May 26, 1953 L. M. COTCHETT ET AL 2,639,558

BUFFING MACHINE FOR DRAWING ROLLS

Filed Aug. 24, 1951 3 Sheets-Sheet 1

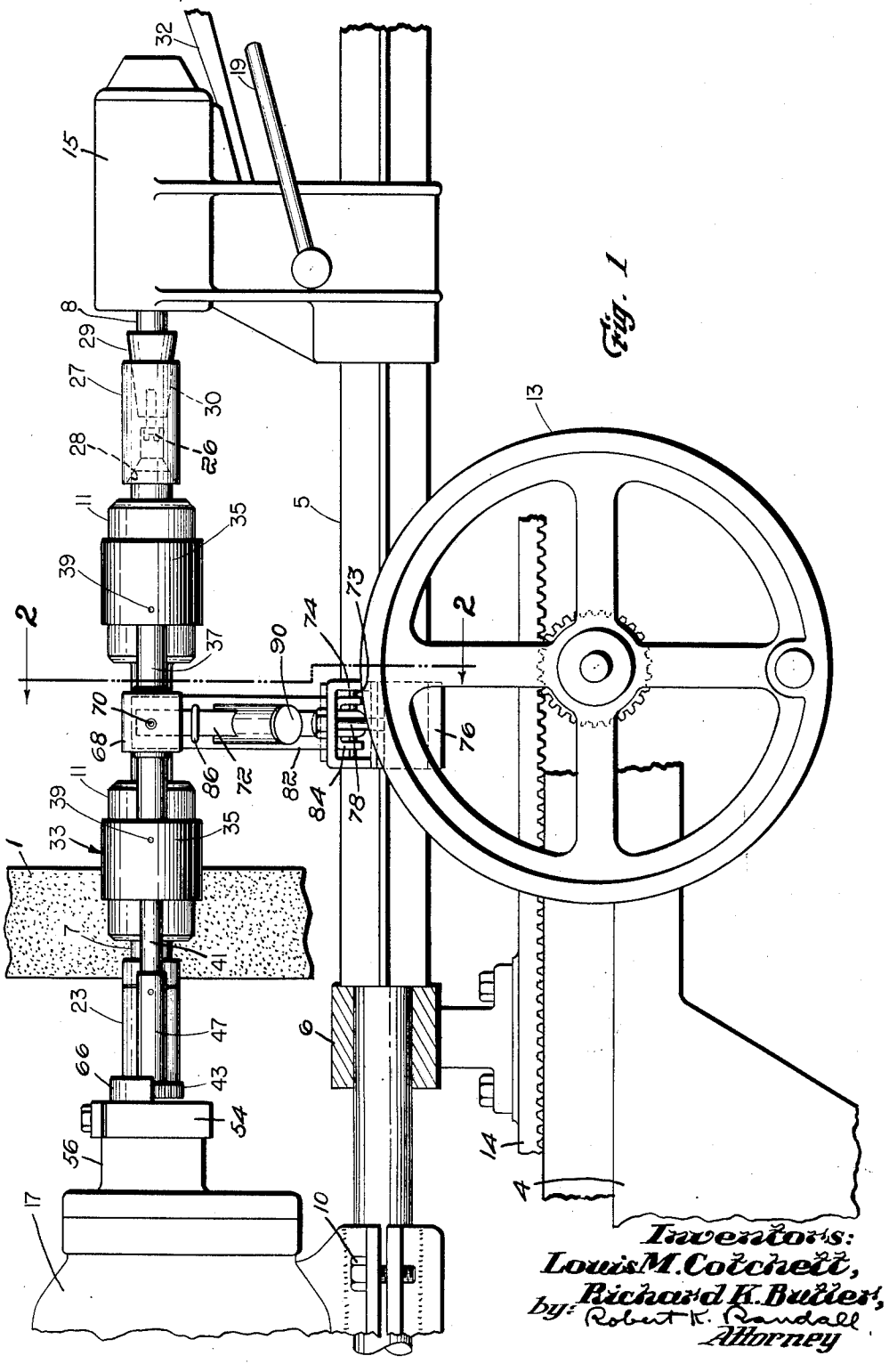


Fig. 1

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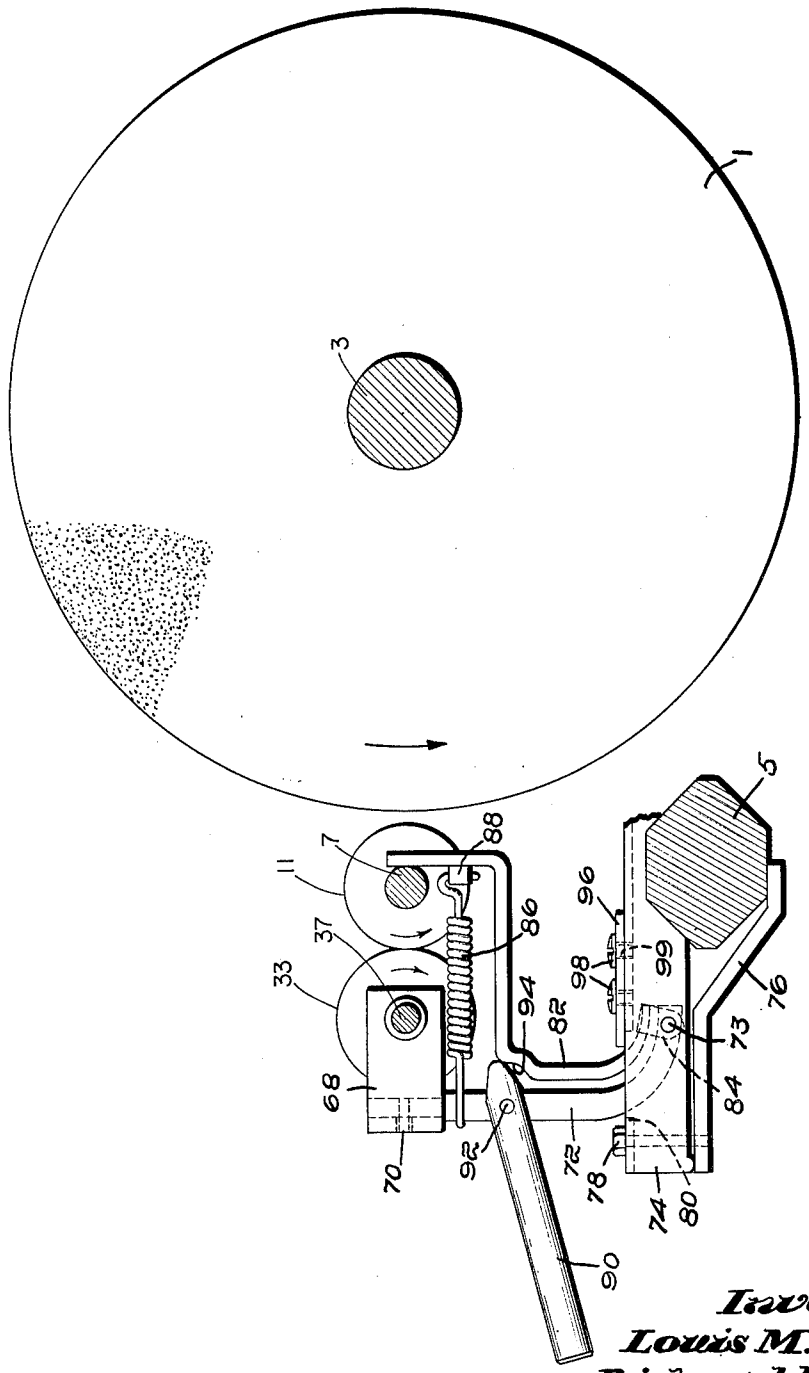


Fig. 2

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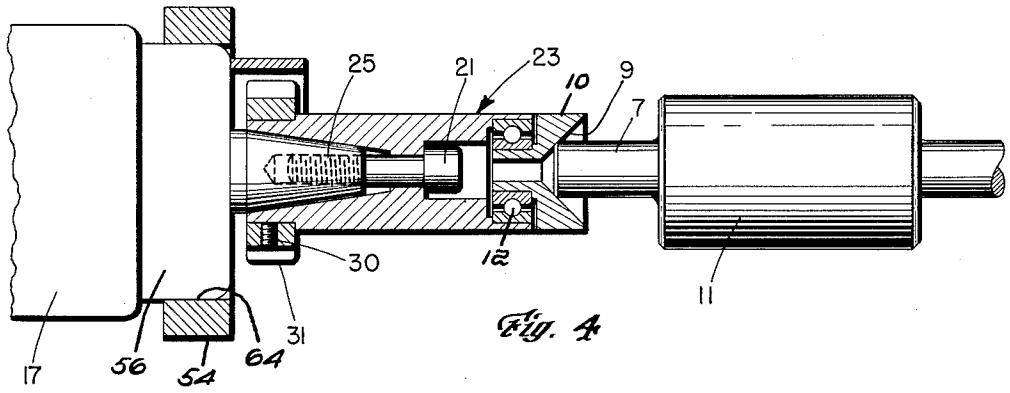


Fig. 4

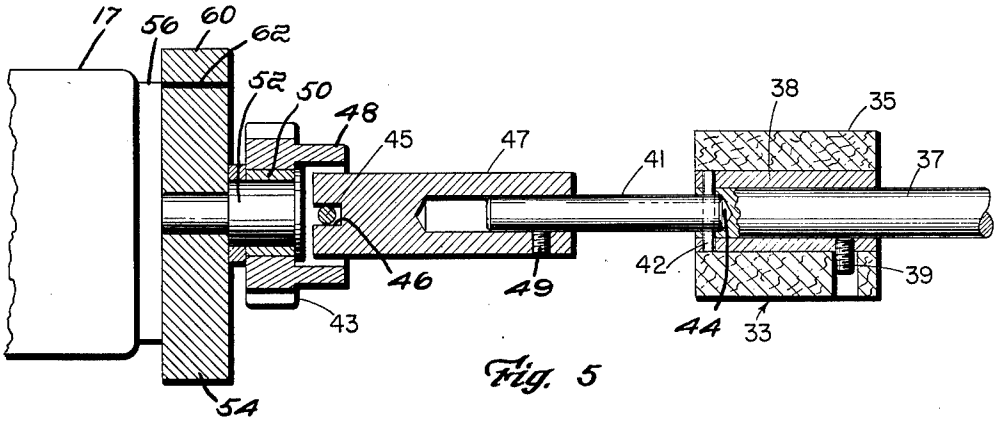


Fig. 5

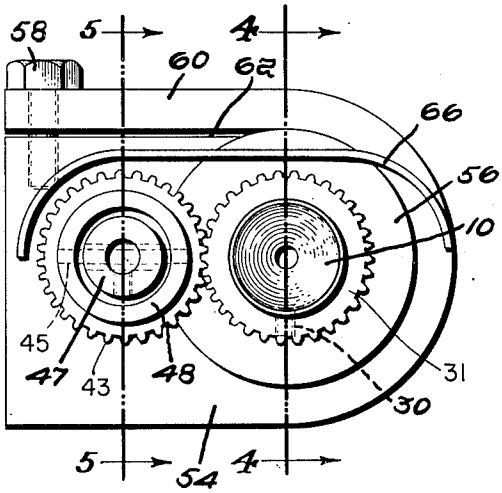


Fig. 3

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UNITED STATES PATENT OFFICE

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BUFFING MACHINE FOR DRAWING ROLLS

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10 Claims. (Cl. 51—95)

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This invention relates to machines for buffing the outer coverings of drawing rolls of roving and spinning frames, and is more especially concerned with rolls of the so-called shell type.

A smooth, cylindrical and concentric surface must be put on and kept on the cots covering the bosses of top rolls in order to make good yarn and every mill employing the customary top rolls covered with cork or rubber composition or other synthetic resilient material must have access to buffing machines in order to keep its top rolls in good working condition.

The introduction of shell rolls, including ball bearing rolls, and other anti-friction bearing rolls, has made a new problem for the mills, because most existing buffing machines are built solely for solid rolls and are designed to revolve the rolls, while pressed against the grinding wheel, by engaging solely the pintles of the rolls. Hence these machines are useless for grinding shell and anti-friction type rolls the bosses of which are free on their axles, and as constructed can only be used to grind each shell of the shell type roll individually after removal from the roll axle. Such step is impracticable because of resulting lack of standarization in grinding successive rolls, and its proneness to produce tapered rolls having different diameters at their two ends; in addition to the nuisance of requiring disassembling and reassembling of each roll, inferior performance results from returning the rolls to the wrong ends of the shaft. Also, when the pintles of the solid rolls are formed of nylon or other material having a low coefficient of friction these machines do not work reliably.

Machines have been proposed to grind these shell type and anti-friction rolls by driving the bosses instead of the pintles, but had the drawback that they would not handle the solid type rolls conveniently or efficiently, and therefore the mill making yarn needed two kinds of grinders, because it also possessed and used solid rolls which had to be buffed. In addition, such of these prior machines as rotated the bosses frictionally about their own axles had defective capacity for adjustment to take rolls of different dimensions, and also did not have capacity for proper adjustment of the pressure or consistent pressure on successive top rolls exerted by the frictional driving means against the cot. Also, it has been difficult in prior machines to avoid grinding a taper on the cots.

The main object of the present invention is to devise a buffing apparatus to be made primarily for attachment to existing commercial

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buffing machines with a minimum of change in the latter, whereby either solid, anti-friction, or shell type rolls can be buffed while they remain in their assembled condition and are revolved about their own axles or journals; also, to remedy the other drawbacks noted in prior structures.

Another object of the invention is to rotate the shells of shell type or anti-friction rolls by frictional engagement with a driving assembly which contains a minimum number of working parts and of supports for such driving mechanism connecting the roll with the driving motor which rotates it during buffing, and requiring the least change in the established manner of operating the machines to which the operators have become accustomed.

The manner of attainment of these and other objects of the invention is shown in the accompanying drawings, in which

Fig. 1 is a front elevation of certain portions of a buffing machine having the novel attachment according to our invention applied thereto.

Fig. 2 is a side view partly in section on line 2—2 of Fig. 1.

Fig. 3 is a side elevation showing details of the power take-off from the driving motor.

Fig. 4 is a section on line 4—4 of Fig. 3.

Fig. 5 is a section on line 5—5 of Fig. 3.

The invention is shown as built to serve as an attachment to an existing buffing machine built for solid rolls only, to enable a single buffing machine to grind either solid type or shell type rolls. Herein, the attachment is designed to fit on the well-known buffing machines sold by the Armstrong Cork Co., of Pittsburgh, Pa., in which a grinding wheel 1, Figs. 1 and 2, on its motor-driven drive-shaft 3 is mounted in a fixed position on the stationary frame 4 of the machine while a carriage 14 slides back and forth parallel to the grinding wheel shaft 3 carrying the rock-shaft or rocking rail 5 on which is adjustably mounted the tailstock 15 held to the rail by a clamp actuated by hand lever 19, and an electric motor 17 which as the machine is sold acts as the headstock and drives the solid roll directly by chuck means engaging one of its journals. This top roll is traversed back and forth in a straight line across the grinding surface of the wheel 1 when hand-wheel 13 is rotated in the accustomed manner to reciprocate carriage 14 by the rack and pinion shown, the usual screw means (not shown) limiting the rocking of rail 5 and the parts borne thereby toward wheel 1 and holding rail 5 at the desired angle during traverse to give the wanted depth of cut.

The novel attachment of the invention comprises essentially means for supporting the top roll being ground in the same position on the axis of the driving motor 17 and thus in the same position with respect to grinding wheel 1 as is determined by the design of these buffing machines as initially made and sold, but driving either the entire solid roll or the shell rolls of a shell type roll by means of a friction driving roller engaging the surfaces of the cots being ground and itself driven by simple power takeoff means from the original driving motor 17. That is, though the roll being ground is supported in coaxial relation with the motor's shaft, which as the machine was built drove the solid roll directly by engaging one pintle of this roll, the drive from the motor is now taken off tangentially therefrom, carried along a shaft substantially parallel to the common axis of the motor and top roll, and then applied frictionally tangentially to the cot-clothed bosses or shell rolls of either type of roll.

The driving roller presses the bosses of the top roll toward the grinding wheel in a direction radial to the latter, and such pressure is applied in line with and diametrically opposite to the radial force of reaction of the grinding wheel against the cots of the top roll. By using a driving roller which engages directly with the cot surface being ground diametrically opposite the grinding point, rather than by exerting pressure at midlength or at the ends of the roll and offset with respect to the force of reaction, the invention avoids the fault of prior structures of grinding a taper instead of a true cylinder shape on the cots, which results in solid rolls through bending of the roll as a result of such offset pressure.

Thus as shown in Fig. 1, and more particularly in Fig. 4, the top roll 11, which can be either of shell roll or solid type, has one end of its axle or journal 7 seated in a conical recess 9 in a cup 10 acting as a live center for the axle 7, which cup is mounted on ball bearings 12 in the end of a sleeve 23 having a tapered recess fitting the tapered motor shaft 25, being held thereon by screw 21. The motor shaft 25 thus supports one end of the roll, but does not drive it directly. In this manner, axle 7 is free to rotate independently of sleeve 23, though supported coaxially thereby. The opposite end of shaft 7 is supported by the usual sleeve member 27 having a conical recess 28 in which such other end of axle 7 is seated, this sleeve having a tapered socket 30 wherewith it is fixed by screw 26 on the tapered portion 29 of the tailstock's free-turning center 8, spring-pressed toward the roll and retracted manually by depressing lever 32.

To rotate the top roll about its axis to give its surface relative travel with respect to that of grinding wheel 1 during the time when these two surfaces are in engagement, a friction driving roller 33, Figs. 1 and 5, is provided having two bosses formed of metallic sleeves 38 having deep coverings 35 of rubber or other frictional material, and fixed to a common axle 37 by set screws 39. Roller 33 is driven from motor 17 by an extensible shaft of which the portion 41 of smaller diameter telescopes within the large portion 47, being held by set screw 49, to enable the position of roller 33 to the shifted toward or from driving motor 17 so that its bosses 35 will cooperate correctly with drawing rolls 11 of different lengths and gages. For the same purpose, the bosses 35 are adjustable along their common axle 37 by

use of the set screws 39. Portion 41 of the telescoping shaft is received loosely within a socket 44 in the end of axle 37, being held therein by a pin 42 fixed in portion 41 but fitting loosely in over sized holes in both axle 37 and the metallic sleeve 38. This loose connection at pin 42 comprises one portion of a universal joint, the complementary portion being provided by forming a notch 45 at the left-hand end of part 47 of the telescoping shaft, occupied by a pin 45 angularly displaced 90° from pin 42.

Pin 45 extends diametrically through and is fixed in the rim 48 of a gear 43 mounted by means of its bushing 50 on the shank of a headed stud 52. This stud is fixed in a plate 54 clamped fixedly on the extension 56 of the housing of motor 17, by means of clamp screw 58 drawing down on a tongue 60 freed from the body of plate 54 by a slot 62 tangent to the aperture 64, Fig. 4, formed in the plate for the reception of the reduced end 56 of the motor housing.

Gear 43 is driven from the motor by a gear 31 intermeshing therewith and fixed by set screw 30 on the reduced end of sleeve 23 fixed on the tapered end of the motor shaft 25.

Thus, though the journal or axle 7 of the top roll 11 is supported by and coaxially with the motor shaft and thus in proper relation to be brought into grinding relation with wheel 1 when rail 5 is rocked, the drive of the top roll is no longer transmitted through the journal or axle of the top roll but through gears 31, 43 flexibly mounted telescoping shaft 41, 47, through axle 37, and thence delivered frictionally directly to the cots of top roll 11 whether of solid or shell roll type through engagement of the frictional surface coverings 35 of bosses 33 with the cots. Interposition of the two gears 31, 43, retains the original direction of rotation of roll 11 so that its surface is rotated counter to the direction of travel of grinding wheel 1, as before. Guard 66 on plate 54 protects the operator from the gears.

To hold driving roller 33 in firm driving engagement with the cots convering each boss of roll 11, roller 33 is supported by a strap 68 U-shaped in plan view in the ends of which shaft 37 is journaled at midlength, strap 68 for conforming engagement of the roller with the cots of roll 11 being loosely mounted by pin 70 on the reduced top end of a member 72 which is pivotally mounted at 73 on a bracket 74 fixed to the octagonal section of rocking rail 5 with capacity for adjustment therealong by means of a clamp 76 engaging the under side of such rail and held by screw 78. As shown in Fig. 1, bracket 74 is of inverted U-shape in section, being stamped from sheet metal with a wide slot 80 formed in its top surface to accommodate member 72 as well as a second member 82 which is also pivoted at its lower end by means of a yoke 84, welded thereto, upon the same pivot 73. The upper ends of the two members 72 and 82 are drawn toward each other by a contracting spring 86 looped around member 72 at one of its ends and having its other end hooked through a loop 88 fixed on one surface of member 82.

Member 82 engages the neck between the two bosses of the roll 11 to be ground, such roll being held in axial alignment with motor shaft 25 and spindle 8 of the tailstock, and friction driving roller 33 is brought into and held in driving engagement with such bosses by the action of spring 86 exerted on member 72 supporting the driving roller 33. With top roll 11 thus driven in the direction indicated by the arrows in Fig. 2, rail

5 and all parts thereon are then rocked toward grinding wheel 1 to bring top roll 11 within range thereof, while hand wheel 13 is manipulated to traverse these parts past grinding wheel 1 just as heretofore to grind the cots of top roll 11 to truly cylindrical and concentric shape and identical diameter.

To facilitate installing and removing top roll 11 before and after grinding, a hand lever 90 forked and pivoted at 92 on member 72 bears against a shoulder 94 of member 82 when the lever is in raised position to displace the upper end of member 82 away from driving roll 33 to make room for the easy passage of the neck of top roll 11 down or up in front of such end before or after grinding the top roll. One edge of slot 80 in bracket 74 limits the excursion of member 72 in one direction, while a plate 96 adjustably mounted on top of bracket 74 by screws 98 passing through slots 99 in plate 96 limits the movement of member 82 in a direction away from member 72.

The universal joint or flexible shaft drive of roller 33 permits relative change of the spacing of such roller's axis from the axis of top roll 11 to accommodate top rolls of different diameter, the changes in diameter during grinding, and the insertion and removal of the top rolls, contact and conformation between the bosses of the top roll and of the roller as well as constant driving pressure with successive top rolls being automatically effected by the action of spring 86.

To use the device in buffing an anti-friction top roll 11, handle 32 is depressed to retract spindle 8 of tailstock 15 and the ends of the axle of a shell type roll or the journals of a solid type roll are inserted in conical recesses 28 and 9, with the neck of the roll in front of member 82. When the top roll is so inserted and handle 32 is released, lever 90 is depressed to permit spring 86 to bring the driving roller 33 into frictional driving engagement with the coils of the top roll. With the top roll thus revolving, the rail 5 is rocked toward the grinding wheel 1, and carriage 14 reciprocated to carry the top roll past and in contact with the periphery of wheel 1, the only new manipulation over the established technique used by the operator being the raising and lowering of handle 90.

As is obvious, no changes are necessary in the machine to enable it to grind either solid or shell type top rolls, since member 10 on its bearings 12 leaves the journals of a solid roll free to rotate at all times and thus solid rolls are buffed with the same ease and accuracy as shell type rolls.

While we have illustrated and described certain forms in which our invention may be embodied, we are aware that many modifications may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, we do not wish to be limited to the particular forms shown or to the details of construction thereof, but what we do claim is:

1. A machine for buffing drawing rolls having in combination a grinding wheel, a motor, a shaft on the motor, means for supporting a drawing roll for rotation about the axis of such shaft, devices mounting the supporting means and the motor for movement to and from the grinding wheel, a driving roller to engage the drawing roll, means driven by the motor rotating the driving roller about an axis offset from that of the motor shaft, and means for shifting the driving roller in and out of driving engagement with the drawing roll.

2. An attachment for drawing roll buffing machines having a grinding wheel, a traversing carriage, and a driving motor on the carriage, comprising in combination freely rotating supports for the ends of a drawing roll carried by the carriage, a driving roller to engage the surface of the drawing roll and to press the latter toward the grinding wheel in a direction radially of the grinding wheel, spur gears driven by the motor, and transmission means between the driving roll and the gears.

3. An attachment for drawing roll buffing machines having a grinding wheel, a traversing carriage, and a driving motor and its shaft on the carriage, comprising in combination freely rotating supports coaxial with the motor shaft for the ends of a drawing roll carried by the carriage, a roller to drive the drawing roll by frictional contact and to press the latter toward the grinding wheel in a direction radially of the grinding wheel, and driving means between the roller and the motor and actuated by the latter permitting substantial sidewise shift of the roller axis while continuing the drive.

4. A machine for buffing drawing rolls having in combination a grinding wheel, a traversing carriage, supporting means for one end of the roll to be ground carried by the carriage, a driving motor on the carriage to support the other end of the roll, a rockshaft on the carriage mounting the supporting means and the motor for movement to and from the grinding wheel, a driving roll on the carriage driven by the motor and adapted to engage the drawing roll, a spring to force the driving roll into contact with the bosses of the drawing roll, and means manually operable in one direction to relieve the driving roll from the stress of the spring for removal of a buffed roll and in the other direction to reinstate the identical force upon the driving roll when the latter is engaged with a second drawing roll of the same size as the first.

5. A buffing machine for drawing rolls having in combination a grinding wheel, supporting means for the ends of a drawing roll, a rockshaft mounting the supporting means for movement to and from the grinding wheel, a driving roll mounted on the rockshaft, means for rotating the driving roll also mounted on the rockshaft, a supporting member for the driving roll adapted to thrust the latter yieldingly against the drawing roll in a direction radially of the grinding wheel and manually operable means for releasing the pressure of the driving roll against the drawing roll.

6. A buffing machine for drawing rolls having in combination a grinding wheel, rotatable supporting means for the ends of the drawing roll, a rockshaft mounting the supporting means for movement to and from the grinding wheel, a driving roll mounted on the rockshaft for bodily movement therewith, means for rotating the driving roll also mounted on the rockshaft, and means for shifting the driving roll transversely of the rockshaft into and out of driving engagement with the drawing roll.

7. An attachment for drawing roll buffing machines having a grinding wheel, a traversing carriage, a rockshaft thereon, a driving motor also on the carriage, and a shaft on the motor, such attachment having in combination members to be mounted on the motor shaft supporting one end of the drawing roll for rotation independent of that of the motor shaft, a bracket to be also mounted on the rockshaft, a member pivoted on

such bracket, a roller for frictional driving engagement with the drawing roll, means to drive the roller from the motor shaft and means to mount such roller on the member pivoted on the bracket with capacity for change of the angular relation of its axis with respect to the axis of the drawing roll.

8. A machine for buffing drawing rolls having in combination a grinding wheel, a motor, a shaft on the motor, gear means on the shaft, roll supporting means on such shaft freely mounted for relative rotation with respect to such shaft, a flexible shaft in substantially parallel and offset relation to the motor shaft, gear means on the latter shaft in driving engagement with the first-named gear means, and a driving roll driven by the flexible shaft for frictionally engaging the lateral surface of the drawing roll and for rotating the latter at a different angular velocity than that of the motor shaft.

9. A machine for buffing drawing rolls having in combination a grinding wheel, a motor, a shaft on the motor, gear means applied to the shaft, roll supporting means on such shaft mounted for relative rotation with respect to such shaft, a rockshaft mounting the supporting means for

movement to and from the grinding wheel, a driving roll mounted on the rockshaft for bodily movement therewith, means for rotating the driving roll also mounted on the rockshaft, and means shifting the driving roll relatively to the rockshaft into and out of driving engagement with the drawing roll.

10. A machine for buffing the cots of drawing rolls having in combination a rotating grinding wheel, a motor, a shaft on the motor for supporting one end of a drawing roll, means for supporting the other end of the roll coaxially with the shaft, and a roller driven by the motor and adapted to rotate the roll by frictional engagement with its cot.

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