E. E. SLICK.

WHEEL MILL.

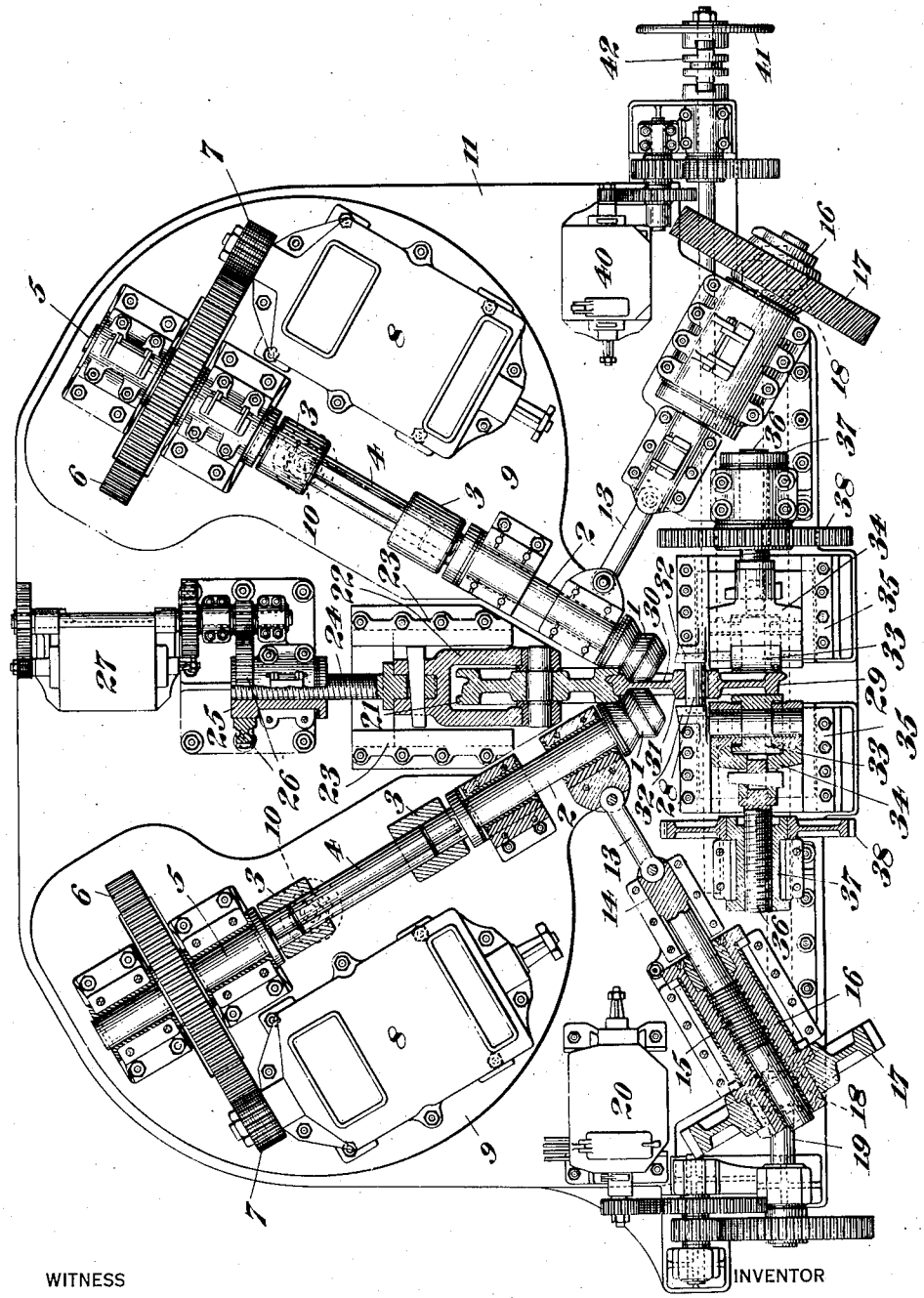
APPLICATION FILED DEC. 26, 1916.

1,327,635.

Patented Jan. 13, 1920.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESS

Elmer Seavey.

BY

INVENTOR

Edwin E. Slick.

Geo. E. Thackray

his ATTORNEY

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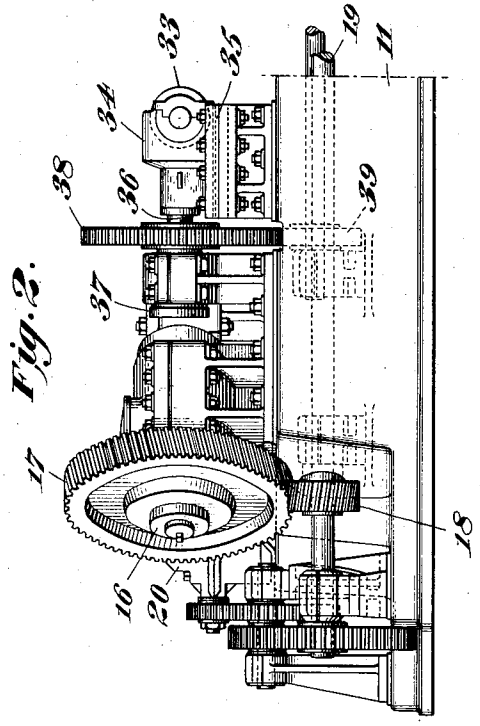


Fig. 2.

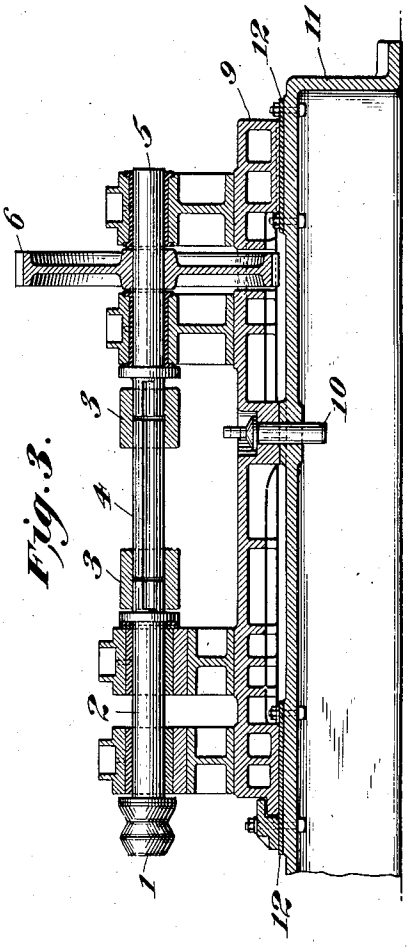


Fig. 3.

WITNESS

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UNITED STATES PATENT OFFICE.

EDWIN E. SLICK, OF WESTMONT BOROUGH, PENNSYLVANIA.

WHEEL-MILL.

1,327,635. Specification of Letters Patent. **Patented Jan. 13, 1920.**

Application filed December 26, 1916. Serial No. 138,741.

To all whom it may concern:

Be it known that I, EDWIN E. SLICK, a citizen of the United States, and a resident of the borough of Westmont, county of Cambria, and State of Pennsylvania, (whose post-office address is Johnstown, Pennnsylvania,) have invented certain new and useful Improvements in Wheel-Mills; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to a wheel mill adapted to roll or form metal wheels, gear blanks, pulleys, fly-wheels, or other generally circular metal bodies. I provide a pair of web rolls adapted to reduce the thickness of the web of the wheel blanks and increase the diameter and circumference thereof while, at the same time, forcing material against the tread roll, which, as it revolves, also forms the tread and flange portion of a car wheel. At the same time I provide rim rolls which act on the edge of the rim to make and maintain it of proper size during the operation of the web rolls and tread roll. In order to simplify the mechanism and at the same time make it exact and well adapted to perform its work, I mount the web rolls, their shaft and driving mechanism consisting, preferably, of a prime mover comprising an electric motor and gearing, upon a base plate which is pivoted to a bed plate, whereby all the parts mentioned may rotate or partially rotate in preferably a horizontal plane to bring the web rolls to or retract them from the work. By this means I obviate the use of universal joints, or similar connections, from the driving mechanism to the web rolls by mounting the prime mover on the movable base plate with each web roll, and thereby simplify the construction and make the same more exact and easily adjustable.

In order to move the web rolls to and from their work, as above mentioned, I connect the forward bearing of the same by means of a link or pitman to a screw of large size fitted with a nut, which nut is adapted to be revolved, thereby projecting the rolls into their work or retracting the same therefrom in order to withdraw the wheel, or other rolled article. While the wheel, or other article, is thus being formed, I can support it on suitably disposed rollers, or, if provided with a bore, I insert therein an arbor or mandrel which may be supported on suitable guides adapted to allow rotation and horizontal movement of the wheel or other body, while presenting its web to the web rolls and its tread to the tread roll. I also provide rim rolls which are adapted to be projected toward each other against the rim portion to form and maintain the rim dimensions. The web rolls are preferably angularly disposed with relation to each other so that they work both upon the web and upon the inside of the rim and, at the same time, force the tread firmly against the tread roll for the purpose of shaping it also.

Having thus given a general description of my invention, I will now, in order to make the matter more clear, refer to the annexed two sheets of drawings forming part of this specification and in which like characters refer to like parts. Figure 1 is a general plan view, showing some parts in horizontal cross-section for clearness of illustration; Fig. 2 is a front elevation of substantially the left-hand half of the mill; Fig. 3 is a vertical cross sectional elevation taken on the axis of the web rolls and shaft thereof, showing the bed-plate, the base-plate and the pivoted connection between the two.

Referring to the characters of reference on the drawings:—1 are the web rolls, 2 are roll-shafts formed separately or integrally with the web rolls as may be desired, the shafts being mounted in bearings as shown, each roll-shaft being in line and connected with its driving shaft 5 by means of the spindle 4 and the coupling boxes 3, which are machine-fitted together to form tight joints to maintain each roll-shaft 2 always in line with its driving shaft 5, thus obviating the use of any universal joints between the driving shaft and the web rolls. Each web roll 1 may be secured firmly on the shaft 2 by keying or otherwise, or may be preferably made as shown, integral with the shaft 2. Each shaft 2 is mounted in separate bearings so as to withstand the pressures put upon the web roll when doing its work, and the shaft 2 is also preferably made separate from the driving shaft 5 and connected thereto by a separate spindle 4 and tight fitting couplings 3, as illustrated, so that when it is desired to change the web rolls 1, this may be done without interfering with the driving shaft 5 and its di-

rect connections. This may be done by slipping the collar or coupling 3 along the spindle 4 and removing the journal box covers of the shaft 2 and then removing the web roll and its shaft. A new one can then be replaced by a reverse operation.

I wish it understood, however, that one of the particular features of my invention resides in maintaining the driving shaft 5 in line with the web roll shaft 2, thus obviating the use of any loose or universal joints and making a compact construction, and this I accomplish by pivoting the bed plate so that the web rolls 1 can be moved to and from their work by rotating the base plate 9 on the bed plate. Each driving shaft 5 is mounted in bearings as shown, and provided with a driving spur wheel 6 mounted on and secured to the drive shaft 5; 7 is the driving pinion mounted on the shaft of each prime mover, indicated as an electric motor 8 and driven thereby for the purpose of driving the shafts 5 and the web rolls 1. 9 are base-plates on which are mounted the various parts shown, and each of which is provided with a pivot pin 10, which secures it to the fixed bed-plate 11 and adapts it and all its attachments to rotate thereon. The fixed bed-plate 11 is provided with slides or wearing plates 12, on which the base-plates 9 are adapted to move. 13 are links or pitmans connected to the forward bearings of the web rolls, and 15 are screws provided with square ends 14, pivotally connected to the links 13 as shown, these square ends being each mounted in guide-ways to prevent the rotation of the screw, but allowing it to move longitudinally backward and forward and thus advance the web rolls to or retract them from the work. Mounted on each screw 15 is a nut 16, while 17 is a helical gear wheel mounted on the nut 16 for the purpose of rotating it in either direction as may be desired, and 18 are helical pinions mounted on the shaft 19. 20 is an electric motor adapted to drive the shaft 19 and the pinions 18 in either direction by means of the gearing shown. The rotation of the motor 20 in one direction will advance the screws 15 and project the web rolls against the work, while the rotation of the motor in the other direction will retract the same. 21 is a tread roll, 22 is the crosshead in which the tread roll is rotatably mounted, as shown, 23 are guides secured to the fixed bed plate 11 and adapted to support and guide the cross-head in its forward and backward movement. Secured to the cross-head is the screw 24; 25 is a nut fitting on the said screw, 26 is a gear wheel secured to and mounted on the nut 25, 27 is a motor adapted to rotate the gear wheel 26 and nut 25 in either direction as desired by means of the connections shown.

28 is a mandrel or arbor which fits loosely in the wheel bore, 29 indicates the metal wheel generally, 30 is the web of the wheel, 31 is the wheel hub, provided with the bore as shown, 32 are guides between which the arbor rests and is supported from moving in a vertical direction but allowed to rotate or move backward or forward in a horizontal direction, 33 are rim rolls adapted to operate on the sides of the rim of a car wheel as illustrated, 34 are crossheads in which the rim rolls are mounted, the crossheads being mounted in guides 35 secured to the fixed bed plate 11, these guides being adapted to permit the rim rolls to be projected to or retracted from their work. Connected to each crosshead 34 is a screw 36, having a nut 37 mounted thereon and adapted to rotate in either direction as desired to project or retract the screw, 38 is a gear wheel mounted on the nut and adapted to be driven in either direction by the pinion 39, 40 is a motor adapted to rotate the pinions 39 in either direction and thereby rotate the nuts for projecting or retracting the screws 36 and the attached rim rolls, 41 is a hand-wheel mounted on the shaft as illustrated and provided with a clutch 42, whereby the rim rolls may be moved toward or from the work manually if desired instead of by the motor 40.

It will be noted that I provide a general bed or bed-plate for supporting the various portions of my wheel mill and the driving and adjusting mechanisms thereof, but supplementary to the general bed I also provide other and movable base plates which are mounted on the bed or bed-plate aforesaid, and on these movable base plates I mount the web rolls, their direct appurtenances and driving mechanism; the driving mechanism in this case being shown as a prime mover comprising an electric motor. The power may be connected to these motors by means of a flexible cable which allows the ready movement of the base plates while maintaining the power connection.

Although I have illustrated the web rolls as mounted upon bed plates, each provided with a pivot, I wish it understood that my invention relates broadly to mounting each of the web rolls on a movable base plate and this may either be pivoted or may slide or move in any manner desired in order to project the rolls to their work or retract them therefrom. The tread roll, the rim rolls and their adjusting mechanisms are preferably mounted upon a fixed bed or fixed bed-plate and the adjustment of the tread roll to or from its work is accomplished by means of a separate motor and mechanism, and the adjustment of the rim rolls to or from their work is performed by another separate motor and connecting mechanism. The motion of the movable base plates carrying the web rolls is accomplished by another separate

motor and mechanism secured to the fixed bed, while the driving mechanism, shafts, bearings and connections of the web rolls and the web rolls themselves are mounted on the movable base plates.

Having thus described my apparatus I will now describe is operation:—The gear wheels 17 are rotated in a reverse clock-wise direction by means of the motor 20 and its connections, which will retract the web rolls 1 and leave a considerable space between the same. A wheel blank, provided with an arbor 28 located in the bore thereof, is now inserted in position so that its web is between the web rolls and it is supported by means of the arbor which rests upon and between the guides 32. The gear wheels 17 are then rotated in clock-wise direction to any extent desired, whereby the web rolls 1 are projected against the wheel web on each side thereof, and pinch the same between said rolls, which rolls are revolved in opposite directions by means of the prime mover motors 8 and their connections. As the rolling proceeds, the web rolls are gradually pushed together to produce a web of proper thickness by slightly rotating the gear wheels 17 in the right direction, which, in turn, projects the screws 15 forward, these screws being connected to the bearings of the web rolls by means of the pivoted links 13. As this is being done, the inner surfaces of the web rolls also work on the inner surfaces of the rim and force the tread against the tread roll 21, which forms the tread as the wheel-blank or wheel revolves. I may either set the tread roll in advance to the position desired to produce a wheel of right diameter, or by means of the motor 27 and its connections, may project the tread roll forward against the tread, as desired, during the process of rolling. While this is being done the rim roll 33 contact with the side surfaces of the rim and may be set a suitable distance apart or may be forced against the rim, as desired, by means of rotation of the motor 40 and its connections, which rotates the gear wheels 38, which are mounted on the nuts 37, which, in connection with the screws 36, are adapted to project or retract the rim rolls as desired. After this is done, the various rolls may be withdrawn from contact with the wheel so as to allow it to be removed and another blank put in its place, whereupon the operation proceeds as before described. After the wheel is so formed, it may be put into a press or between dies and the web formed to any shape or curvature desired, and the various parts brought into their proper relations.

Although I have described and illustrated my invention in considerable detail, I do not wish to be limited to the exact and specific details thereof as shown and described, but may use such modifications in, substitutions for, or equivalents thereof, as are embraced within the scope of my invention, as pointed out in the claim.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

In a wheel mill, a web roll and a prime mover for driving the same, both mounted on a movable base, whereby said web roll may be projected to its work.

In testimony whereof I hereunto affix my signature.

EDWIN E. SLICK.