Sept. 13, 1949. A. E. HAMILTON 2,481,588

GRINDING AND POLISHING MACHINE
OF THE ROTARY-TOOL TYPE

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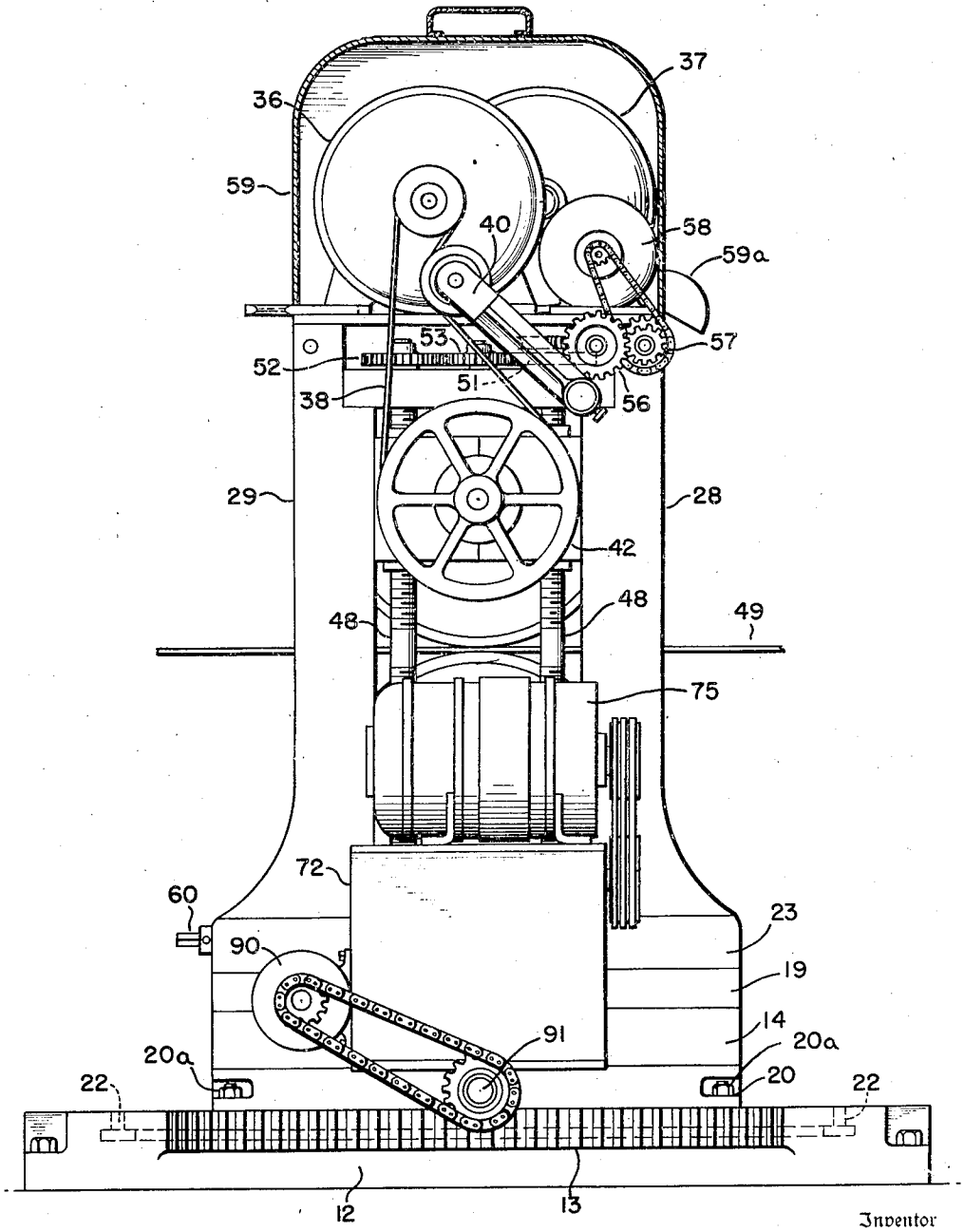
FIG. 1



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GRINDING AND POLISHING MACHINE
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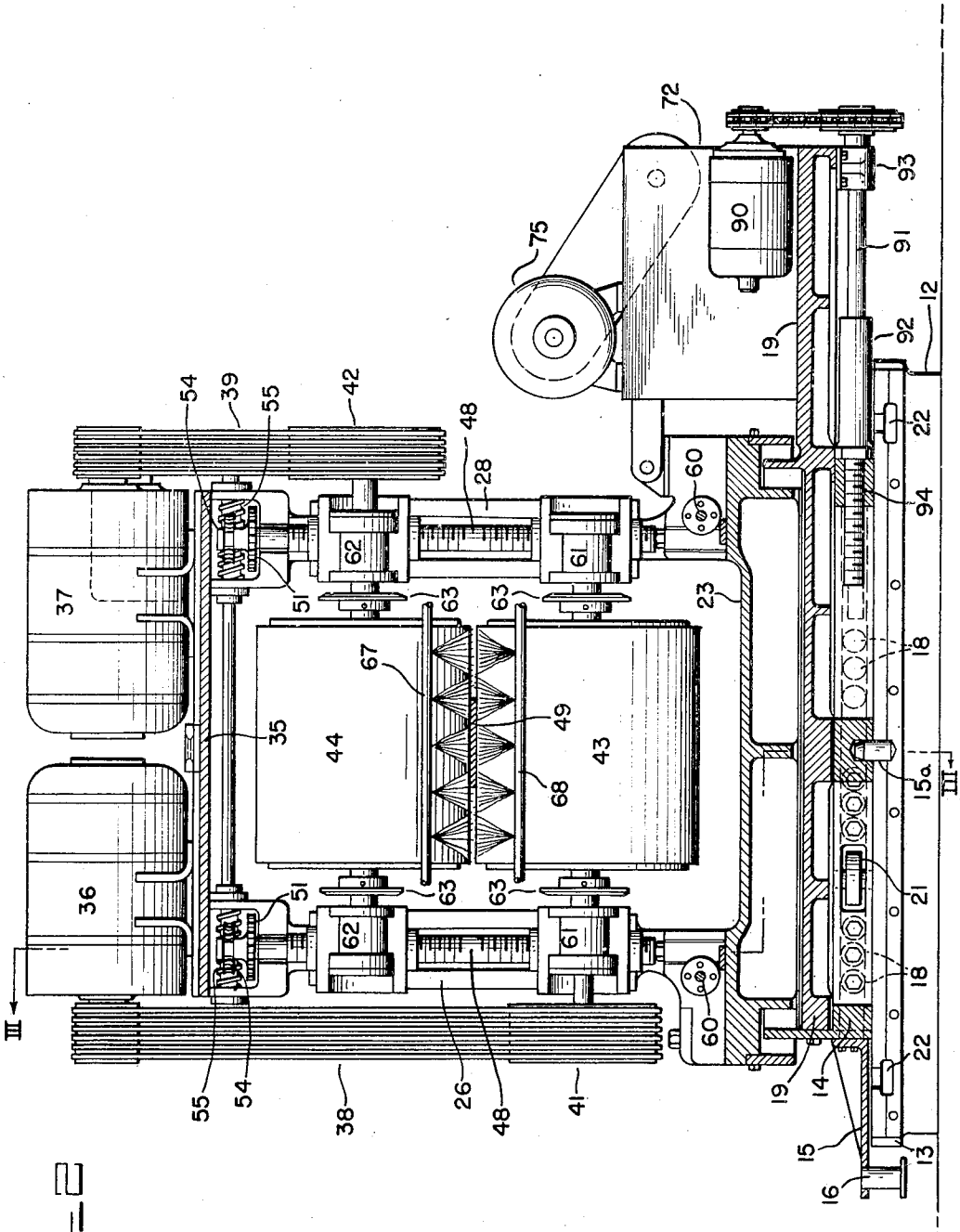

FIG. 2

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GRINDING AND POLISHING MACHINE
OF THE ROTARY-TOOL TYPE

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FIG. 6

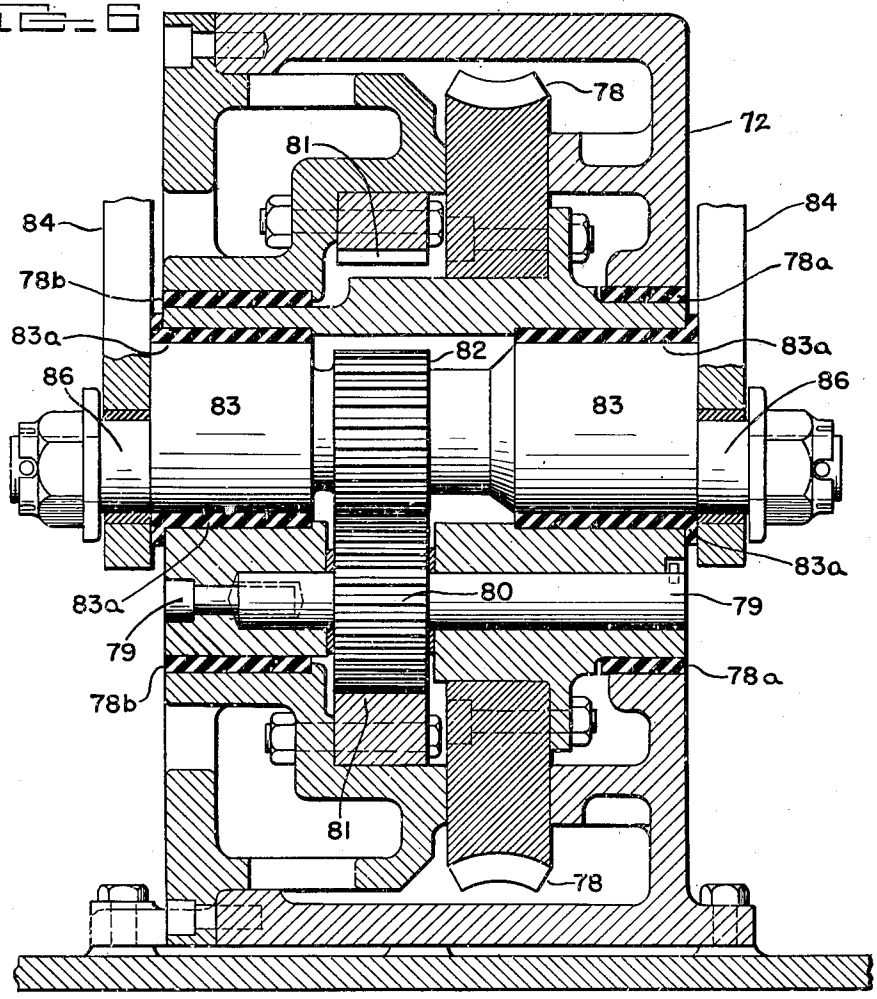


FIG. 3A

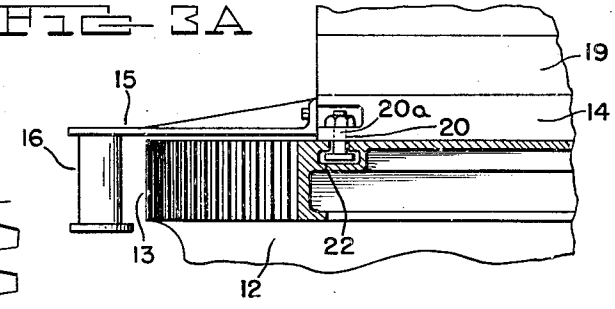
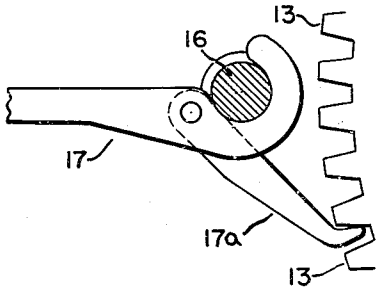


FIG. 2A



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GRINDING AND POLISHING MACHINE
OF THE ROTARY-TOOL TYPE

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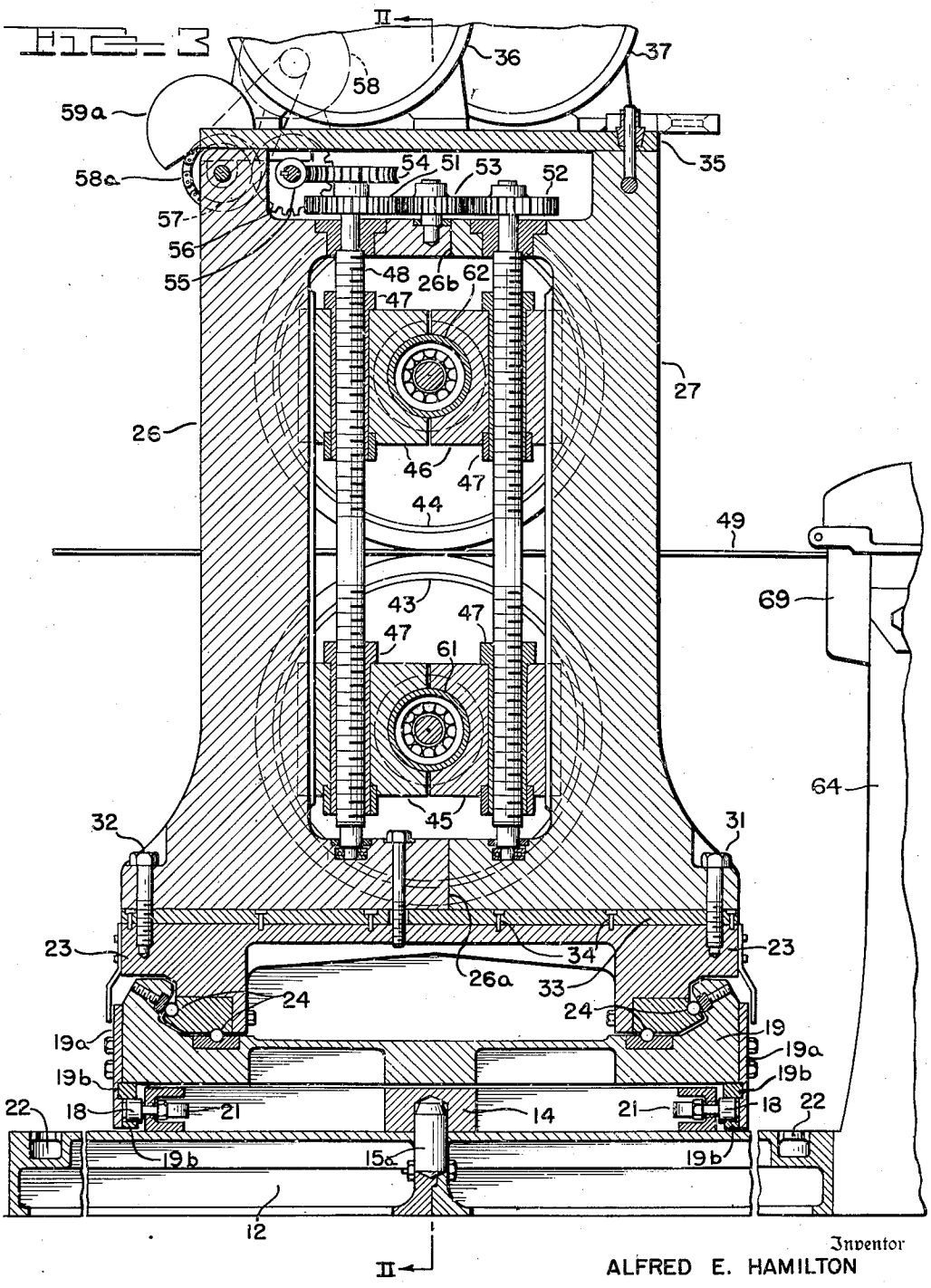
FIG. 3



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GRINDING AND POLISHING MACHINE
OF THE ROTARY-TOOL TYPE

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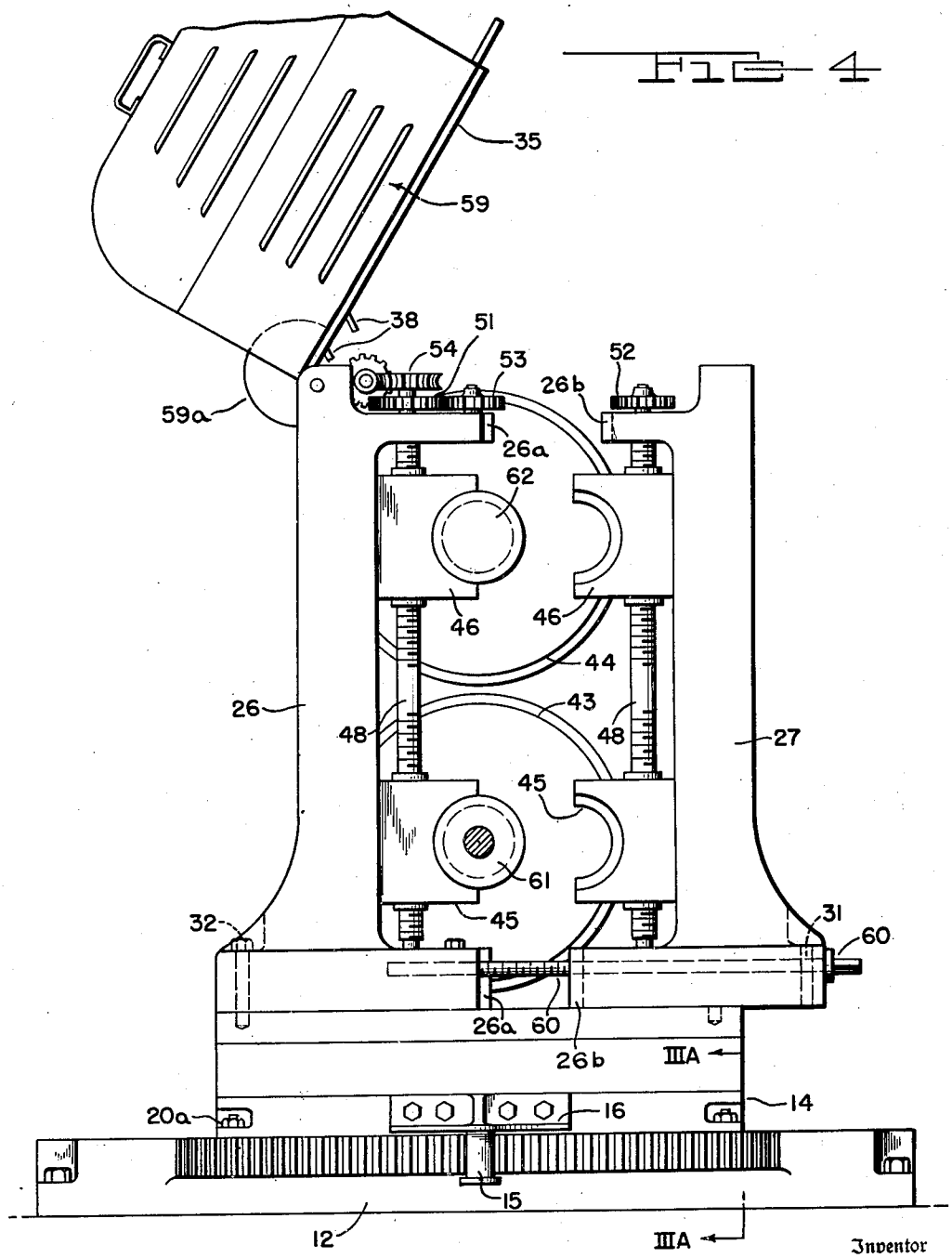
FIG. 4



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Sept. 13, 1949. A. E. HAMILTON 2,481,588

GRINDING AND POLISHING MACHINE
OF THE ROTARY-TOOL TYPE

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FIG. 7

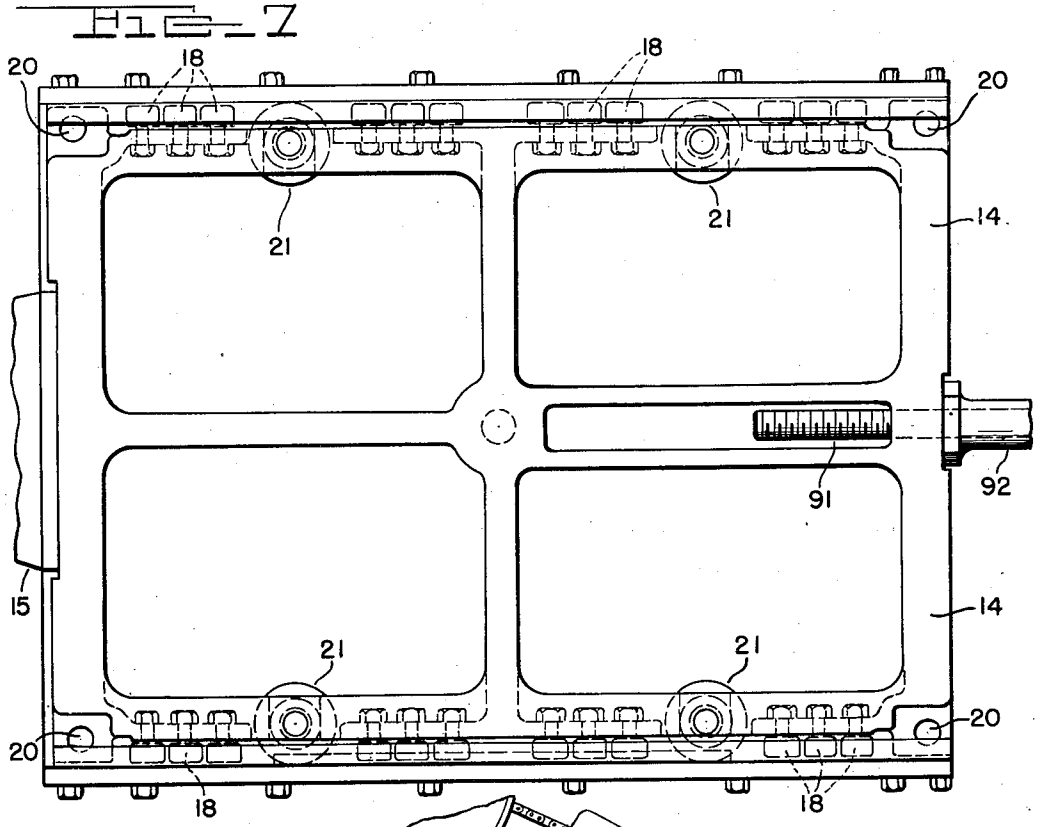
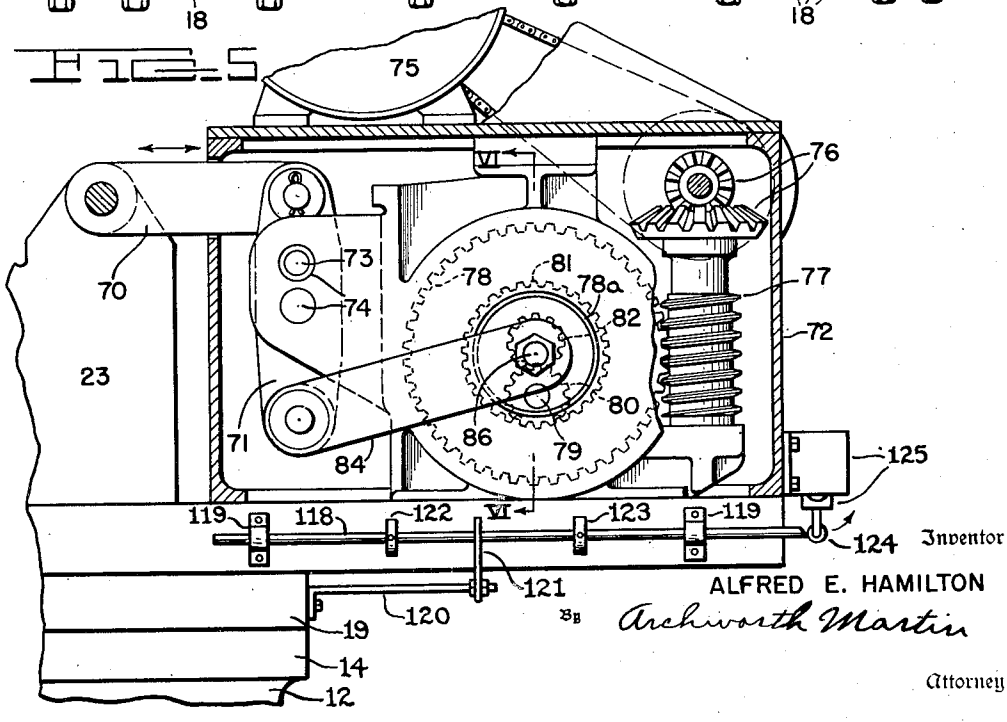


FIG. 5



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GRINDING AND POLISHING MACHINE
OF THE ROTARY-TOOL TYPE

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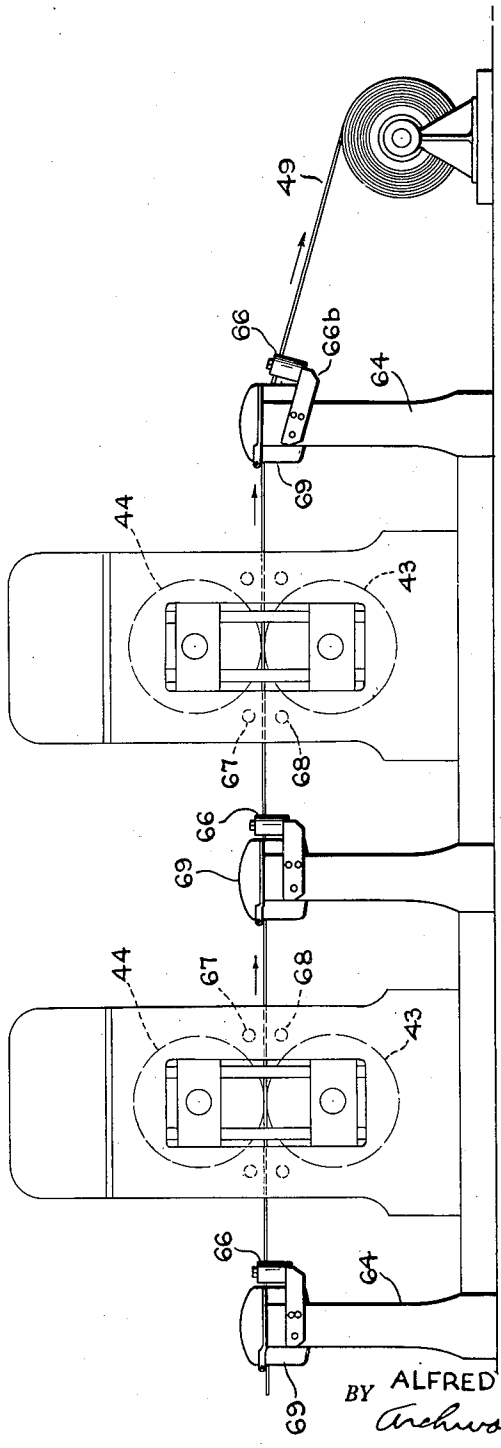

FIG. 8

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GRINDING AND POLISHING MACHINE
OF THE ROTARY-TOOL TYPE

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FIG. 9

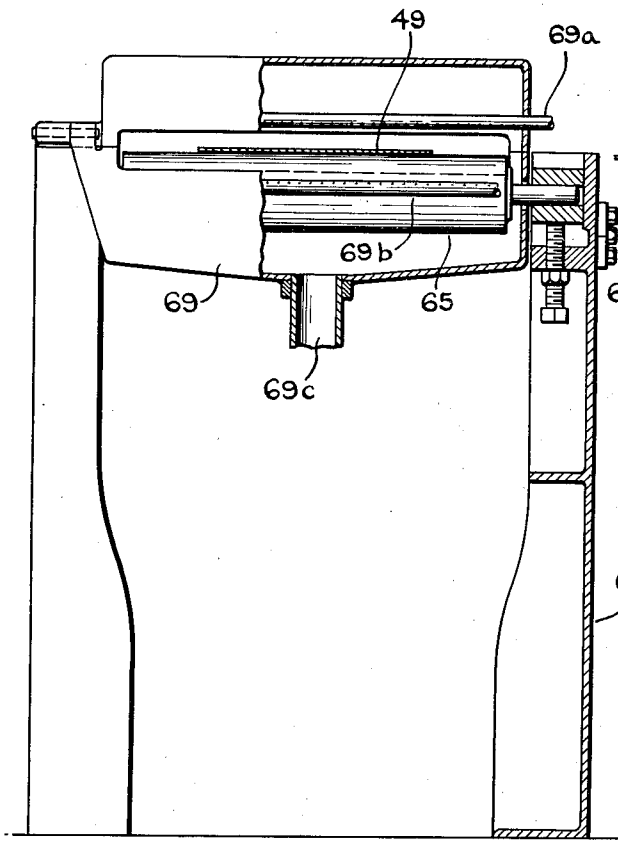


FIG. 10

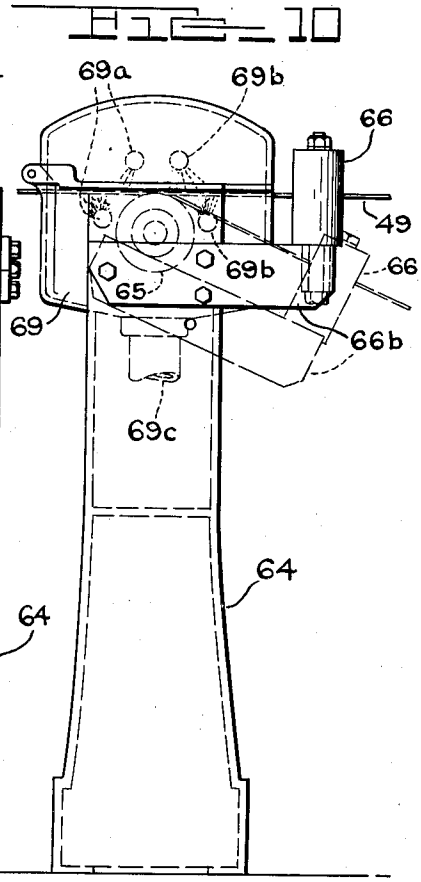
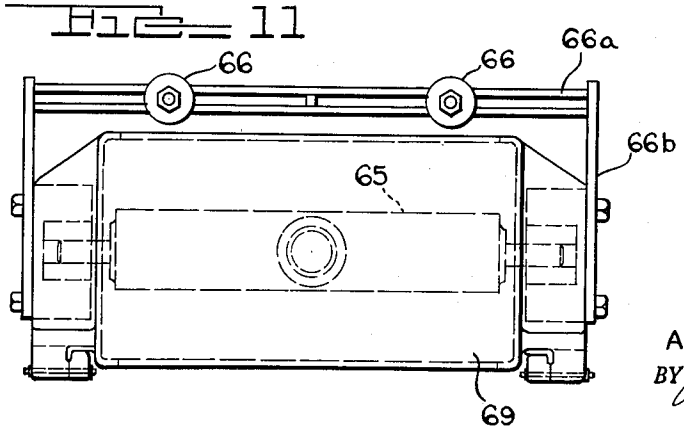


FIG. 11



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Sept. 13, 1949. A. E. HAMILTON 2,481,588

GRINDING AND POLISHING MACHINE
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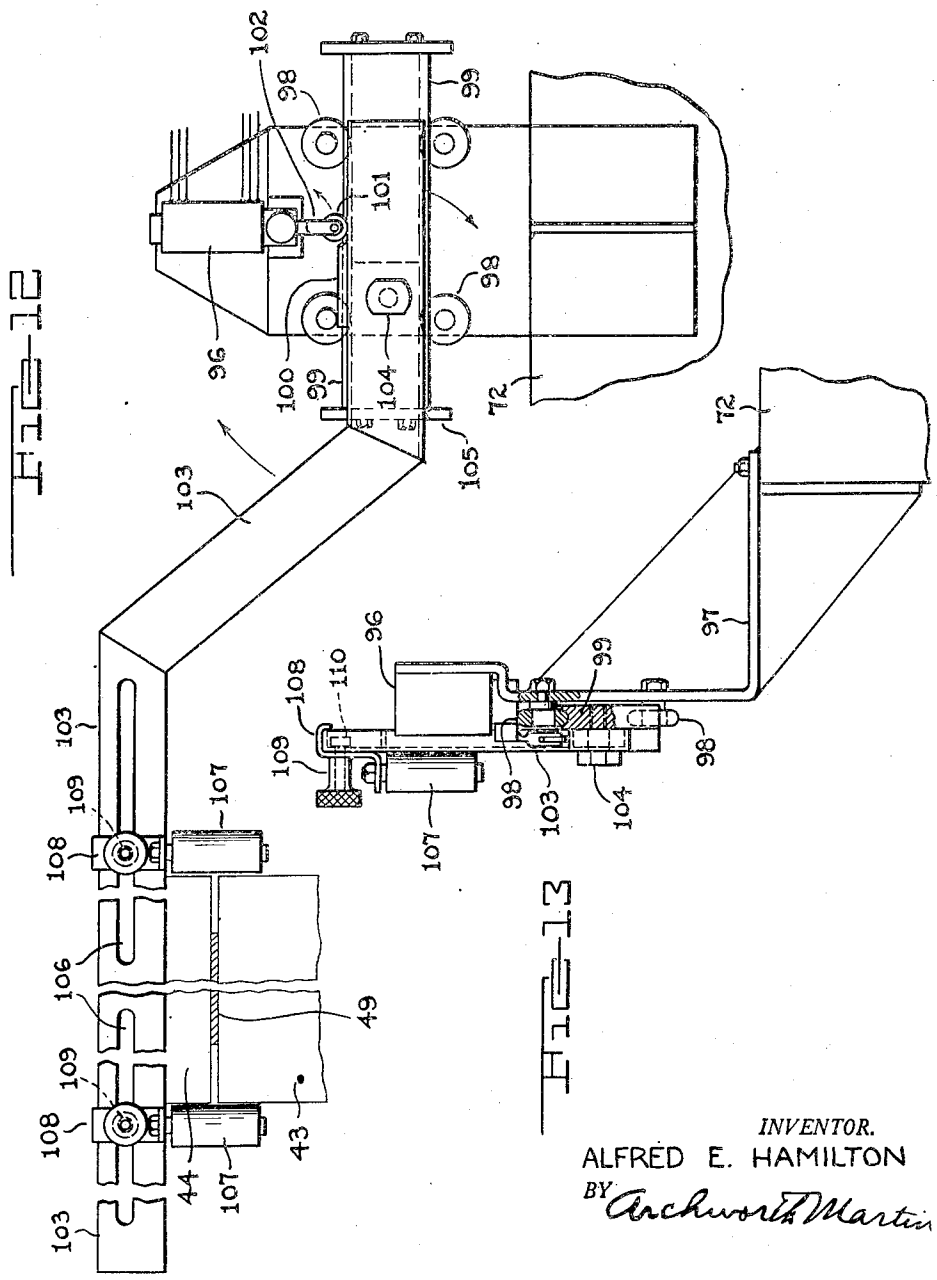

FIG-12

FIG-13

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GRINDING AND POLISHING MACHINE
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Fig-14

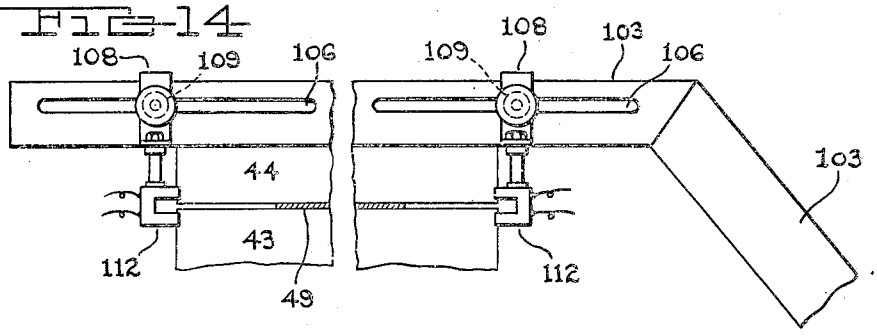


Fig-15

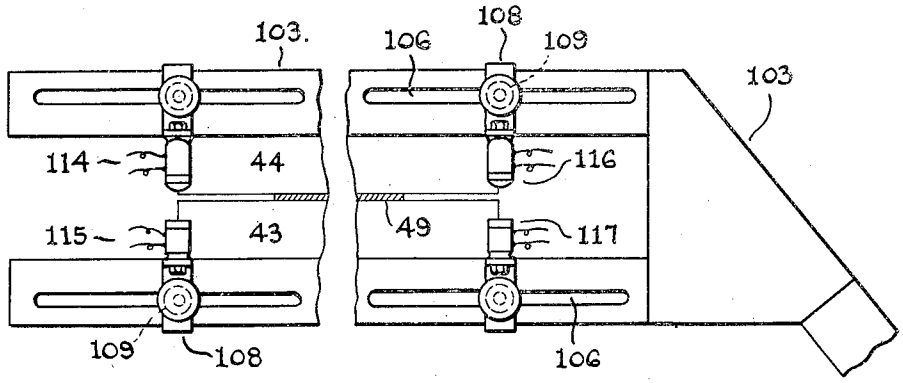
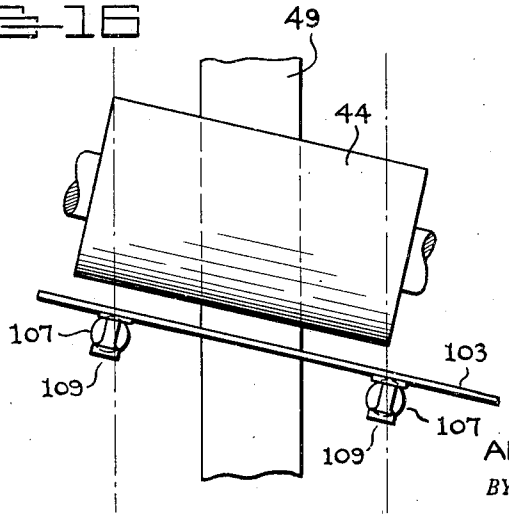


Fig-16



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ATTORNEY

Patented Sept. 13, 1949 2,481,588

UNITED STATES PATENT OFFICE

2,481,588

GRINDING AND POLISHING MACHINE OF THE ROTARY-TOOL TYPE

Alfred E. Hamilton, Pittsburgh, Pa.

Application October 8, 1947, Serial No. 778,554

20 Claims. (Cl. 51—40)

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This invention relates to machines for grinding and polishing strip steel, sheets, etc., of the type of machine described and claimed in my application Serial No. 759,012, filed July 5, 1947. The present application, however, discloses various improvements and modifications in structure and method of operation, not found in the previous application.

One object of the present invention is to provide an improved means for imparting vibratory and reciprocatory movements to surfacing rolls or drums, in lateral directions relative to the strips or sheets being operated upon, in a manner not only to effect uniform surfacing, without pattern effects, but to effectively utilize substantially all of the abrasive material on the drum surfaces, no matter at what angle the drums are set relative to the path of travel of the strips or sheets, the reciprocating movements being automatically controlled in accordance with the widths of the strips.

Another object of my invention is to provide an improved manner of supporting the surfacing drums in roll housings, whereby the housings at each end of the rolls can be so shifted as to permit convenient insertion and removal of the rolls and their bearings into the housings.

Another object of my invention is to provide an improved means for effecting vertical adjustments of the surfacing drums relative to one another, either to vary the roll pass or the pressure of the drums against one another, or to facilitate removal of one or both of the drums from the roll housings.

Still another object of my invention is to provide an improved manner of angularly adjusting the roll housings and their surfacing rolls to adjustably fixed positions relative to the path of travel, and without disturbing the mechanism for effecting reciprocatory and vibratory movements of the roll stands.

In the accompanying drawings, Figure 1 is an end elevational view of a machine embodying my invention, partly in section; Fig. 2 is a sectional view of the machine taken on the line II—II of Fig. 3; Fig. 2A is an enlarged plan view showing the pawl device that is employed for adjusting the roll stands about a vertical axis; Fig. 3 is a vertical sectional view of the machine on an enlarged scale taken on the line III—III of Fig. 2; Fig. 3A is an enlarged fragmentary view showing the manner in which the movable bases for the roll stands are adjustable relative to the stationary sub-base; Fig. 4 is a view in end elevation showing the manner in which the divided roll housings at each end of the rolls can be separated to permit placement and removal of the rolls, with various parts of the machine omitted for clarity; Fig. 5 is an enlarged sectional view through that portion of the mechanism of Fig. 2

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which effects combined vibratory and reciprocatory movements of the roll stand; Fig. 6 is a still further enlarged view taken on the line VI—VI of Fig. 5; Fig. 7 is a plan view showing the frame that is interposed between the stationary sub-base of the machine and the movable bases for the roll housings; Fig. 8 is a schematic view showing the manner in which scrubbing boxes and guide rollers are positioned with respect to the surfacing drum housings; Fig. 9 is an enlarged sectional view through one of the scrubbing boxes of Fig. 8; Fig. 10 is an end view showing one of the scrubbing boxes and vertical guide rolls; Fig. 11 is a plan view of the structure of Fig. 10; Fig. 12 is a side elevational view showing mechanism for operating a switch that controls a reversing motor for reciprocating the roll stands transversely of the path of strip travel; Fig. 13 is an end view thereof, partly in section; Fig. 14 shows a modification of a portion of the structure of Fig. 12; Fig. 15 shows still another modification thereof, and Fig. 16 is a schematic plan view showing the relative positions of the strip and surfacing drums when the roll housings and their rolls are diagonally positioned with respect to the path of strip travel.

It will be understood ordinarily there will be a plurality of sets of grinding rolls or drums in a train through which the strip is passed. Since these sets of rolls will be of approximately the same form, only one set need be here described as a grinding and polishing unit. The grinding and polishing unit comprises a stationary sub-base 12 having teeth 13 arranged at one end as a rack for use in rotatably or angularly adjusting the roll stand that will be hereinafter described.

A frame 14 (Figs. 3 and 7) is supported upon the base 12 and is held in centralized position thereon by a pivot stud 15a. The frame has an extension plate or bracket 15 secured thereto at one end which carries a stud 16 (Figs. 2—2A) for a reversible ratchet handle or lever 17 which has a pawl 17a for engagement with the teeth 13 when it is desired to impart some rotative movement to the frame 14, for adjusting the roll stand relative to the path of strip travel. The ratchet 17 is reversible so as to rotate in either direction. A row of anti-friction rollers 18 is journaled on each side of the frame 14, to afford vertical support for an intermediate reciprocable base 19, the base being provided with shield plates 19a and bars 19b that are engaged by the rollers. Rollers 21 are mounted in the frame 14, on vertical axes, to serve as anti-friction guide elements and resist any lateral thrust of the reciprocating base 19 to be explained more fully later.

Bolts 20a extend downwardly through holes 20 (Figs. 3A and 7) in each corner of frame 14 and into slot 22 extending on circular lines in the base 12. The slots are undercut to receive the

bolt heads and permit locked engagement between the frame 14 and the base 12 at any angular relationship with each other, as indicated in Fig. 3A. The central pin 15a and the circular path of the slot 22 serve to accurately retain the frame 14 at a given center regardless of its angular displacement with respect to the stationary base 12.

A roll housing base 23 is supported upon the intermediate reciprocable base 19, by anti-friction balls 24, so that the roll housing can be vibrated and reciprocated axially of the rolls or surfacing drums, upon the intermediate reciprocable base 19, by means to be hereinafter described.

The roll stand comprises a pair of housing members 26—27 for supporting the surfacing drums at one end, and at the other end there is a pair of similarly arranged housing members 28—29. In each instance these pairs of housings are vertically divided, so that one housing member of each pair may be slid on its supporting base to release the bearings that support the roll shafts, as hereinafter explained. When the housing members are in engagement, they are locked against axial displacement, by keyways 26a and 26b (Fig. 4). The housing members are detachably attached to the base 23 by screws 31 and 32 that extend through a hardened plate 33 which is interposed between the roll housing and the base 23 and is in turn connected to the base by small screws 34 (Fig. 3).

A motor base plate 35 is hingedly mounted on the top of the roll housings and carries electric motors 36 and 37 that drive the surfacing drums or rolls, through belts 38 and 39 that respectively pass around pulleys 41 and 42 which are connected to the shafts of the surfacing rolls 43 and 44 respectively. A tensioning arm and roll 40 is provided for the belt 38 (Fig. 1). These rolls 43—44 may suitably be of the pneumatic drum type faced with abrasive sleeves or helically wound abrasive strips as in my Patent 2,368,760 or my application Serial No. 655,485, filed March 19, 1946, and issued as Patent No. 2,448,884 on September 7, 1948, for example.

As shown more clearly in Fig. 3, the bearings at the ends of the roll shafts are supported in bearing blocks 45 and 46 that have vertical adjustment in the roll housings 26—27—28—29, these bearing blocks have threaded bushings 47 rigidly mounted therein and having threaded engagement with spindles 48 which are reversely threaded as between their upper and lower portions, so that upon turning of the spindles the roll shafts will be moved toward or away from one another in symmetrical relation to the path of travel of the strip metal 49 upon which the abrasive rolls operate.

The spindles 48 are provided with gear wheels 51 and 52 on their upper ends, at the ends of the rolls. An intermediate gear wheel 53 is interposed between each pair of gear wheels 51 and 52, to impart driving motion from each gear wheel 51 to its associated gear wheel 52.

The spindles which carry the gear wheels 51 also carry worm gears 54 that are driven by a worm 55. The shaft of the worm 55 is provided with a spur gear 56 that is driven by a spur gear 57 which in turn is driven from a motor 58 by sprocket 58a. In this way the surfacing drums 43—44 can be moved vertically toward one another and apart, either simply to effect separation of the rolls or to bring them into closer relationship to one another and thereby exert a desired grinding pressure on the strip 49.

In order to separate the half-housing members 27 and 29 from their mating housing members 26 and 28, the screws 31 are first removed; then belts 38 and 39 are removed from pulleys 41 and 42. Screw rods 60 that have threaded engagement with the housing members 26 and 28 and are journalled in the housing members 27—29 are rotated to slide these housing members on the plate 33, to thereby separate the bearing blocks 45 and the bearing blocks 46, as shown more clearly in Fig. 4. This releases the shaft bearings 61 and 62 so that the rolls and their shafts can be lifted free of the housing by lifting-chain hooks that will engage the shafts between discs 63 and the bearings 61—62. The entire motor housing assembly 59 is hinged to housing members 26 and 28 and can be tilted upwards and held in this position by its motor housing stop 59a. The drums 43 and 44 are thus free to be lifted up between the housing members 26—28 and 27—29 and removed.

Guides for the strip 49 are provided at either or both sides of the roll stand (Figs. 8 to 11) and each comprises upright members 64 that support horizontal rollers 65, and also supporting vertical guide rollers 66 at each edge of the strip, that are adjustably bolted in a slotted member 66a so as to accommodate any desired width of sheet.

The rollers 66 and member 66a are carried by a bracket 66b which is adjustable about a horizontal axis as indicated in Fig. 10, so that when they are used at the ends of a roll train, they can be tilted to guide a strip to or from coilers that are positioned at planes lower than the roll pass. The strips such as 49 will sometimes be moved through the rolls in one direction, and at other times, in the opposite direction, and are passed through scrubbing boxes 69. These boxes contain spray pipes 69a and 69b. Water or other liquid is directed through these spray pipes in angular directions, to remove grit from the strip. Thus when a scrubbing box is mounted between roll stands as shown schematically in Fig. 8, the jets at 69a will clean the strip of grit left thereon by a preceding pair of surfacing drums, before it enters the pass of the next roll stand, when the strip is traveling in the direction of the arrows in Fig. 8. When the strip is traveling in the opposite direction, the jets at 69b will remove the grit therefrom. The use of the jets between roll stands is of importance, because they will remove loose coarse grit left by one roll stand, before the strip enters a roll stand wherein the surfacing drums have finer grit. At the ends of the roll stands, the jets will remove grit from the strip before it is wrapped on the coiler. A drain pipe 69c is provided for the detritus.

In order that the strips may be wet-ground, spray pipes 67—68 are provided for wetting the surfaces thereof with oil or water. The wet grinding will prevent overheating of the drums and also prevent floating dust.

The base member 23 and the roll housing are given combined reciprocating and oscillating movement longitudinally of the roll axes, in a manner similar to the reciprocatory and vibratory movement shown in my Patent No. 2,269,197. In this case, a somewhat different form of mechanism is shown for this purpose. The mechanism shown in Figs. 5 and 6 involves a link 70 that has pivotal connection with the base member 23 and its outer end is connected to a lever 71 which is pivotally mounted in a gear casing

72 that is, in turn, mounted on the base member 19. The lever is pivotally supported intermediate its ends by a pin 73 and holes are provided at 74 to afford vertical adjustment of the lever and thereby permit a variation in the "throw" of the link 70.

The mechanism for effecting the combined reciprocating-oscillating movement of the roll stands is driven by a motor 75. The motor drives bevel gearing 76 and a worm 77 as shown in Fig. 5. The worm 77 meshes with a worm gear 78 (shown more clearly in Fig. 6) which rotates within bushing rings 78*a* and 78*b*. Mounted eccentrically in the worm wheel 78 is a shaft 79 onto which is journaled a gear wheel 80. As worm gear 78 is rotated, it carries gear wheel 80 around in a circular path in mesh with internally-toothed gear ring 81. The gear ring 81 is bolted in a stationary position to the housing and is mounted concentrically to the worm gear 78. As the gear wheel 80 is rotated around the gear ring 81, it is also in meshed engagement with, and rotates, a gear wheel 82 which is secured to a shaft 83. The shaft 83 is mounted eccentrically within the worm wheel 78 and rotates within the bushing rings 83*a*. On each end of the shaft 83 are crank-like extensions 86.

Thus, as worm gear 78 rotates, the shaft 83 which is mounted eccentrically to it moves bodily in a circular path thereby imparting one slow, single reciprocating thrust to links 84 during each complete revolution of the worm wheel. Simultaneously the shaft 83 is being rotated by gear wheels 82 and 80, through its movement around the internal gear ring 81. This causes rotation of the crank extensions 86 and also imparts an oscillating movement, or a series of short, rapid thrusts to the links 84. This dual reciprocating-oscillating motion serves to convey to the housing members, through the base 23 and bearings 24, a lateral movement comprised simultaneously of a long but relatively slow cycle broken by a series of short but rapid cycles.

The movements above referred to are primarily for the purpose of providing a smooth and unpatterned finish on the steel strip. There is still another movement imparted to the roll housing and the rolls in a direction transversely of the path of strip travel, which is provided in order that substantially all of the abrasive material on the rolls or drums will be operative upon the strip, even though the strips are of narrow width relative to the lengths of the surfacing drums. This later mentioned movement avoids excessive waste of abrasive material and also enables use of the surfacing drums over longer periods of time and less frequent shutting down for replacement of abrasive strips or sleeves on the drums.

A motor 90 (Fig. 2) is mounted on the base 19 and drives a screw shaft 91 which is journaled in bearings 92 and 93 that are also carried by the base 91. The shaft 19 has threaded engagement at 94 with the frame 14. The motor 90 is of the reversible type so that the shaft 91 can be driven alternately in opposite directions to effect reciprocation of the base 19 on the frame 14. The length or distance of reciprocating movements will be regulated in accordance with the width of strip steel that is being operated upon.

As shown in Figs. 12 and 13, the means for effecting reversals of the motor 90 and the screw shaft 91 in accordance with the width of strip

steel that is being operated upon comprises a reversing switch 96 having wired connection with the motor 90 and carried by a bracket 97 that is, in turn, mounted upon the gear case 72. Rollers 98 are journaled on the bracket. A bar 99 has track grooves in its upper and lower edges and is movable between the rollers 98.

An arm 103 is pivotally connected at 104 to the bar 99 and is normally supported in approximately horizontal position by a plate 105 that is screwed to the end of the bar 99. A camming rail 100 is carried by the arm 103 and as the arm is moved back and forth with the bar 99, the rail engages and disengages a roller 101 to oscillate a switch lever or arm 102 to operate the switch 96 and thereby effect reversals of the motor 90.

The arm 103 extends across the path of travel of the strip, and above the pass line through the surfacing drums and has a pair of slots 106 that adjustably support a pair of rollers 107 in position to be engaged by the edges of the strip steel during reciprocation of the roll stands. The rollers 107 are supported on the arm 103 by hangers 108 through which screw 109 extends, the screw also extending through the slots 106 and having threaded engagement with nuts 110 whereby the rollers can be set at adjusted positions depending upon the angularity of the surfacing drum housings with respect to the path of strip travel. When the surfacing drums are positioned directly crosswise of the strip, the rollers 107 will be placed farther apart than when the surfacing drums and their housings are positioned diagonally of the path of strip travel as in Fig. 16, in order that approximately all of the abrasive surfaces of the drums will engage the strip.

During back and forth travel of the base 19 through reversals of the screw 94, the rollers 107 will alternately be brought into engagement with the edges of the strip. Upon each such engagement, the arm 103 will be shifted to operate the switch 96, thus providing for automatic reversals of the motor 90 and the screw 94. The arm 103 can be moved away from the roll housings by swinging it upwardly about its pivot 104, away from its supporting plate 105.

In Fig. 14, a somewhat different arrangement is shown, such arrangement comprising a pair of magnetic switches 112 that are adjustably mounted on the arm 103. These switches will be actuated through breaking of the magnetic field by the edges of the strip during reciprocation of the surfacing rolls, the motor 90 thereby being periodically reversed.

In Fig. 15, I show pairs of photo-electric cells 114—115 and 116—117 that are carried by the arm 103, the strip serving to break the beam between these cells at about the ends of the reciprocatory travels of the roll housings, to thereby effect reversals of current through the motor 90.

In order to prevent jamming of the screw 94 when the motor 90, along with its base 19 and the roll housings, is being reciprocated and there is no strip steel present to effect automatic operation of the reversing switches of Figs. 12 to 15, I provide means shown in Fig. 5, for effecting reversals of the motor and the screw at points short of those at which the screw would become jammed. These reversals are effected at points a somewhat greater distance apart than the widest points of normal adjustment of the switch-operating elements of Figs. 12 to 15.

As shown in Fig. 5, the reciprocating base 19 that carries the motor 90 has a switch-operating

bar 118 slidably mounted thereon in guides 119. A bracket 120 is secured to the base member 14 and carries a finger 121 that extends upwardly past the bar 118, in position to engage collars 122 and 123 that will shift the bar 118 during reciprocating movements of the base 19 and the drum housings by the screw 94. The bar operates a switch arm 124 through camming action on a switch lever 125, which correspond to the switch members 96 and 102 of Fig. 12, to thereby effect reversals of the motor 90.

The strip material will be passed through the surfacing drums in any suitable manner, as for example by the coiling and uncoiling reels as disclosed in my said application Ser. No. 759,012.

I claim as my invention:

1. A roll stand for a pair of rolls mounted in approximately superposed relation, comprising a pair of bearing housings at each end of the stand, vertically-spaced bearing blocks in each housing, positioned to cooperate with the bearing blocks of the adjacent housing, to support the ends of vertically-spaced roll shafts, when the housings at each end of the stand are in proximity to each other, a base for the housings, and a screw-operated device for sliding one of the roll housings on the base, at each end of the stand, for releasing the roll shafts.

2. A roll stand for a pair of rolls mounted in approximately superposed relation, comprising a pair of bearing housings at each end of the stand, vertically-spaced bearing blocks in each housing, positioned to cooperate with the bearing blocks of the adjacent housing, to support the ends of vertically-spaced roll shafts, when the housings at each end of the stand are in proximity to each other, a base for the housings, a screw-operated device for sliding one of the roll housings on the base, at each end of the stand, for releasing the roll shafts, and means for simultaneously adjusting the bearing blocks at each side of the roll stand, toward and from one another, when the housings are in shaft-supporting position.

3. Apparatus for surfacing traveling strip material, comprising a roll stand, a surfacing drum mounted therein for rotative movement on a strip that is being surfaced, means for reciprocating the drum transversely of the path of strip travel, and means actuated by the strip edges for controlling the lengths of reciprocatory strokes.

4. Apparatus for surfacing traveling strip material, comprising a roll stand, a surfacing drum mounted therein for rotative movement on a strip that is being surfaced, means for adjusting the roll stand about an axis perpendicular to the plane of the strip, means for reciprocating the roll stand transversely of the path of strip travel, and means actuated by the strip edges for controlling the lengths of reciprocatory strokes.

5. Apparatus for surfacing traveling strip material, comprising a roll stand, a surfacing drum mounted therein for rotative movement on a strip that is being surfaced, means for adjusting the roll stand about an axis perpendicular to the plane of the strip, means for reciprocating the roll stand transversely of the path of strip travel, and means actuated by the strip edges for controlling the lengths of reciprocatory strokes, the last-named means being adjustable axially of the drum.

6. Apparatus for surfacing traveling strip material, comprising a roll stand, a surfacing drum mounted therein for rotative movement on a strip that is being surfaced, a fixed support a screw rotatable on the support and having threaded connection with the roll stand, for reciprocating the stand in directions transverse to the path of strip travel, a reversible member for driving the screw, and means actuated by the strip, for periodically reversing the said member in accordance with the width of the strip.

7. Apparatus for surfacing traveling strip material, comprising a roll stand, a surfacing drum mounted therein for rotative movement on a strip that is being surfaced, means for adjusting the roll stand about an axis that is perpendicular to the plane of the strip, a fixed support a screw rotatable on the support and having threaded connection with the roll stand, for reciprocating the stand in directions transverse to the path of strip travel, a reversible motor for driving the screw, and means for periodically reversing the motor movement, the last-named means being adjustable axially of the drum.

8. Apparatus for surfacing traveling strip material and the like, comprising a roll stand a rotatable abrasive drum rotatably carried by the stand, a base for the roll stand, means for rotatably adjusting the base about an axis that is perpendicular to the plane of the material to be operated upon, a motor carried by the base, a sub-base for the roll stand, an element driven by the motor and having connection with the sub-base, for effecting reciprocating movements of the roll stand and its base relative to the sub-base and transversely of the path of strip travel.

9. Apparatus for surfacing traveling strip material and the like, comprising a roll stand a rotatable abrasive drum rotatably carried by the stand, a base for the roll stand, means for rotatably adjusting the base about an axis that is perpendicular to the plane of the material to be operated upon, an element driven by the motor and having connection with the sub-base, for effecting reciprocating movements of the roll stand and its base relative to the sub-base and transversely of the path of strip travel, the motor being reversible and the said element having a screw that has threaded connection with the sub-base.

10. Apparatus for surfacing traveling strip material and the like, comprising a roll stand a rotatable abrasive drum rotatably carried by the stand, a base for the roll stand, a sub-base, an intermediate base between the other two bases, means for adjusting the intermediate base on the sub-base, about an axis vertical to the plane of the material to be operated upon, a motor carried by the intermediate base, a reciprocating device connected to the intermediate base and to the sub-base and driven by the motor, for reciprocating the intermediate base and the roll stand, and means for oscillating the first-named base on the intermediate base, the said reciprocating and oscillating movements being in directions axially of the surfacing drum.

11. Apparatus for surfacing traveling strip material and the like, comprising a roll stand a rotatable abrasive drum rotatably carried by the stand, a base for the roll stand, a sub-base, an intermediate base between the other two bases, means for adjusting the intermediate base on the sub-base, about an axis vertical to the plane of the material to be operated upon, a motor carried by the intermediate base, a reciprocating device connected to the intermediate base and to the sub-base and driven by the motor, for reciprocating the intermediate base and the roll stand, a second motor on the intermediate base, and a driving connection between the second motor and the first-named base, for imparting combined os-

cillatory and vibratory movements to the first-named base relative to the intermediate base, the reciprocating, oscillatory and vibratory movements all being in directions axially of the surfacing drum.

12. Apparatus for surfacing traveling strip material and the like, comprising a sub-base, a frame rotatably adjustable on the base, about a vertical axis, an intermediate base carried by the frame and adjustable therewith, a third base movable on the intermediate base, a roll stand on the third base, a surfacing drum rotatable in the stand, to operate upon the material, and means for imparting reciprocatory movements to the intermediate base and combined oscillatory and vibratory movements to the third-named base, in directions axially of the surfacing drum.

13. Apparatus for surfacing traveling strip material and the like, comprising a sub-base, a frame rotatably adjustable on the base, about a vertical axis, an intermediate base carried by the frame and adjustable therewith, a third base movable on the intermediate base, a roll stand on the third base, a surfacing drum rotatable in the stand, to operate upon the material, and means for imparting reciprocatory movements to the intermediate base and combined oscillatory and vibratory movements to the third-named base, in directions axially of the surfacing drum, the said two means for imparting the reciprocating and combined oscillatory and vibratory movements comprising motors that are mounted on the intermediate base.

14. Apparatus for surfacing traveling strip material and the like, comprising a sub-base, a frame rotatably adjustable on the base, to fixed positions about a vertical axis, an intermediate base carried by the frame and rotatable therewith about said axis, a motor on the intermediate base, a connection between the motor and the said frame for imparting horizontal reciprocating movements to the intermediate base relative to the frame, a third base movable on the intermediate base, means for imparting oscillatory movements to the third base, in horizontal directions, relative to the intermediate base, a roll stand on the third base, and surfacing drums on the roll stand, for operating upon the material.

15. Apparatus for surfacing traveling strip material, comprising a roll stand, a rotatable abrasive drum on the roll stand, to operate on the strip, mechanism for reciprocating the stand and the drum in directions transversely of the path of strip travel, means controlled by the edges of the strip, during reciprocating movements of the stand, for limiting the lengths of reciprocatory strokes, and means effective when no strip material is present, for periodically effecting reversals of said mechanism, to confine the said reciprocating movements within predetermined distances.

16. Apparatus for surfacing traveling strip material, comprising a roll stand, a rotatable abrasive drum on the stand, to operate on the strip, mechanism for reciprocating the stand and the drum in directions transversely of the path of strip travel, means controlled by the edges of the strip, during reciprocating movements of the stand, for limiting the lengths of reciprocatory strokes, means effective when no strip material is present, for periodically effecting reversals of said mechanism, to confine the said reciprocating movements within predetermined distances, and a device operative in the absence of a strip in the roll pass, for automatically reversing the motor at approximately the greatest possible extent of screw movement in either direction.

17. Roll supporting and driving apparatus comprising a pair of housings, a bearing in each housing, a roll having its ends respectively supported in said bearings and removable vertically from the housings, in an upward direction, a motor base pivotally supported on the upper ends of said housings, and a motor on said base and having detachable driving connection with the roll, the base being movable about its pivot to expose the said roll for vertical removal from between the housings.

18. Roll supporting and driving apparatus comprising a pair of housings that are laterally separable at their upper ends, bearings in said housings for supporting a pair of rolls in superposed relation, a motor base extending across the upper ends of said housings and pivotally mounted on one of the housings, and a motor on said base having detachable driving connections with the said rolls, the base being movable about its pivot from a position above said rolls, to expose said rolls for removal thereof from the housings.

19. Roll supporting and driving apparatus comprising a pair of housings, a bearing in each housing, a roll having its ends respectively supported in said bearings and removable vertically from the housings, in an upward direction, a motor base removably supported on the upper ends of said housings, and a motor on said base and having detachable driving connection with the roll, the base being removable to expose the said roll for vertical removal from between the housings.

20. Apparatus for surfacing traveling strip material and the like, comprising a roll stand, a pair of vertically-spaced bearing blocks in each end of the roll stand, each block being in the form of vertically divided halves, a pair of surfacing drums mounted in the bearings for rotative movement on the upper and lower surfaces of the material, a pair of vertical spindles extending through the bearing blocks at each end of the stand and each spindle having screw-threaded connection with two of the vertically-spaced half blocks, the threads near the upper and lower ends of the spindles being reversely arranged relative to each other, and means for rotating the spindles, to vertically adjust the bearing blocks relative to the path of strip travel, the roll stand being divided at the vertical plane of the drum axes, for separation of its parts and separation of the bearing blocks, to release the drums.

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