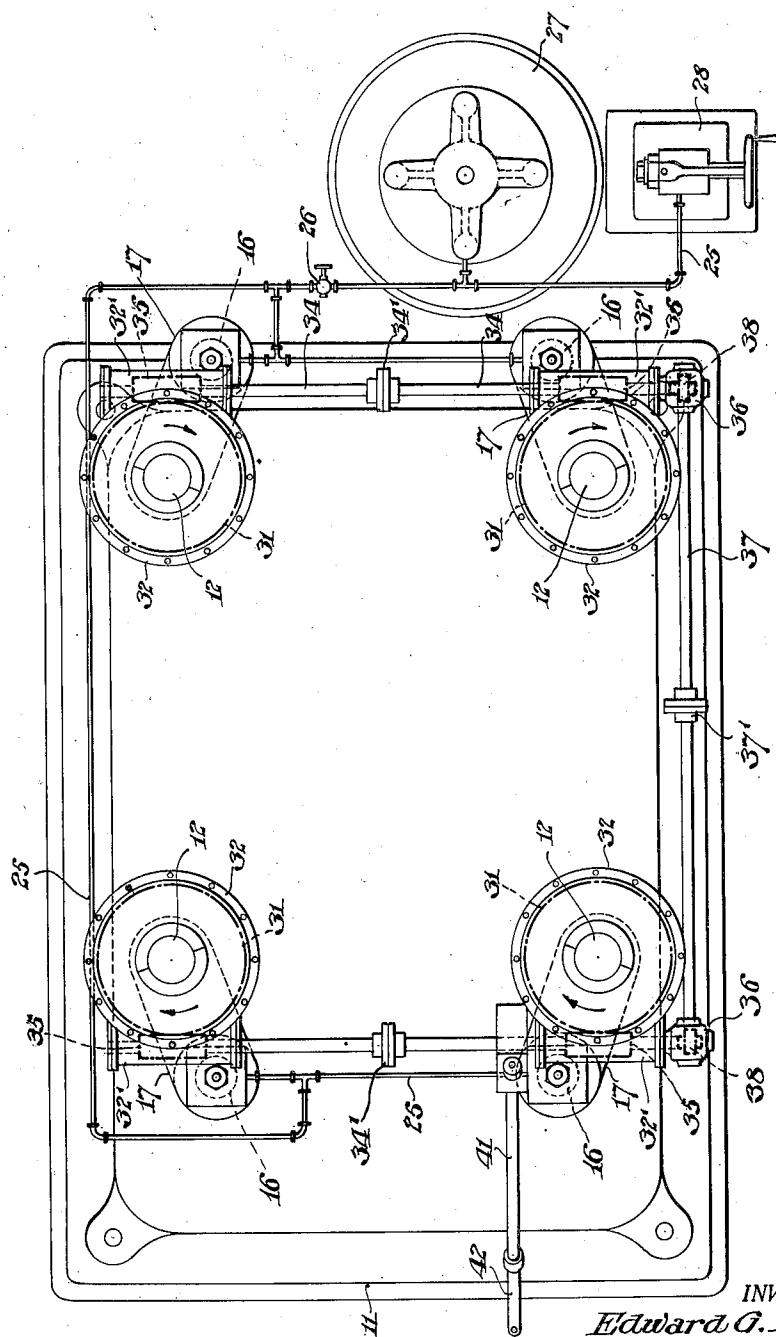


Fig. 2.

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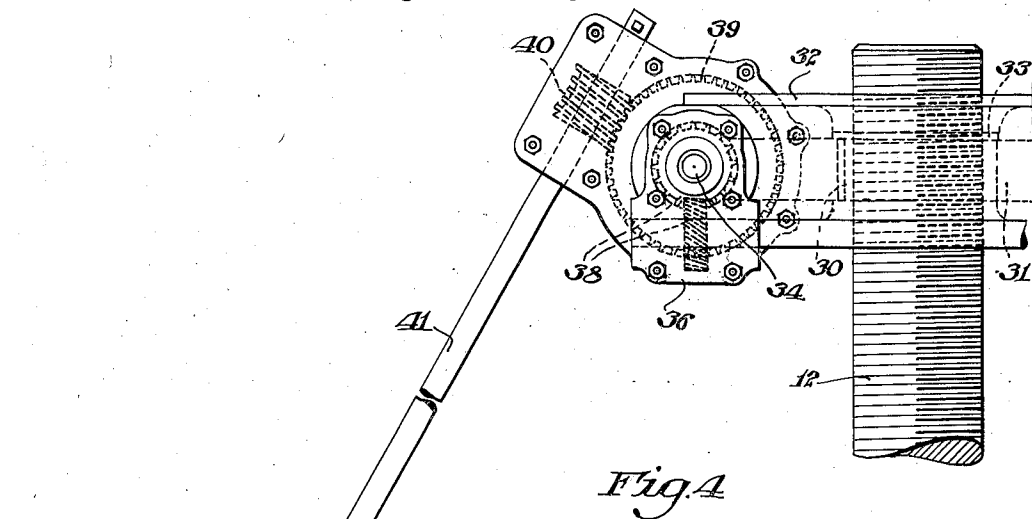
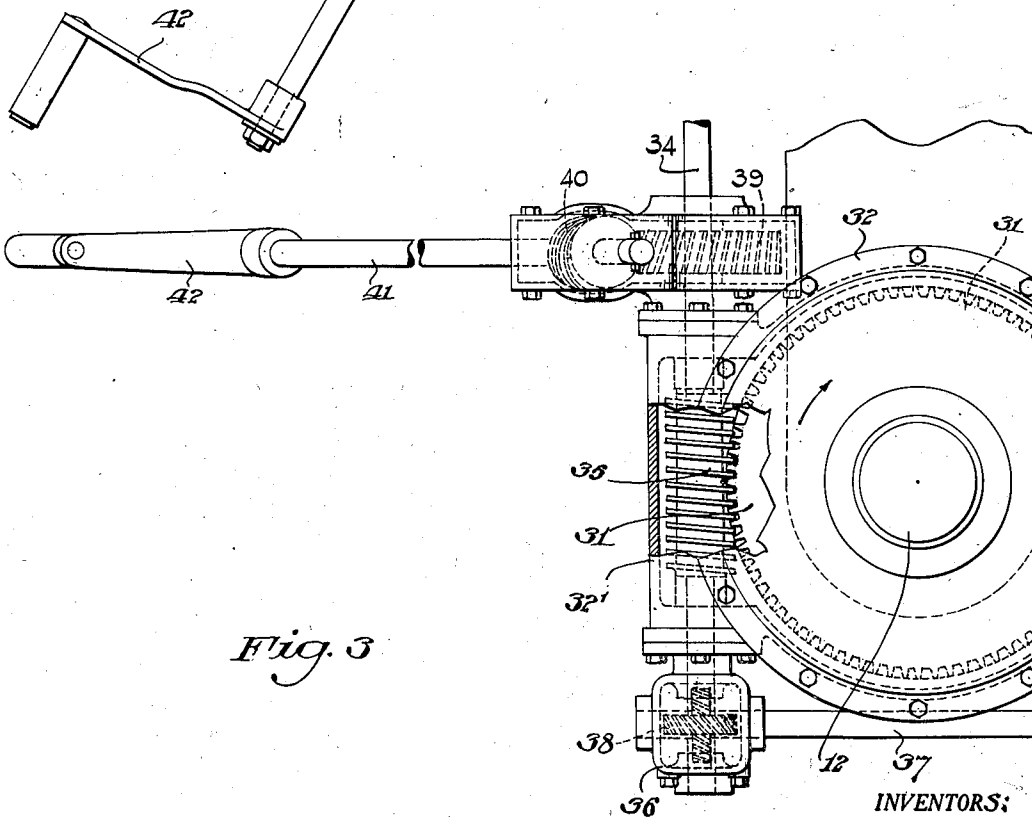
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APPARATUS FOR ADJUSTING ROLLING MILLS

Original Filed April 6, 1926 3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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APPARATUS FOR ADJUSTING ROLLING MILLS

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The invention relates to disc rolling mills and more particularly to the means for adjusting and supporting the roll-carrying heads of such mills as are adapted for the rolling of discs of different thicknesses.

In some machines of this class the rolls are carried by a heavy roll-carrying head which is supported on pillars from the base of the machine on which the rotating support for the blank to be rolled is supported, and the roll carrying head and support are given a relative approach and separation movement to bring the rolls into rolling engagement with the blank after which the rolls are traversed outwardly to roll the disc. It has heretofore been proposed to support this roll carrying head on the pillars by means of upper and lower nuts engaging screw threaded portions of the pillars. When it was desired to change the height of the head to produce a disc of a different thickness, it was necessary to individually adjust each of said nuts, and to make these adjustments substantially equal. Since the heavy head was continuously resting on the lower nuts during the adjustment, it necessarily involved a slow and tedious procedure.

It is an object of the invention to provide a means for effecting this adjustment easily and quickly and this object is attained by incorporating in the machine means whereby the weight of the head can, at will, be almost instantly taken off the lower nuts, and thereby at least one set of nuts, either the upper or the lower set, can then be simultaneously adjusted to the same extent, thereby establishing a new plane, parallel to the original plane of the head, in which the head can be clamped readily by the adjustment of the other set of nuts.

Other and further objects and advantages will be apparent from the following description read in connection with the accompanying drawings forming a part of this specification, and in which—

Fig. 1 is a side elevation of the right-hand half of a machine showing the invention applied thereto, a part of the nut adjusting means being shown in section.

Fig. 2 is a diagrammatic plan view of the

whole machine, showing the invention applied thereto.

Fig. 3 is a detail plan view of parts of the means for adjusting the upper set of nuts simultaneously and Fig. 4 is an elevation of the parts shown in Fig. 3.

In the drawings, the invention is shown embodied in a machine of the class disclosed in an application of Emil A. Nelson, Serial No. 21,797 dated April 9, 1925, for machine for rolling wheel discs, in which the roll carrying head 10 is of massive proportions and is supported from the base 11 of the machine, by four vertical pillars 12. The roll carrying head is substantially rectangular in shape in plan, and the pillars 12 pass up through elongated bearings in the head arranged adjacent the four corners of the rectangle. The roll carrying head is secured in a given horizontal plane by upper and lower sets of nuts engaging screw-threaded portions of the pillars 12. Since the rolls are carried on this head by carriages having right-line movement only in a direction substantially at right angles to the axis of the rotating platen 13 supporting the blank to be rolled, to adjust the thickness of the disc being rolled, it is necessary to adjust the head 10 vertically along the pillars 12. This is accomplished by adjusting the upper and lower sets of nuts. Prior to the present invention, it had been the practice to adjust these nuts individually, but on account of the great weight of the head, and the necessity, in order to secure accurate work, of having the four corners of the head adjusted to the same height, this method of adjusting involved considerable time and the expenditure of much effort.

In the drawings, Fig. 1, one of the lower supporting nuts is shown in Fig. 1 and designated by the numeral 14. These nuts are preferably split, and provided with clamping bolts 15, as shown, to clamp them in adjusted position. To permit the ready adjustment of these lower nuts, according to the present invention, means are provided to permit the quick and easy lifting of the weight of the roll carrying head off the nuts, and this is accomplished, in the present embodiment of

the invention, by a plurality of hydraulic jacks 16, incorporated in the machine.

Preferably these jacks are four in number, as shown in Fig. 2, one being provided adjacent each pillar 12. As shown in Fig. 1, each jack is supported by a strong bracket 17. This bracket is formed with upper and lower parti-cylindrical seats to receive a pillar 12 and opposed to these seats are provided clamping elements 18 having complementary seats, the bracket and clamping elements being adapted to be drawn together to clamp the bracket securely to the pillar by the screws 19. The cylinder 20 of the jack is fixed by suitable means such as screws 21 to the top of the bracket 17 and the plunger 22 is fixed to an elongated nut 23 bearing against the under surface of the roll carrying head 10, and secured in place by a bolt 24 extending through a portion of said head.

By reference to Fig. 2, it will be seen that all the jacks are connected for simultaneous operation by a system of piping 25, the piping being connected, for this purpose, through a hand-operated valve 26 with an accumulator 27 and a hand pump 28. When the jack cylinders are connected to the accumulator and hand pump by the opening of the valve 26 the plungers of the jacks may be simultaneously actuated by equal pressures to raise the weight of the head 10 off the lower nuts 15. This permits the easy adjustment of these, as desired.

In some cases, the lower nuts may be entirely dispensed with, or they may be backed off some distance so that the head may, during rolling, be constantly forced against the upper nuts by the hydraulic jacks, 16. This method of supporting the roll head still further expedites the adjustment of the head, because it dispenses with the necessity of adjusting the lower nuts 15, when an adjustment of the head is to be made.

By the present invention, the upper nuts 30 are all connected together so that they can be simultaneously adjusted and to a like extent. In this way they will at all times serve as a reference plane, against which the roll-carrying head 10 may be forced, and when so forced, it will always occupy a plane correctly aligned with the rotating platen, which is necessary to secure accurate work.

To permit the simultaneous and uniform adjustment of the four upper nuts 30, each of these nuts is, as clearly shown in Figs. 1 and 3, splined to a worm gear 31 inclosed within a gear housing 32 carried by the nut and forming with the nut a substantially grease-tight casing, suitable packing 33 being provided at the joints between the nut and the gear housing. In a lateral extension 32' of the main gear housing a worm shaft 34 is journaled, this worm shaft carrying a worm 35 for engagement with the worm gear splined to the nut. The worm shafts 34

of the pairs of nuts at each end of the machine, see Fig. 2, extend inwardly into abutting relation and are there united by a suitable universal connection 34' to turn as one shaft. The shafts 34 for the two nuts at the front of the machine, Figs. 1 and 2, project a short distance beyond the gear housing extension 32' in which they are journaled into a gear box 36 forming, in effect, an axial extension of said gear casing extension 32'. A shaft 37, formed by two abutting lengths of shafting united by a universal connection 37', along the front of the machine, has its ends extend into said gear boxes 36. The ends of shaft 37 and shafts 34 are suitably geared together, as by spiral gears 38, so that all the worms 35 are connected together to rotate at the same speed.

It will be obvious, then, that a rotation of one of said shafts 34, 37 will rotate all of them to effect a simultaneous and uniform adjustment of all the nuts 30. A means for manually rotating said shaft is disclosed in Fig. 2 and in the detail views of Figs. 3 and 4. A spiral or worm gear 39 is splined to the shaft 34 at a point adjacent the left-hand forward pillar 12, and with this gear meshes a worm 40 connected to a downwardly extending shaft 41 to the end of which is secured a crank 42 for rotating it. The gears 39 and 40 are enclosed in a suitable gear box in which the shaft 41 is journaled and which is connected in any suitable manner as by a flanged connection to the gear housing extension 32' of the adjacent worm 35 and worm gear 31.

From the foregoing description of its construction, the operation of the apparatus for carrying out the improved method of adjusting and supporting the roll carrying head will be readily apparent. If an adjustment of the head is to be made in downward direction, assuming the weight of the head is carried by the lower nuts 14, and the jacks are idle, hydraulic pressure is simultaneously admitted to the jacks to first take the weight of the head off the nuts 14. These are then easily and quickly adjusted downwardly preferably a distance greater than the desired adjustment of the head. The pressure on the jacks is then slightly released to permit the head to settle. The upper nuts are then simultaneously adjusted by turning the hand crank 42. After having made a few adjustments the operator will soon know how many turns to give the crank to effect the desired adjustment. After the top nuts have, in this way, been adjusted to determine the new plane of the roll carrying head, full pressure is again admitted to the jacks to raise the head against these nuts. The lower nuts may then be rapidly screwed up and clamped in position.

If the lower nuts are not used to keep the head raised against the upper nuts, the pressure is continuously maintained in the hy-

draulic jacks during the time when the machine is rolling. In such case, when the machine is not in use, the head may be allowed to drop below its normal working position and rest on the lower nuts 14.

To adjust the head in upward direction, the upper nuts 30 will obviously be operated first to the required degree, after which the head is raised against them by the hydraulic jacks. The lower nuts may or may not thereafter be moved up against the head dependent upon whether it is desired to support the head during rolling on the lower nuts or on the jacks.

It will be understood that changes and modifications may be made in the apparatus, without departing from the spirit and scope of the appended claims.

We claim:

1. An apparatus of the character described, comprising a roll-carrying head, a plurality of spaced columns supporting said head, means adjustably associated with said columns for vertically locating said head on said columns and simultaneously actuated means engaging the head at spaced points for taking a substantial portion of the weight of said head off said locating means while adjusting the same.

2. An apparatus of the character described, comprising a plurality of supporting columns, a roll carrying head supported thereby, adjustable abutment means associated with each of said columns, and arranged for simultaneous actuation to displace each of said abutment means through equal distances along said columns, and means independent of said abutment-adjusting means for continuously pressing the roll carrying head against said abutment means whereby to cause the head during the adjustment of said means, to move so as to maintain the successive positions thereof parallel to itself.

3. An apparatus of the character described, comprising a plurality of supporting columns, a roll carrying head supported thereby, adjustable means associated with each of said columns to secure the roll carrying head in any given adjusted position, and additional means also associated with said columns and adapted for simultaneous actuation to take the weight of said roll head and thereby permit substantially unopposed movement of said adjusting means to secure the roll head in a different position on said supporting columns.

4. An apparatus of the class described, comprising a plurality of supporting columns, a roll-carrying head adjustably supported on said columns, adjustable means associated with each of said columns for engagement with upper and lower surfaces on said head whereby to clamp the head between them, hydraulic jacks associated with each of said columns and having their plungers acting against the under side of said head,

said jacks being adapted to be actuated simultaneously to lift substantially the entire weight of said head off the lower adjustable means to permit easy adjustment thereof.

5. An apparatus of the class described, comprising a plurality of supporting columns, a roll-carrying head adjustably supported on said columns, nuts associated with each of said columns and arranged to be simultaneously actuated to adjust each an equal amount along said columns, said nuts defining through their simultaneous adjustment, different planes of adjustment of said roll head, each parallel to the others, and means associated with each of said columns and interconnected for simultaneous actuation to raise the roll head against said nuts, and a second set of nuts associated with said columns and adapted to be readily screwed up against said roll carrying head to clamp it against the first set of nuts.

6. An apparatus of the class described, in combination, a plurality of columns, a roll-carrying head slidably supported thereby, a plurality of simultaneously adjustable abutments, one associated with each of said columns and coacting with the upper portion of said head, means for simultaneously adjusting said abutments along the columns at uniform speed, and a plurality of quick-acting pressure elements, one associated with each of column, said pressure elements being adapted to be simultaneously actuated to force the head against and hold it against said adjustable abutments.

In testimony whereof they hereunto affix their signatures.

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