C. M. VAIDEN.

PIPE ROLLING MACHINE.

APPLICATION FILED OCT. 31, 1916.

1,245,827.

Patented Nov. 6, 1917.

3 SHEETS—SHEET 1.

Fig. 1.

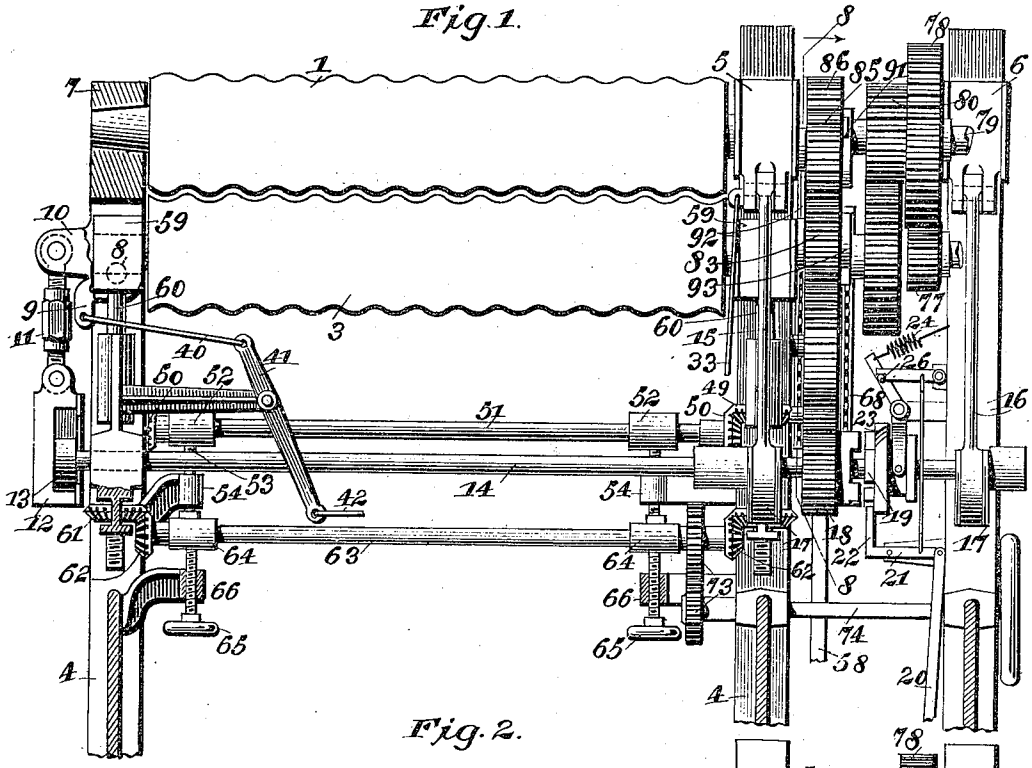
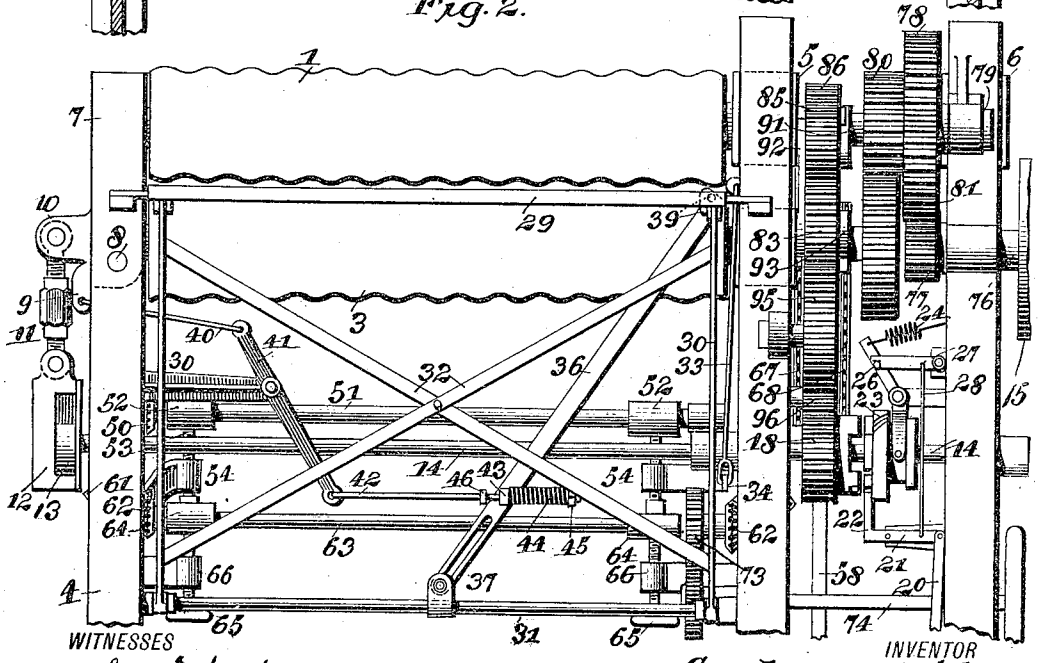


Fig. 2.



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Fig. 3.

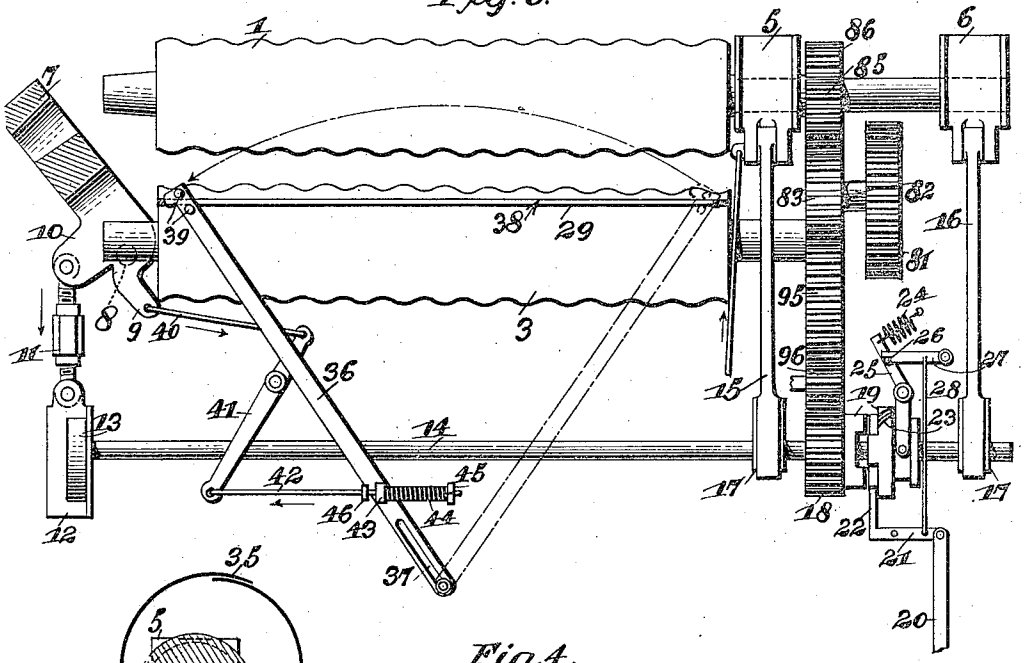


Fig. 4.

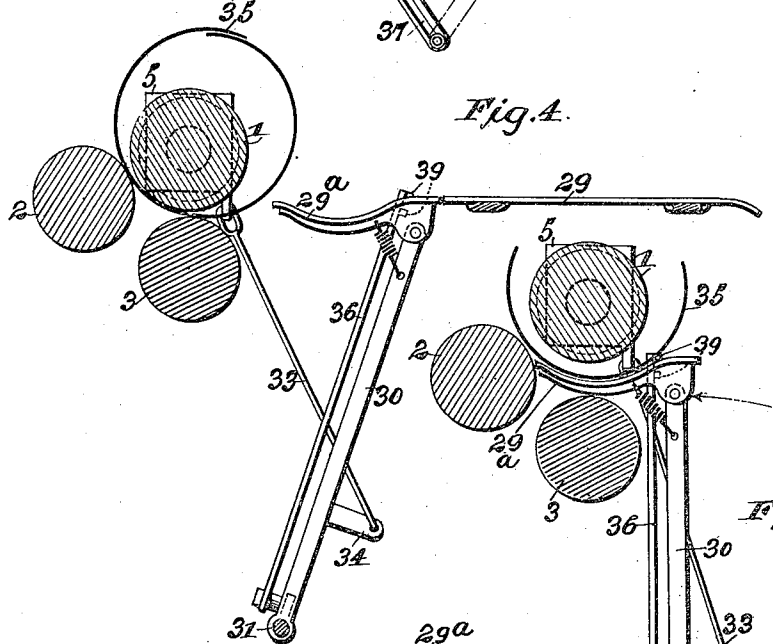


Fig. 5.

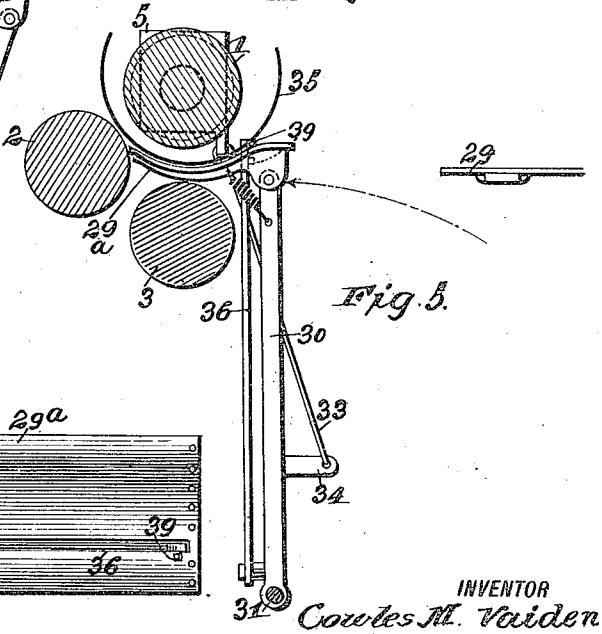


Fig. 6.

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3 SHEETS—SHEET 3.

Fig. 7.

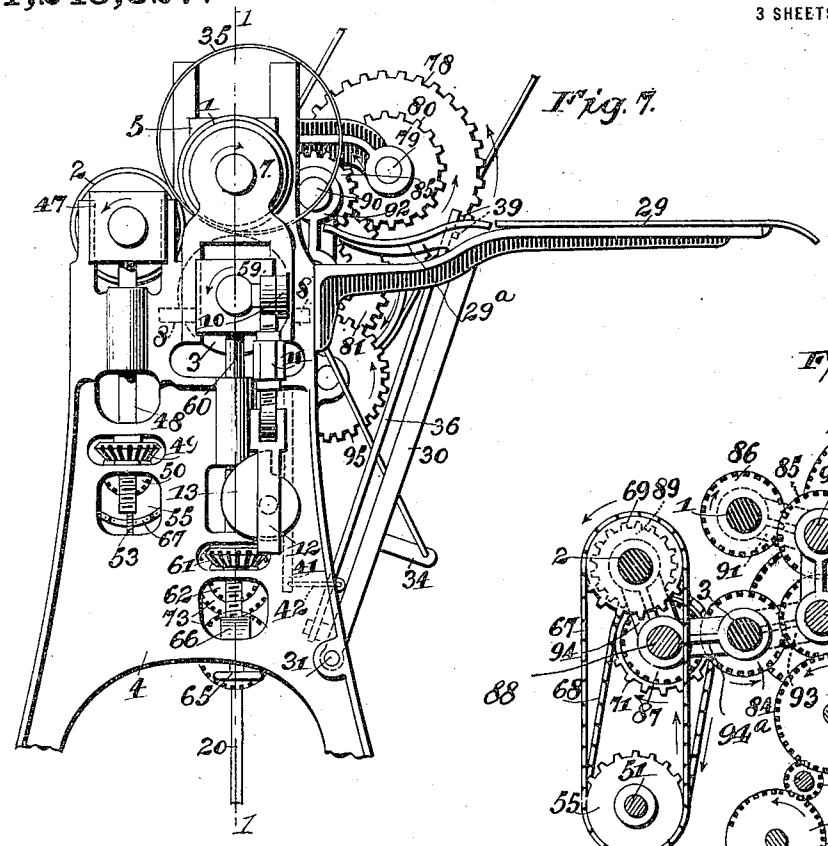


Fig. 8.

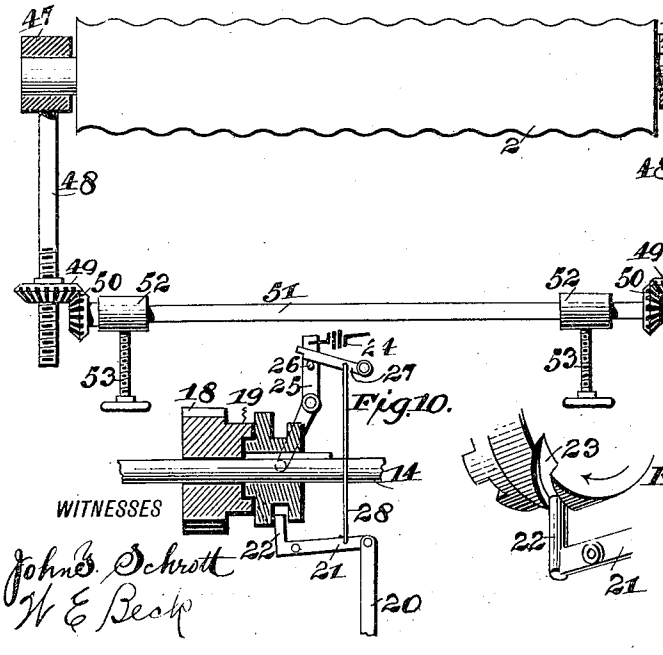


Fig. 9.

Fig. 10.

Fig. 11.

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UNITED STATES PATENT OFFICE.

COWLES MEAD VAIDEN, OF VAIDEN, MISSISSIPPI.

PIPE-ROLLING MACHINE.

1,245,827. Specification of Letters Patent. Patented Nov. 6, 1917.

Application filed October 31, 1916. Serial No. 128,760.

To all whom it may concern:

Be it known that I, COWLES MEAD VAIDEN, a citizen of the United States, and a resident of Vaiden, in the county of Carroll and State of Mississippi, have invented an Improvement in Pipe-Rolling Machines, of which the following is a specification.

My invention is an improvement in pipe rolling machines, and has for its object to provide, in a machine of the character specified for rolling corrugated pipe sections, wherein the sheet metal for forming the pipe is rolled to shape between upper and lower rolls, means for separating the rolls to release the pipe from the corrugations of the rolls, and means for moving the pipe from off the rolls to permit the insertion of another sheet of metal.

In the drawings:

Figure 1 is a section on the line 1—1 of Fig. 7.

Fig. 2 is a front view.

Fig. 3 is a partial front view showing the roll in lifted position and the bearing for the roll released.

Fig. 4 is a detailed sectional view showing the position of the removing table.

Fig. 5 is a similar view showing the parts in another position.

Fig. 6 is a partial top plan view of the removing table.

Fig. 7 is an end view of the machine.

Fig. 8 is a section on the line 8—8 of Fig. 1, looking in the direction of the arrow adjacent to the line.

Fig. 9 is a detail of the rear roll and its adjustment.

Fig. 10 is a sectional view of the clutch mechanism.

Fig. 11 is a partial perspective view of the same.

In the present embodiment of the invention, the sheet of metal to be formed into a pipe is rolled between rolls 1, 2 and 3, the former roll being the upper or top roll, while the rolls 2 and 3 are the bottom rolls, the roll 2 being also the rear roll. These rolls 1, 2 and 3 are mounted in a suitable supporting frame 4, the shaft of the roll 1 being mounted in bearings 5, 6 and 7, the former bearings 5 and 6 being movable vertically, while the bearing 7 is mounted to swing toward and from the end of the shaft to release the same during the removal of the pipe.

The bearing 7 is pivoted to the frame, as indicated at 8, and this bearing has lugs 9 and 10 at its lower end, the former extending downwardly and the latter outwardly. A turn-buckle 11 connects the lug 10 with a species of cam frame 12, in which engages a cam 13 on a shaft 14 mounted in the frame below the rolls. The bearings 5 and 6 are connected to the upper ends of rods 15 and 16 having at their lower ends eccentric straps, engaging eccentrics 17 on the shaft 14 before-mentioned. The arrangement of the eccentrics 17 is similar, but different from the arrangement of the cam 13, the latter being arranged to spring the hinge bearing 7 downward just before the bearings 5 and 6 begin to move upward. When the shaft 14 is rotated, with the parts in the position of Fig. 1, the cam 13 swings the bearing 7 downward in the position of Fig. 3, and as soon as the roll 1 is released, the eccentrics 17 move the bearings 5 and 6 upward.

The shaft 14 is connected to the operating mechanism of the rolls, to be later described, by means of a pinion 18 journaled loosely on the shaft 14, and provided with one of the sections of a clutch 19. The other section of the clutch is feathered on the shaft, and mounted to move toward and from the pinion to engage and disengage the clutch sections. This clutch is operated by a suitable treadle not shown and is released after one-half a revolution of the shaft 14 by mechanism to be described.

The treadle is connected with a link 20 pivoted at its upper end to a lever 21. This lever, at its inner end is provided with an angular lug 22, which is adapted to engage a spirally arranged groove 23 in the movable section of the clutch, under conditions to be presently mentioned.

The movable section of the clutch is normally pressed toward the fixed section, by a coil spring 24, which is arranged between the upper end of the operating lever 25 for the clutch and the frame. The lever 25, which is pivoted intermediate its ends, is provided with a locking pin 26 above its pivotal connection and this pin is adapted to engage a notch in a locking arm 27 pivoted to the frame and connected to the lever 21 by a link 28.

The operation of this mechanism is as follows: The treadle, not shown, is arranged to push up on the link 20, and will lift, through the link 28, the locking arm 27,

which will release the locking lug 26, and the spring 24 will immediately swing the lever 25 to move the clutch section into the position of Fig. 10. It will be noticed from an inspection of Fig. 3 that that end of the movable clutch section remote from the pinion 18 has an annular rib and that the groove 23 before mentioned is in this rib, cutting through the rib. The angular lug 22 of the lever 21 normally occupies the position of Fig. 3, that is on the inner side of the rib, and it will be evident that the said lug will prevent engagement of the clutch sections until the lever 21 is swung as above mentioned. The swinging of the said lever moves the lug 22 downward, and the spring 24 at once engages the clutch sections. During a half revolution the clutch sections remain in engagement, but at the end of this time the pin or lug 22 has entered the groove 23, and the clutch sections are gradually disengaged through the action of the lug 22. The groove 23 is of less depth than the depth of the rib, so that when the pin 22 has passed to the inner side of the rib, it will move upward, drawing down the locking arm 26, and locking the clutch in open position.

After the top roll has been lifted, it is essential to lift the pipe to disengage the corrugations thereof from the corrugations of the lower rolls before the pipe can be withdrawn from off the upper roll. The lifting mechanism is shown more particularly in Figs. 2, 4 and 5. The said mechanism comprises a table 29 having at the side edge adjacent to the rolls the concaved or grooved portion 29^a for receiving the pipe. The table is pivotally connected to the upper ends of links 30, which are secured to a shaft 31 journaled in the frame below the table and below the rolls. These links are braced by cross braces 32, and the table is moved toward and between the rolls 1 and 3, by means of a connecting rod 33, which connects the laterally extending arm 34 on one of the links 30 with the bearing 5 for the top roll 1. When the top roll is lifted, the links 30 are swung, and the portion 29^a of the table 29 is introduced between the top roll 1 and the lower roll 3, as indicated in Fig. 5. The pipe indicated at 35 is lifted and drops into the grooved portion 29^a of the table.

Other mechanism is provided for stripping the pipe from the roll 1 when it has been lifted onto the table. The said mechanism comprises an ejector lever 36, which is connected to the shaft 31 at its lower end by a lost motion connection indicated at 37, and this ejector lever moves in a slot 38 in the portion 29^a of the table. It will be noticed from an inspection of Figs. 4, 5 and 6 that the upper end of the said lever is provided with laterally extending pins 39 engaging above and below the edge of the table, and these pins constrain the upper end of the arm to move at the level of the table. The ejecting lever is moved by the bearing 7.

The lug 9 of the bearing is connected by a connecting rod 40 with one end of a lever 41 pivoted to the frame, and having at the other end a rod 42. This rod extends through a lateral lug 43 on the lever 36 and a coil spring 44 is arranged between the lug and a stop 45 on the end of the connecting rod. The rod has another stop 46 on the opposite side of the lug. When the bearing 7 is swung from the position of Fig. 1 to that of Fig. 3, the lever 41 will be swung in a direction to cause the upper end of the lever 36 to swing to the left of Figs. 2 and 3, that is in a direction to strip the finished pipe 35 from off the roller 1. The connection between the bearing 7 and the lever 36 is a yielding connection, so as to prevent injury to the lever.

Mechanism is also provided for adjusting the front and rear rolls 3 and 2. The mechanism for adjusting the roll 2 is clearly shown in Fig. 9 wherein the roll is journaled in bearings 47 at the upper ends of threaded rods 48. These rods are threaded through bevel gears 49, which are rotatably connected with the frame, and the bevel gears 49 are engaged by bevel gears 50 on a horizontal shaft 51. This shaft 51 is journaled in bearings 52 which are rotatably connected with the upper ends of threaded rods 53, these rods being threaded through bracket arms 54 on the frame. The arrangement is such that when the rods 53 are turned by their hand wheels, the shaft 51 will be raised or lowered. When the shaft 51 is rotated the roll 2 will be raised or lowered, through the threaded rods 48 and the nuts 49. The shaft 51 is rotated in opposite directions by means of sprocket wheels 55 and 56 journaled loosely upon the shaft on opposite sides of a movable clutch section 57 feathered on the shaft. Each of these sprocket wheels has at its inner face the section of a friction clutch, the movable section 57 of the clutch coöperating with the sections of both sprocket wheels. The clutch section 57 is moved in either direction by an operating lever 58, and it will be obvious that since the wheels 55 and 56 will rotate in opposite directions, when either is secured to the shaft, the shaft will be rotated in the same direction. Thus the roll 2 may be either raised or lowered. The roll 3 is journaled in bearings 59 having guided vertical movement in the frame, and these bearings are connected with the upper ends of threaded rods 60 having guided vertical movement in the frame. The lower ends of the rods 60 are threaded through nuts in the form of bevel gears 61 and these gears 61 mesh with the gears 62 at the opposite ends of a shaft 63, which

is mounted in bearings 64 rotatably connected with the upper ends of threaded rods 65. These rods 65 are threaded through bracket arms 66 on the frame, and it will be obvious that by means of the rods 65 the shaft 63 may be adjusted vertically to disengage bevel gears 62 thereof from the gears 61. By means of the threaded rods 60 and the bevel gears 61 the roll 3 may be adjusted toward and from the roll 1. These sprocket wheels 55 and 56 are driven by chains 67 and 68 from sprocket wheels 69 and 70, the former being on the shaft of the roll 2, while the latter is rigid with a pinion 71 meshing with a pinion 72 on the shaft of the roll 2. It will be evident from the description that the shaft 51 may be rotated from the roll 2 directly to cause it to turn in the same direction or from the pinion 71 to cause the said shaft 51 to be rotated in the opposite direction to the roll 2, as may be desired. The shaft 63 is rotated by means of interengaging gears 73 from a shaft 74 journaled on the frame, and having a hand wheel at its outer end. The gears 73 are on the shafts 63 and 74.

The machine is operated from any suitable source of power by means of a belt (not shown) connected with the belt wheel 75. This wheel 75 is on a stub shaft 76 journaled on the frame, and having at its inner end a pinion 77, which meshes with the pinion 78 on a second shaft 79. The shaft 79 has a pinion 80 which meshes with a gear wheel 81 on a shaft 82, supported in a manner to be described, and having a pinion 83, which meshes with a pinion 84 on the roll 3. This pinion 83 also meshes with a pinion 85, secured to a shaft 90 supported in a manner to be presently described, and meshing with a pinion 86 on the roll 1. The pinion 84 also meshes with a pinion 87 on a shaft 88 and the pinion 87 meshes with a pinion 89 on the shaft of the roll 2.

Since the rolls 1, 2 and 3 are movable, it is obvious that the pinions 85 and 87 must move with them to retain the meshing relation. With this purpose the shaft 90 is supported by links 91 journaled on the shaft of the roll 1, and other links 92 connect the shaft 90 with the shaft 82. This shaft 82 is again supported by links 93 which are journaled on the shaft of the roll 3. The shaft 88 is supported by links 94 and 94ª journaled on the shafts of the rolls 3 and 2, respectively. The shafts 90, 82 and 88 are movable, and it will be evident that when the roll 1 is lifted, the upper end of the links 92 will swing inward, the pinion 85 remaining in mesh with the pinion 86, and the pinion 83 remaining in mesh with the pinions 85 and 84. When the shaft of the roll 3 is adjusted vertically the pinions 81 and 87 will follow its movement, and when the roll 2 is adjusted vertically the pinion 87 will follow the movement thereof. The pinion 83 also meshes with a gear wheel 95, which is connected with the shaft 14 by means of a pinion 96 meshing with the pinion 95 and a pinion 18 on the shaft 14. The pinion 18 is loose on the shaft 14, and may be connected thereto by the clutch 19.

I claim:

1. In a machine of the character specified, the combination with the frame, the upper, lower and rear rolls journaled in the frame, and the means for rotating said rolls, of means for vertically adjusting the lower and rear rolls, the adjusting means for the rear roll being manually operated and that for the lower roll being controlled by the rotation of the rolls, means for raising the upper roll, a bearing hinged to the frame for one end of said roll, means operated by the rotating means for the rolls for swinging the said bearing outward and for afterward raising the upper roll, means for lifting the rolled pipe from the lower roll and controlled by the lifting of the upper roll, and means controlled by the swinging of the bearing for stripping the pipe from the roll.

2. In a machine of the character specified, the combination with the frame, the upper, lower and rear rolls journaled in the frame, and the means for rotating said rolls, of means for vertically adjusting the lower and rear rolls, means for raising the upper roll, a bearing hinged to the frame for one end of said roll, means operated by the rotating means for the rolls for swinging the said bearing outward and for afterward raising the upper roll, means for lifting the rolled pipe from the lower roll and controlled by the lifting of the upper roll, and means controlled by the swinging of the bearing for stripping the pipe from the roll.

3. In a machine of the character specified, the combination with the frame, the upper, lower and rear rolls journaled in the frame, and the means for rotating said rolls, means for raising the upper roll, a bearing hinged to the frame for one end of said roll, means operated by the rotating means for the rolls for swinging the said bearing outward and for afterward raising the upper roll, means for lifting the rolled pipe from the lower roll and controlled by the lifting of the upper roll, and means controlled by the swinging of the bearing for stripping the pipe from the roll.

4. In a machine of the character specified, the combination with the frame and the rolls mounted one above the other, and the means for raising the upper roll, a bearing hinged to the frame for one end of the said roll, means operated by the rotating means for the roll for swinging the said bearing outward and for afterward raising the roll, means for lifting the rolled pipe from the

lower roll and controlled by the lifting of the upper roll, and means controlled by the swinging of the bearing for stripping the pipe from the roll, and a yielding connection between the bearing and the stripping means.

5. In a machine of the character specified, the combination with the frame and the rolls mounted one above the other, and the means for raising the upper roll, a bearing hinged to the frame for one end of said roll, means operated by the rotating means for the rolls for swinging the said bearing outward and for afterward raising the roll, means for lifting the rolled pipe from the lower roll and controlled by the lifting of the upper roll, and means controlled by the swinging of the bearing for stripping the pipe from the roll.

6. In a machine of the character specified, the combination with the frame and the rolls mounted one above the other, and the means for raising the upper roll, a bearing hinged to the frame for one end of said roll, means operated by the rotating means for the rolls for swinging the said bearing outward and for afterward raising the roll, and means for lifting the rolled pipe from the lower roll and controlled by the lifting of the upper roll.

7. In a machine of the character specified, the combination with the frame and the rolls mounted one above the other, and the means for raising the upper roll, a bearing hinged to the frame for one end of said roll, and means operated by the rotating means for the rolls for swinging the said bearing outward and for afterward raising the roll.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."