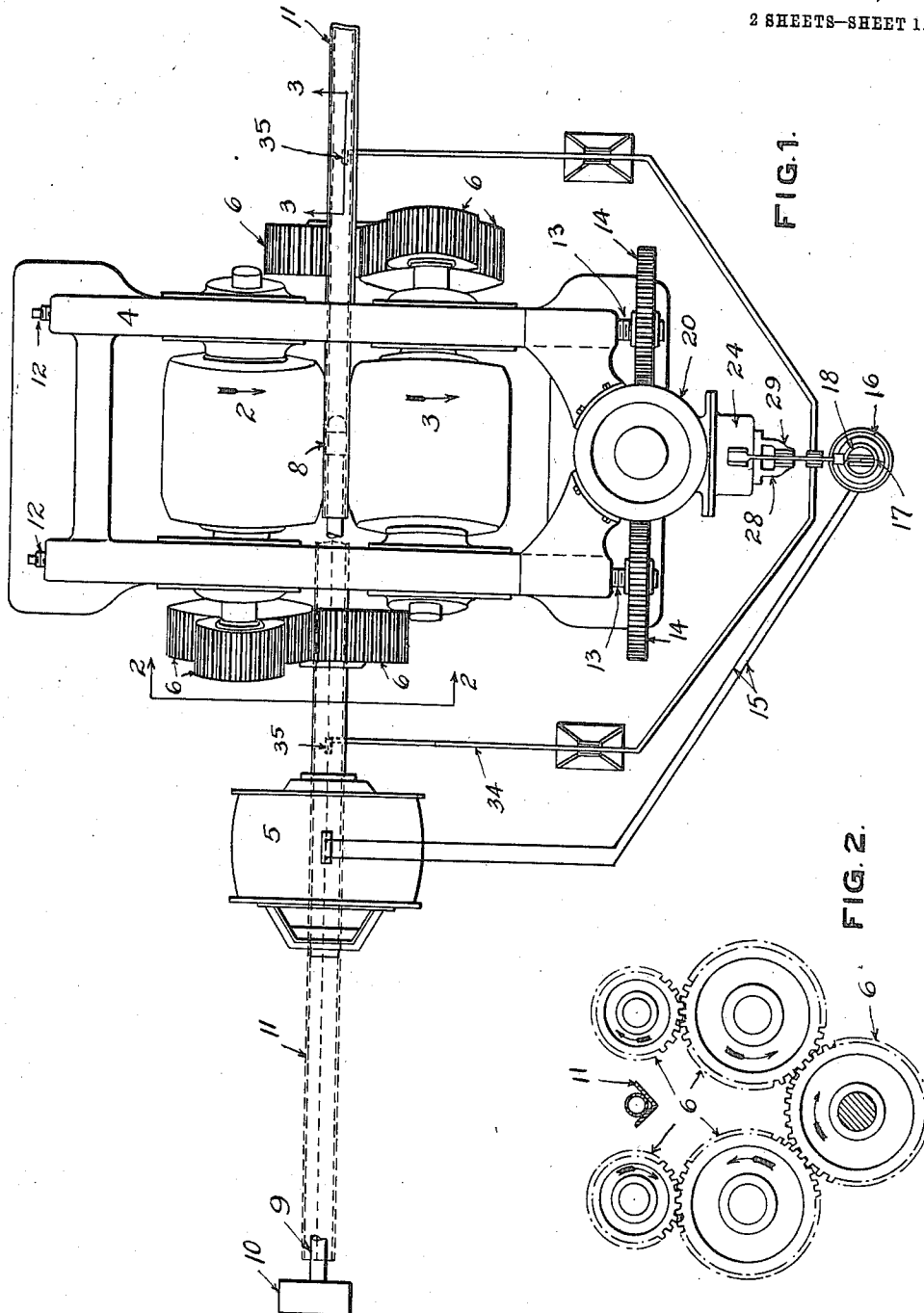


G. H. BLAXTER.
METHOD OF REELING TUBES.
APPLICATION FILED JAN. 11, 1912.

1,059,955.

Patented Apr. 22, 1913.

2 SHEETS-SHEET 1.



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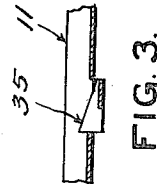


FIG. 3.

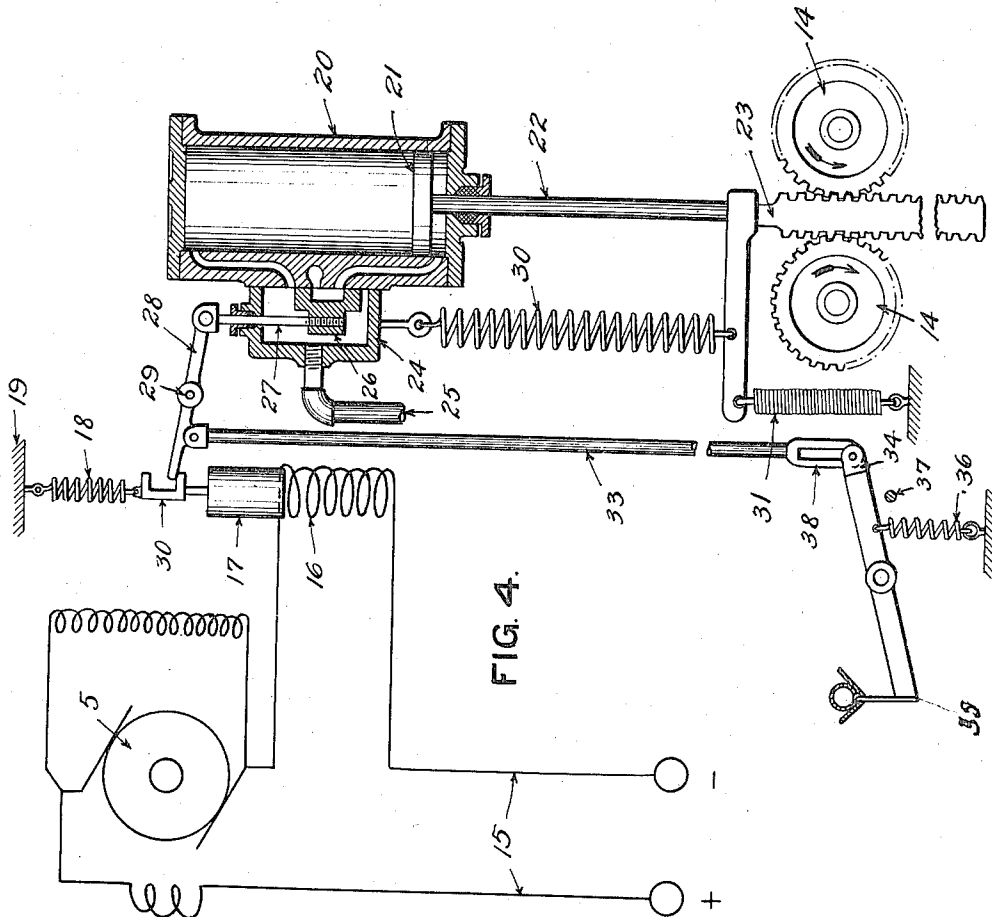


FIG. 4.

WITNESSES

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METHOD OF REELING TUBES.

1,059,955.

Specification of Letters Patent.

Patented Apr. 22, 1913.

Original application filed October 10, 1911, Serial No. 653,847. Divided and this application filed January 11, 1912. Serial No. 670,652.

To all whom it may concern:

Be it known that I, GEORGE H. BLAXTER, a subject of the King of Great Britain, and a resident of New Brighton, in the county of Beaver and State of Pennsylvania, have invented a new and useful Improvement in Methods of Reeling Tubes, of which the following is a specification.

This invention relates to a method for reeling tubes.

The object of the invention is to provide a method for reeling tubes to a uniform diameter and in a manner to reduce labor and attention on the part of the workmen.

In the manufacture of seamless tubing the hollow blank or tube as it leaves the rolling mill varies considerably in diameter, the walls vary in thickness and the tube is more or less rough both exterior and interior. When such tube or blank is reeled in the ordinary way it results in a tube of varying diameter due to the rolls performing different amounts of work on the walls of the tube at different points along the length thereof, which in turn is due to the inequalities in the wall thickness of the rough tube. The reeling is generally done over a plug and consequently the thicker portions of the tube walls, in being reduced to the desired gage, expand to a greater extent than the thinner portions. Inequality in diameter of the product is of course objectionable.

The present invention provides a method for reeling tubes over a mandrel in which the inequality in wall thickness is substantially reduced, the irregularities of the inner and outer surfaces are substantially removed, and the tube given the necessary finish, and at the same time producing a tube of uniform diameter. This is accomplished without the addition of extra labor cost and without any particular attention being given thereto by the workmen.

In the accompanying drawings Figure 1 is a general plan view partly diagrammatic of the apparatus; Fig. 2 is a vertical transverse section on the line 2—2, Fig. 1; Fig. 3 is a vertical longitudinal section on the line 3—3, Fig. 1; and Fig. 4 is a diagrammatic view of the driving and adjustment controlling apparatus.

The reeler may be of any desired type. That shown comprises a pair of barrel-

shaped rolls 2 and 3 mounted in a suitable frame or housing 4 and driven from an electric motor 5 which is connected to the roll necks by suitable intermediate gears 6, or by any other suitable connecting means now well known in the art. Between the rolls is the usual mandrel head or plug 8 supported by the usual mandrel bar 9 and back rest 10. A trough 11 or other guiding means for the tube is provided as usual.

Either or both of the rolls 2 and 3 may be mounted for adjustment during the reeling operation, but as shown, the roll 2 is not intended to be adjusted during the reeling operation but is adjustable by set screws 12 adapted to be manipulated by hand. The roll 3 is adjustable during the reeling operation and to this end adjusting screws 13 bear against the journal boxes of the roll necks, and at the outer ends are provided with gears 14 for actuating the same. These screws are controlled automatically by the amount of current consumed by the main motor 5. When the rolls are acting upon the relatively thick portions of the tube walls the amount of current consumed is considerable, while when the rolls are acting upon the relatively thin portions of the tube walls the amount of current consumed by the main motor is less. I take advantage of this to effect the adjustment of the rolls, the parts being so arranged that when the current consumed rises, the adjusting screws 13 are slacked off to enlarge the roll pass, and when the current consumed by the main motor decreases the screws 13 are set up to reduce the roll pass. This may be accomplished in various ways, but as shown, there is placed in the mains 15 of the motor 5, a solenoid or other magnet 16 provided with a core or other armature 17 which is normally drawn out of the solenoid by spring 18 connected to a suitable fixed member 19. This spring is of such strength that when no current is flowing through the solenoid 16, or when the motor 5 is running under light load, the core 17 is drawn out of the solenoid. As the current to the motor increases, the core 17 is drawn into the solenoid to an extent depending upon the amount of current being used, and as the latter varies directly with the load on the motor or the amount of reduction being effected by the reeler, it is obvious that the

solenoid core can be utilized as a means for regulating the adjustment of the rolls.

As shown in Figs. 1 and 4, the adjustment of the rolls is effected directly by a double acting power cylinder 20, piston 21 of which is connected to piston rod 22, which in turn is connected to or carried by a suitable rack member 23 working between the gears 14 of the roll adjusting screws 13. The cylinder 20 is double acting and constitutes in effect a reversible fluid pressure motor. It is obvious that the reciprocation of the rack back and forth will actuate the adjusting screws 13 in reverse directions.

Admission and exhaust ports lead to both ends of the cylinder from a suitable chest 24 to which the fluid pressure pipe 25 is connected. The admission of the fluid pressure to the opposite ends of the cylinder is controlled by a slide valve 26 actuated by a rod 27 connected to one end of a lever 28 fulcrumed at 29 and having its opposite end extending within a yoke 30 secured to or formed on the solenoid core 17.

When the slide valve 26 is in the position shown in Fig. 4, the fluid pressure medium is admitted to the outer end of the cylinder 20 and forces the piston 21 outwardly and through the rack 23 and gears 14, rotates the screws 13 in the direction to close the rolls together. When the slide valve 26 is moved to its reverse position, the fluid pressure is exhausted from the outer end of the cylinder and is admitted underneath the piston 21 to reverse the same, and this through the rack and gears rotates the adjusting screws in the reverse direction to slack off the rolls. When the valve is in the middle or neutral position, fluid pressure is admitted to neither end of the cylinder and the rolls will be held in whatever position they may have been previously adjusted. Springs 30 and 31 are provided to accelerate the movement of the piston 21 to the middle of the cylinder and to make the device more readily responsive and delicate in operation.

In the use of the apparatus described, as long as the work in the rolls is uniform, the solenoid core is in such position as to hold the slide valve 26 in its middle position, in which position the piston 21 is at rest in its neutral position and produces no change in the roll adjusting means. When, however, the work entering the rolls is relatively small, so that the power necessary to reduce it is decreased, the amount of current consumed by the motor 5 drops, thereby permitting the spring 18 to partly withdraw the core 17 from solenoid 16. This moves the slide valve 26 to admit fluid pressure to the outer end of cylinder 20 to drive the piston 21 outwardly and cause rotation of the screws 13 in a direction to close up the rolls, the spring 30 tending to prevent such movement. If, however, the reduction of the

tube becomes more difficult, more current flows to the motor 5, thereby strengthening the solenoid 16 and thus drawing the core 17 inwardly and causing the slide valve to move in the reverse direction. Should the size of the tube increase still more, the increasing amount of current flowing to the motor 5 will draw the core 17 still farther into the solenoid, thereby moving the slide valve 26 into position to admit pressure into the lower end of cylinder 20 and forcing the piston to the opposite end of the cylinder and slacking off the rolls. Any movement of the piston away from middle or neutral position is resisted by the springs 30 and 31, which tend to return the piston to middle position and thereby turn the screws 13 in reverse direction to close up or slack off the rolls, as the case may be. It will thus be observed that by the means described the rolls of the reeler are adjusted toward and from each other according to the variation in the walls of the tube passing between the rolls and that this is effected entirely automatically, being controlled by the load on the motor which drives said rolls.

Provision is made for holding the valve in the middle or neutral position when no work is passing through the rolls, as otherwise the screws 13 would be rotated until the rolls were entirely closed together. This is effected by means of rod 33 connected at one end to the lever 28 and at its other end to a yoke or forked lever 34 having beveled ends 35 projecting into the path of the tube in the reeler. The lever 34 is forked to provide two controlling members, one at the exit and the other on the entrance side of the reeler, so as to insure the roll adjusting means being in operative condition as long as there is a tube in the reeler. The lever 34 is normally held by spring 36 against a stop 37, in which position the slide valve 26 is in neutral position. When, however, a tube passes through the guide trough 11 it contacts with one of the ends of lever 34 and swings the lever against the tension of spring 36, thereby (on account of the slot and pin connection 38) relieving the rod 33 and lever 28, so that as long as the tube is in the reeler the slide valve 26 is controlled exclusively by the solenoid core 17.

The connections between the solenoid core 17 and the roll adjusting means may vary within wide limits. In the present application, I have shown but one means for this purpose, operated by a fluid pressure medium. Other forms of connection are shown however in my prior application, Serial No. 653,847, filed Oct. 10, 1911, of which the present application is a division, and it is to be understood that any of the forms there shown may be used if desired. In a prior application, Serial No. 653,848, filed Oct. 10, 1911, I have shown and described electrical

controlling means for the adjusting mechanism, which electrical means may also be used in the practice of the present method. It is also to be understood that the prior applications referred to are specific to apparatus while the present application is for a method and no limitations beyond their scope are to be imposed upon the terms of the claims hereinafter made by the specific form of apparatus shown or the specific description herein.

What I claim is:—

1. The method of reeling tubes in an adjustable reeling mill, consisting in causing the supply of power for driving the rolls to regulate the adjustment of the rolls while the tube is passing therebetween and in synchronism with variations in the load on the

machine, to thereby produce a tube of uniform diameter from end to end.

2. The method of reeling tubes over a mandrel, consisting in electrically driving the rolls and causing the current consumed in driving the rolls to adjust the rolls as the tube passes therebetween in synchronism with variations in the thickness of the tube wall, to thereby equalize the rate of consumption of power for driving the rolls and produce a tube of uniform diameter from end to end.

In testimony whereof, I have hereunto set my hand.

GEORGE H. BLAXTER.

Witnesses:

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WILLIAM M. WYLIE.