Oct. 16, 1945. F. M. RODDY 2,386,748

BUILDER MECHANISM

Filed Feb. 17, 1944 5 Sheets-Sheet 1

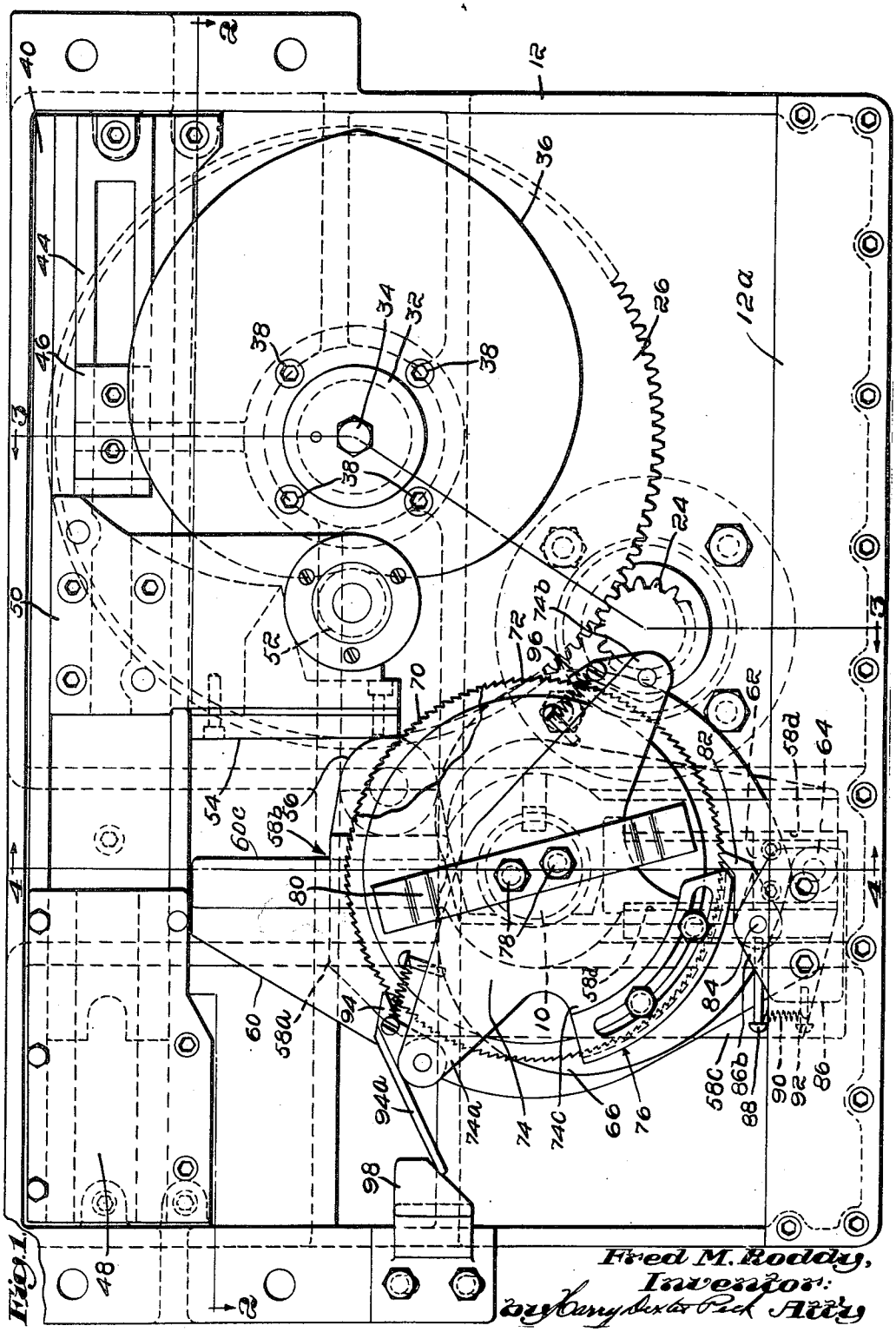


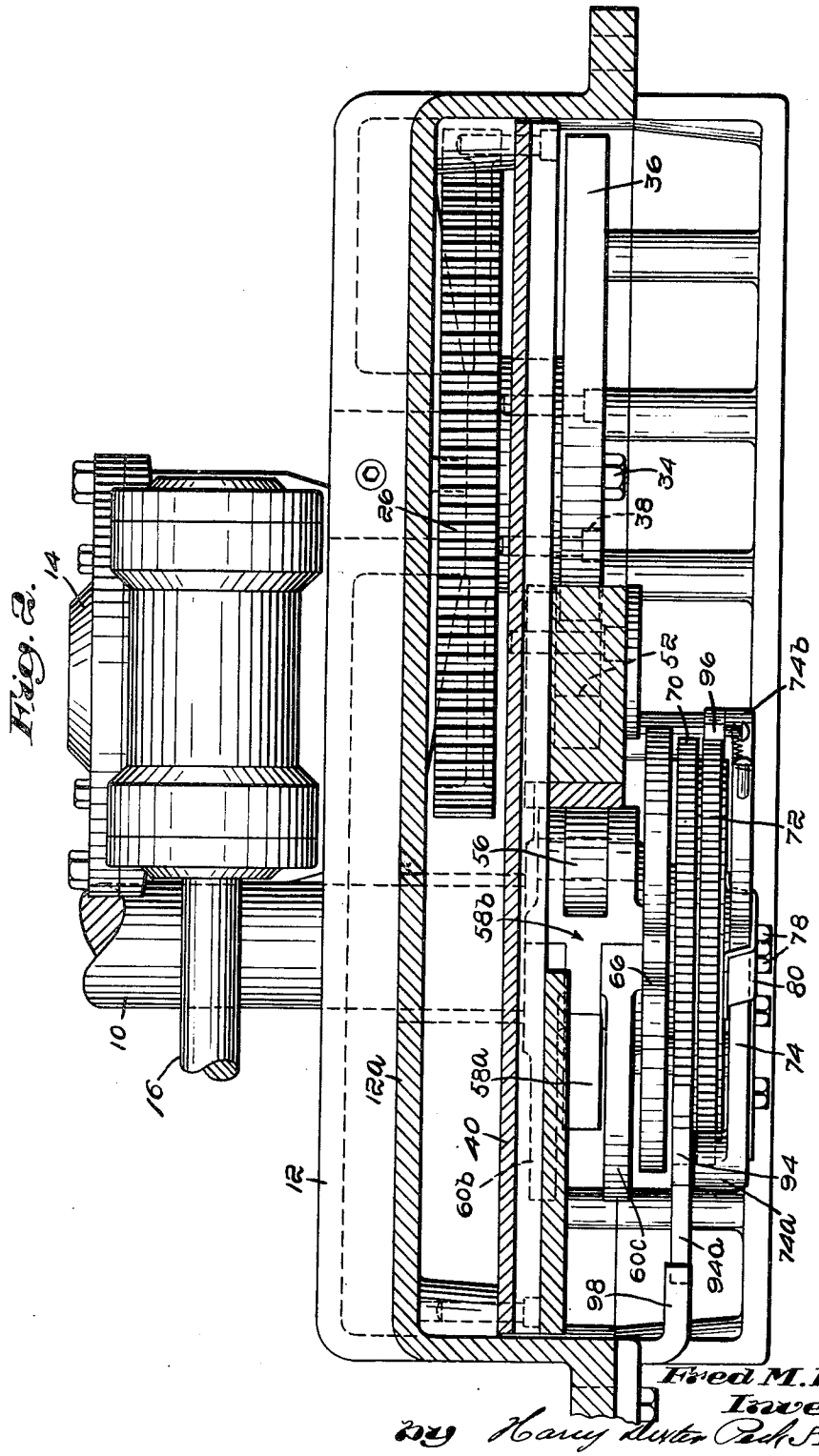
Fig. 1.

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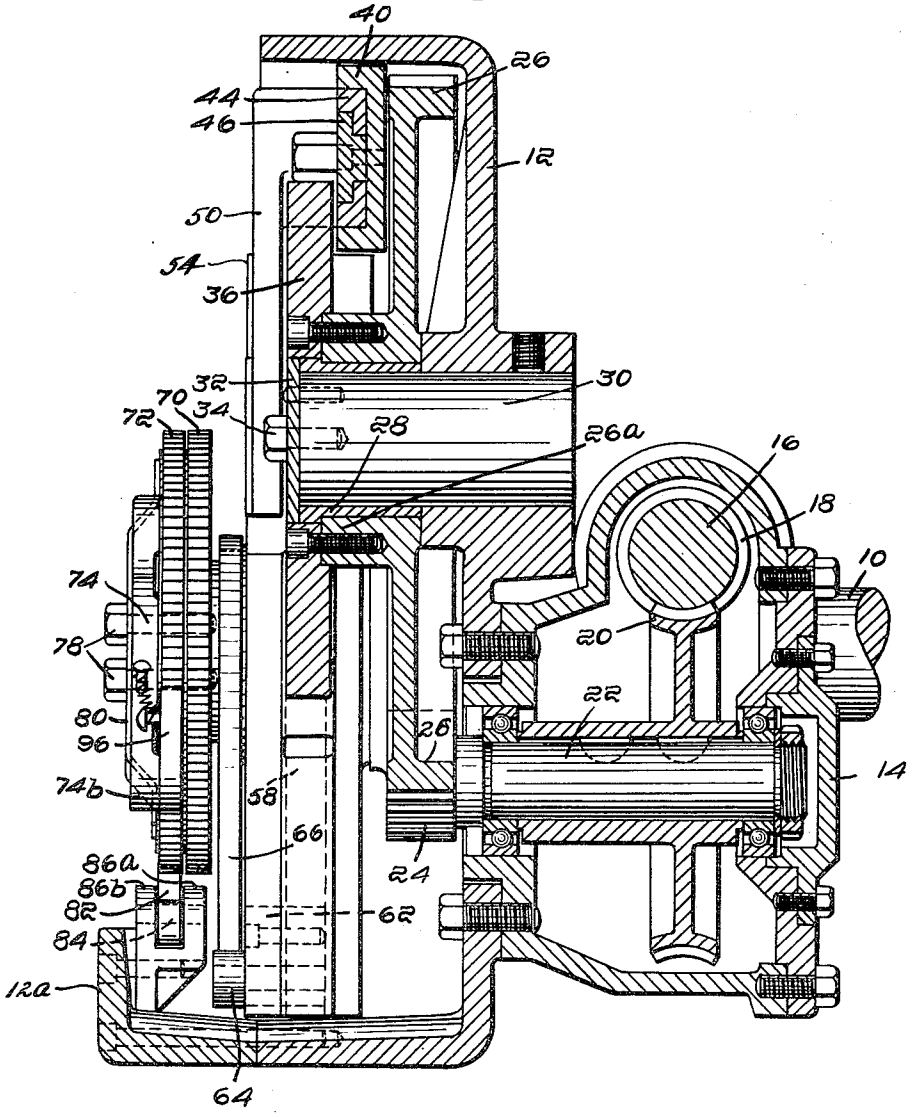
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BUILDER MECHANISM

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Fig. 3.



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BUILDER MECHANISM

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Fig. 4.

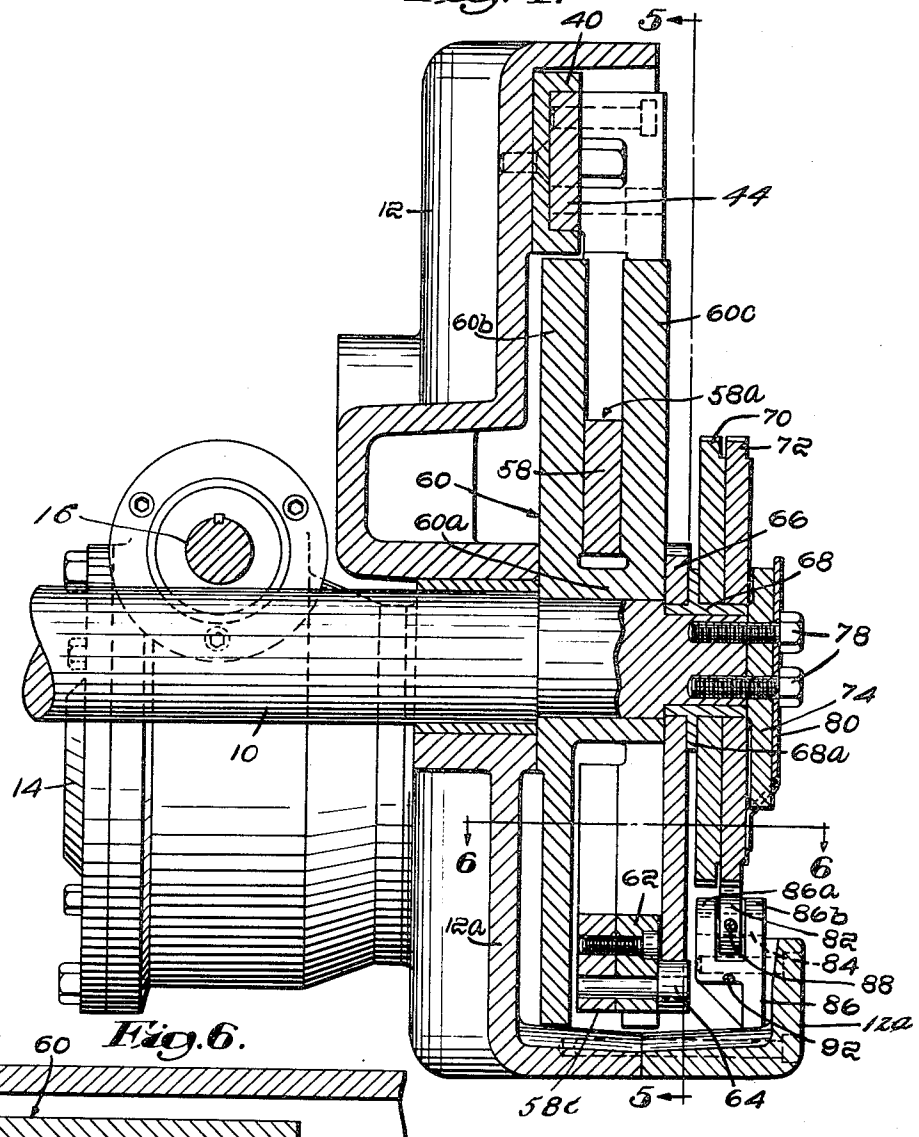
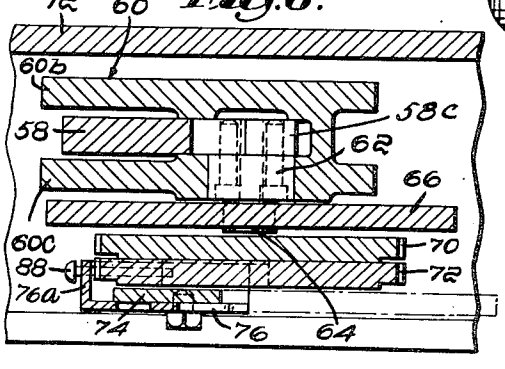


Fig. 6.



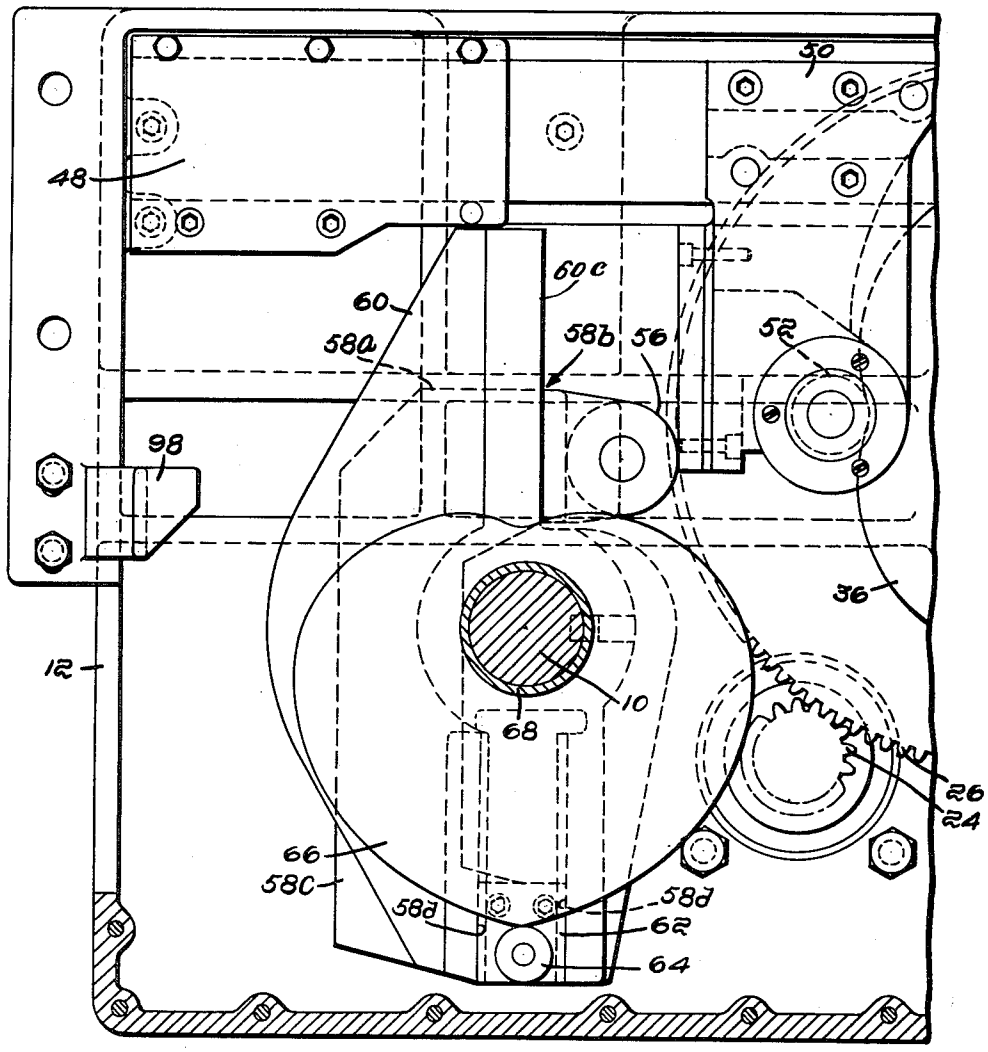
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BUILDER MECHANISM

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Fig. 5.



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UNITED STATES PATENT OFFICE

2,386,748

BUILDER MECHANISM

Fred M. Roddy, Providence, R. I., assignor to H & B American Machine Company, Pawtucket, R. I., a corporation of Maine

Application February 17, 1944, Serial No. 522,815

7 Claims. (Cl. 242—43.4)

This invention relates to improvements in builder mechanism. More especially it has to do with mechanism for effecting the movements of the ring rail of a twisting machine or the like.

Among the objects of the invention are the provision of rugged yet simple builder mechanism which will (*a*) cause the ring rail to be raised and lowered at a constant rate of travel through its traverse with no dwell at either end of the stroke, which will (*b*) by the selection of suitable cams enable the bobbin to be wound with a cylindrical section extending upward from the lower end and terminate in a formed section which will prevent sloughing-off of the windings and yet will permit the yarn to be pulled easily from the package, which will (*c*) permit random doffing of the bobbins, and which (*d*) can be readily adjusted to produce wound bobbins of desired contour. Other objects and features of the construction will be pointed out as the description develops.

The best mode in which I have contemplated applying the principles of my invention is shown in the accompanying drawings but these are to be deemed merely illustrative for it is intended to cover by suitable expression in the appended claims whatever features of patentable novelty exist in the invention disclosed.

In the drawings:

Figure 1 is a front elevation of builder mechanism embodying my improvements;

Figure 2 is a plan in section taken as on line 2—2 of Figure 1;

Figure 3 is an elevation in section taken as on line 3—3 of Figure 1;

Figure 4 is another elevation in section taken as on line 4—4 of Figure 1;

Figure 5 is an elevation, partly in section as on line 5—5 of Figure 4; and

Figure 6 is a partial plan in section as on line 6—6 of Figure 4.

Referring to the drawings the function of the builder mechanism is to control and regulate the oscillations of a rocker arm shaft 10 which is suitably connected to and actuates a lifting mechanism (not shown) which effects the raising and lowering of a ring rail (also not shown). The builder mechanism is contained in a housing 12 attached preferably to the spindle rail of a twisting machine. The front of the housing, as seen in Fig. 1, has a cover not shown in the drawings. Attached to the rear of the housing is a speed reduction unit 14 whose shaft 16 is driven from the main drive shaft of the twisting machine, or by other suitable means such as a separate motor.

A worm 18 (see Fig. 3) on the shaft 16 drives a worm gear 20 on shaft 22 which extends through the housing 12 and carries at its inner end a pinion 24. The drive from the speed reduction unit is transmitted by the pinion 24 to a cam gear 26 whose hub 26*a* rotates about a bearing bushing 28 which is held in place on a fixed axle shaft 30 by a cap 32 clamped to said axle shaft by a bolt 34. A main builder cam 36 is secured to the hub 26*a* of the cam gear 26 by bolts 38 and is therefore rotated continuously at uniform speed when the twisting machine is in operation.

Extending substantially across the housing just below the top thereof is a guide way 40 along which a slide 44 is reciprocated. The latter is held in place in the guide way by a guide block 46 and a holding plate 48 and carries an outstanding and depending cam follower arm or bracket 50. At the lower end of the arm is suitably mounted a cam roll 52 which rides on the perimeter of the main builder cam 36, and on the side of the bracket 50 is a vertically disposed shoe plate 54. The main builder cam 36 is shown as heart-shaped with duplicate halves, and so the slide, bracket and shoe plate are reciprocated with uniform speed in both directions of travel.

Resting against and riding on the shoe plate 54 is a roller 56 pivotally mounted on a carrier 58 which is movable along a rocker arm 60. The hub 60*a* of the latter is secured to the rocker arm shaft 10 whose oscillations are to be controlled and regulated by the builder mechanism. Upstanding from the hub is a back plate 60*b* and a front plate 60*c* between which the top portion 58*a* of the carrier extends and against the front faces of which plates the yoke portion 58*b* of the carrier bears and slides.

As shown in the drawings, when the slide 44 and shoe plate 54 are at the right hand end of their stroke the rocker arm 60 is in its vertical position. As the shoe plate is moved toward the left the roller 56, carrier 58, rocker arm 60 and the rocker arm shaft 10 are all swung counterclockwise about the axis of the said shaft 10. The extent of this swing is determined by the vertical position of the roller 56 and carrier 58. As best seen in Fig. 5, the roller 56 is in its lowermost position and the oscillation of the rocker arm and its shaft will be the greatest in extent. When the roller 56 and carrier 58 are in a higher position or, in other words, at a greater radial distance from the axis of shaft 10, the extent

of the oscillation will be reduced from its maximum. By changing the extent of oscillation, the upward travel of the ring rail will be correspondingly changed and thus the shape or contour of the wound bobbin can be regulated. It is to be noted, however, that regardless of the position of the roller 56 with respect to the axis of shaft 10, the rocker arm 60 will always return to its illustrated vertical position when the shoe plate 54 is at the end of its right hand stroke. Accordingly the windings on the bobbin will always extend to the bottom thereof thereby giving a cylindrical portion at the bottom end of the bobbin.

The mechanism for automatically moving the roller 56 upward or radially away from its lowermost position will now be described.

The carrier 58 has a depending portion 58c extending downward and carries at its lower end a slide block 62 which can slide with the carrier along guide ways 58d on the rocker arm 60.

A cam roll 64 is pivotally mounted on the block 62 and rides on the perimeter of an auxiliary cam 66 which can rotate with a bushing 68 around the rocker arm shaft 10. This bushing has an annular flange 68a which is interposed between the cam 66 and a pair of ratchet wheels 70, 72 also rotatable with respect to the bushing. These wheels are attached together and duplicates except that the teeth on one are undercut in one direction while the teeth on the other wheel are undercut in the opposite direction. The ratchet wheels 70, 72, the bushing 68 and the cam 66 are pinned together and turn as a unit.

Outside of the bushing 68 and ratchet wheels 70, 72 is a peculiar shaped lever 74 termed the picking pawl regulator. This has two opposed arms 74a and 74b and a third arm 74c upon which is adjustably mounted a regulator slide 76. The picking pawl regulator lever 74 is secured to the rocker arm shaft by bolts 78 which clamp to the face of the regulator lever a strap spring 80 whose bent in ends rest on the face of ratchet wheel 72 and thus apply a sort of friction brake to prevent undue turning of the ratchet wheels and auxiliary cam.

Below ratchet wheel 72 is a picking pawl 82 rotatably mounted on a short axle 84 extending between the upstanding arms 86a and 86b of a bracket 86 secured to the front wall 12a of the housing 12. A pin 88 attached to the pawl is connected by a spring 90 to a pin 92 fixed on the bracket 84. Since the spring is always in tension, the pawl is always urged in a counterclockwise direction so as to engage the teeth on ratchet wheel 72.

As best seen in Fig. 1, when the slide 44 is moved to the left and the rocker arm 60 is turned counterclockwise, the carrier 58, cam roll 64, cam 66, ratchet wheels 70, 72 and regulator lever 74 are likewise all turned counterclockwise. During this movement the regulator slide 76, which is L-shaped in cross section and has what may be termed an arcuate shoe 76a overlying the teeth of ratchet wheel 72, tilts the pawl 82 out of engagement with the ratchet wheel 72. This relation continues during the return or clockwise rotation of the rocker arm until the pawl 82 slides off the end of the shoe 76a and again engages the teeth of ratchet wheel 72. When this occurs, the movement of the ratchet wheels is immediately stopped and so, of course, is that of the auxiliary cam 66. The rocker arm 60 and the regulator lever 74 continue to rotate until the former reaches the vertical portion with the slide 44 at the right hand end of its stroke.

During the relative movement of the rocker arm with respect to the ratchet wheels (while the latter are held at rest by the pawl 82) the auxiliary cam 66, being pinned to the ratchet wheels, is shifted with respect to the cam roll 64. As seen in Fig. 1 and perhaps better in Fig. 5, the cam 66 in effect is shifted counterclockwise with respect to the rocker arm, thus permitting the cam roll 64, carrier 58 and roller 56 to move upward with respect to the rocker arm. This upward movement of these last mentioned elements may not occur immediately upon the shifting of the cam, but as the slide 44 begins its left hand stroke and the rocker arm 60 begins to tilt, the resulting V-shape between the faces of the arms 60b and 60c and the face of shoe 54 immediately causes the carrier to move upward and thus bring the cam roll or follower 64 into contact with the auxiliary cam 66. Since the roll 56 is now at a greater distance from the axis of the rocker arm shaft 10 than before, the angular travel of the rocker arm will be reduced accordingly, and the ring rail will not be moved to as high a top position when the slide 44 is at the end of its left hand stroke. The yarn will not be wound so high on the bobbin and thus is begun the shaping of the contour of the wound package. The contour produced will be determined by the shape of the auxiliary cam.

At the ends of the arms 74a and 74b of the regulator lever 74 are mounted pawls 94 and 96. Pawl 96 is arranged to engage the teeth of ratchet wheel 72 so that when the rocker arm 60 and lever 74 are turned counterclockwise the ratchet wheels and auxiliary cam will be sure to turn likewise. Similarly pawl 94 engages the teeth on ratchet wheel 70 and when so engaged insures that the ratchet wheels and auxiliary cam will rotate with the rocker arm and lever 74 when the latter are turned clockwise. However, when the picking pawl 82 slides off the shoe 76a of the regulator slide 76 and engages the teeth of ratchet wheel 72 and thereby stops the rotation of the ratchet wheels, provision must be made to temporarily release the pawl 94 while the rocker arm 60 and regulator lever 74 are completing their clockwise oscillations.

This is accomplished by an extended arm 94a on the pawl 94 and a tripping bracket 98 adjustably secured to the housing 12. As the regulator lever 74 turns clockwise, the pawl arm 94a engages the fixed bracket 98, thereby causing the arm 94a and the pawl 94 to be tilted about the axis of the pawl and out of engagement with the teeth of the ratchet wheel 70. By suitable adjustment of the bracket 98, corresponding to the setting of the regulator slide 76, the pawl 94 will be disengaged from the ratchet wheel 70 whenever the pawl 82 engages the teeth of ratchet wheel 72 and effects relative movement between the ratchet wheels and the regulator lever. Conversely, when the picking pawl 82 is disengaged from the ratchet wheel 72, that is when the regulator slide 76 has moved far enough in a counterclockwise direction to disengage the pawl 82, the regulator lever 74 and pawl arm 94a will also have moved sufficiently to permit pawl 94 to re-engage the teeth of ratchet wheel 70. This engagement will prevent any movement of the ratchet wheels and auxiliary cam 66 which might otherwise tend to occur as the rocker arm 60 swings to the left and its faces and the face of the slide shoe 54 urge the roller 56, the carrier 58 and the cam follower 64 upward.

It will thus be seen that undesired rotation of the ratchet wheels, when the rocker arm is at or near its vertical portion, is prevented by the friction brake effect of the strap spring 80, and when the rocker arm assumes an appreciably inclined position and a greater tendency to rotate the ratchet wheels results, the pawl 94 will be engaged with ratchet wheel 70 and prevent any such undesired rotation.

To sum up briefly the operation of my improved builder mechanism, the traverse mechanism and the up and down movements of the ring rail are effected and controlled by the oscillations of the rocker arm shaft 10. The traverse always comes to the same position at the bottom end of the stroke because the rocker arm 60 always returns to its illustrated vertical position. The extent to which the rocker arm swings away from this vertical position is determined by the distance of the roller 56 from the axis of the rocker arm shaft 10 and this distance is varied by the shape of the auxiliary cam 66 and its position relative to the rocker arm 60 and the cam follower 64. The changing of this relative position is effected by the controlled engagement of the picking pawl 82 with ratchet wheel 72 and this controlled engagement is regulated by the setting of the regulator slide 76. The desired shape of the build at the top of the wound bobbin or package of yarn is determined by the shape or contour of the auxiliary cam 66.

The preferred form of builder mechanism illustrated is rugged and reliable, the adjustable elements are readily accessible, and the adjustments may be easily made. If a different shape of build on the bobbin is desired, the auxiliary cam 66 can be replaced with very little delay. The bolts 78 are unscrewed and the strap spring 80 and regulator lever 74 removed. The ratchet wheels, 70, 72, the bushing 68 and the cam 66 are then withdrawn as a unit and the cam slipped from its pinned engagement with the other parts and a new cam applied. The removed elements are then replaced and the regulator slide and tripping bracket adjusted, if necessary, whereupon the machine can again be started to produce the winding of the bobbins in accordance with the desired contour of the build.

I claim:

1. Builder mechanism for reciprocating a rail of a spinning or twisting machine having an oscillatable rocker shaft operatively connected with said rail, said mechanism comprising a slide moved reciprocally, a rocker arm on the rocker shaft, an element movably mounted on said rocker arm having means at one end interposed between said reciprocating slide and said rocker arm for transforming the reciprocal movements of the slide into oscillation of the rocker arm, said element having at the other end a cam follower, a cam mounted about the rocker arm shaft engaging said cam follower; and means also mounted about said rocker arm shaft for effecting rotary movement of the cam with respect to said rocker shaft whereby the said element is moved relatively to the axis of the rocker arm shaft to vary the extent of oscillation of the rocker arm.

2. Builder mechanism for reciprocating a rail of a spinning or twisting machine having an oscillatable rocker shaft operatively connected with said rail, said mechanism comprising reciprocating means, a rocker arm on said rocker shaft, an adjustable element interposed between said means and said arm for transforming the reciprocating motion into oscillations of the rocker arm, means for adjusting said element with respect to the axis of the rocker shaft, including a cam rotatable about the axis of said shaft, a cam follower engaging said cam and carried by the adjustable element, and means actuated by the oscillation of said rocker arm for rotating said cam with respect to the rocker shaft and thereby effecting the adjustment of said element.

3. Builder mechanism for reciprocating a rail of a spinning or twisting machine having an oscillatable rocker shaft operatively connected with said rail, means for oscillating said shaft comprising a power driven cam, a slide actuated by said cam, a rocker arm secured to said shaft and actuated by said slide, a carrier mounted on said rocker arm having a roller making contact with the slide and being movable along said rocker arm with respect to the axis of said shaft, means for adjusting the position of said roller comprising a cam follower on said carrier, an auxiliary cam rotatable about the axis of said rocker shaft, a ratchet wheel also rotatable with said auxiliary cam about said rocker shaft, a pawl for engaging said ratchet wheel to effect relative movement between said cam and the rocker arm, and means attached to the rocker arm shaft controlling the action of said pawl and thereby the extent of said relative movement.

4. Builder mechanism for reciprocating a rail of a spinning or twisting machine having an oscillatable rocker shaft operatively connected with said rail, means for oscillating said shaft comprising a power driven cam, a slide actuated by said cam, a rocker arm on said shaft actuated by the said slide, an element interposed between the rocker arm and movable with respect to the axis of the rocker shaft, means including a second cam rotatably mounted on the rocker shaft for moving said element, means for oscillating said second cam in unison with the rocker arm, and means rendered effective near the end of an oscillation for holding said cam stationary during the completion of the oscillation of the rocker arm to effect movement of said element with respect to the rocker shaft and thereby vary the extent of its oscillation.

5. Builder mechanism as set forth in claim 4, in which the said element carries a cam follower engaging said second cam.

6. Builder mechanism as set forth in claim 4, in which the means rendered effective near the end of an oscillation includes a ratchet wheel secured to said second cam, a pawl arranged to engage such ratchet wheel, a regulating lever secured to the rocker arm and carrying a regulator slide for normally holding said pawl out of engagement with said ratchet wheel but adjusted to permit such engagement near the end of an oscillation, whereby the movement of the second cam is arrested.

7. Builder mechanism as set forth in claim 4, in which a pair of ratchet wheels having their respective teeth undercut in opposite directions are secured to said second cam, and there are pawls on said regulating lever normally engaging both said ratchet wheels to prevent relative rotation in either direction between them and said rocker arm, and means for holding one of said lever pawls out of engagement with its respective ratchet wheel to permit the ratchet wheels to be held stationary while the rocker arm is completing its oscillation.

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