June 26, 1951 G. E. REPASS 2,558,198

BUNCH BUILDING MECHANISM

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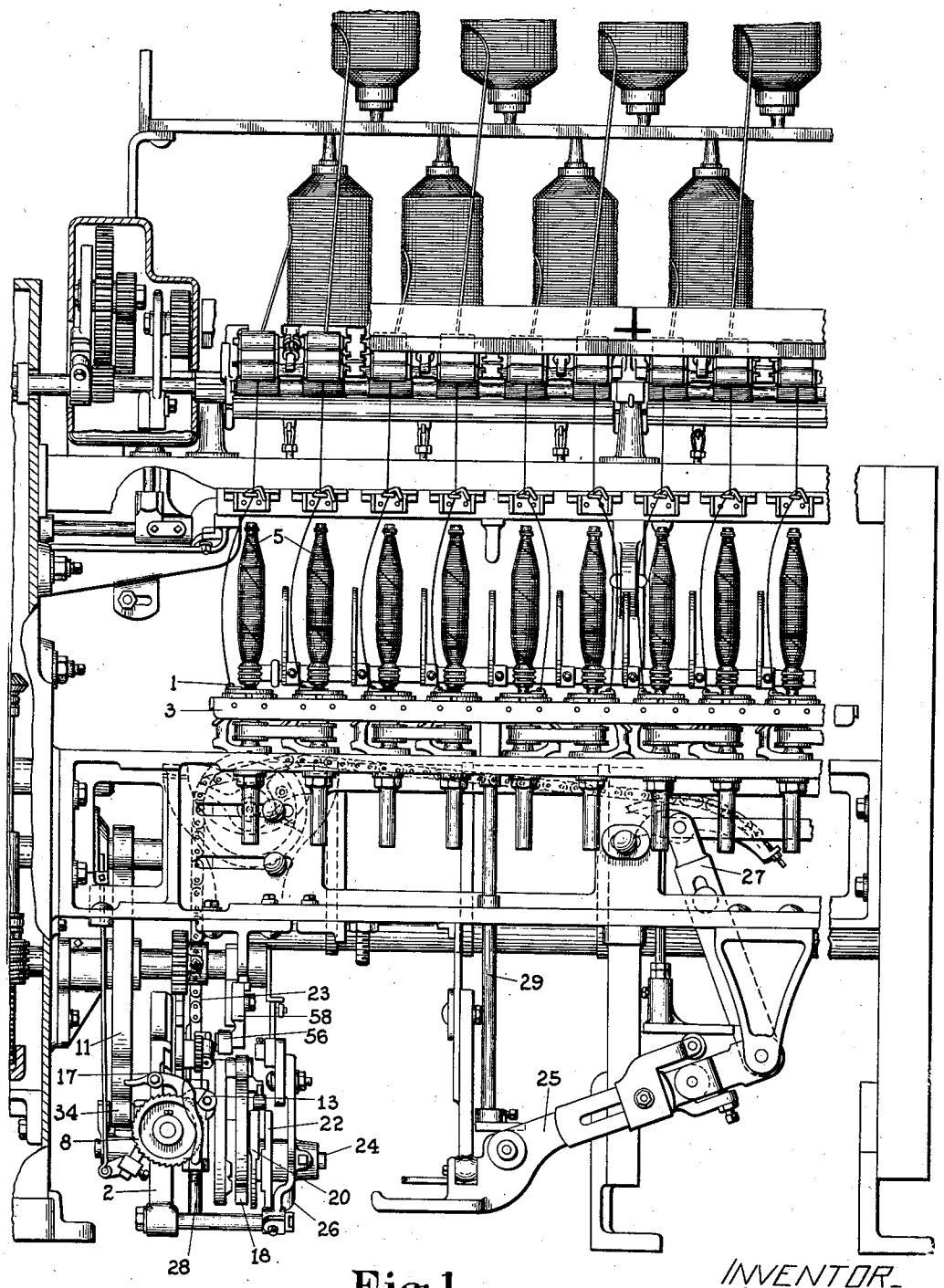


Fig.1.

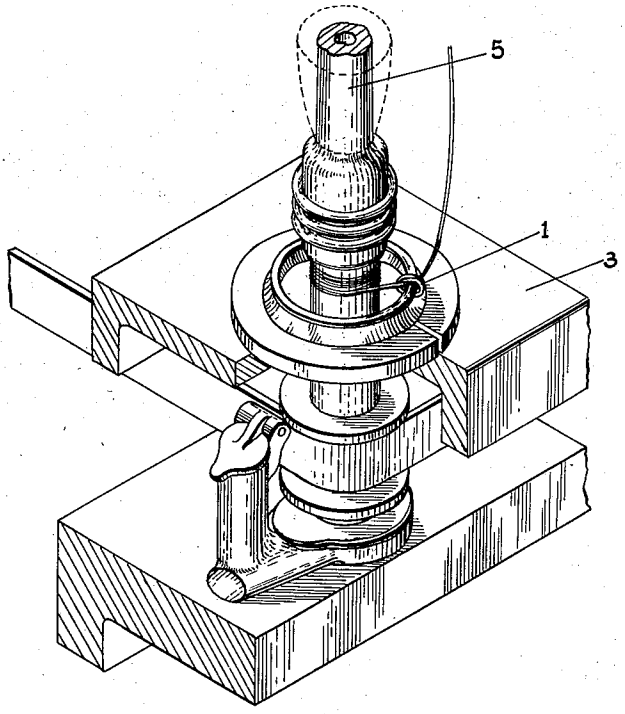
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BUNCH BUILDING MECHANISM

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Fig. 14



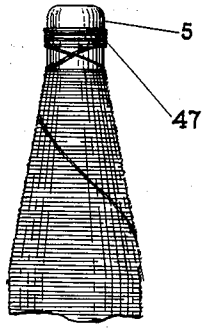
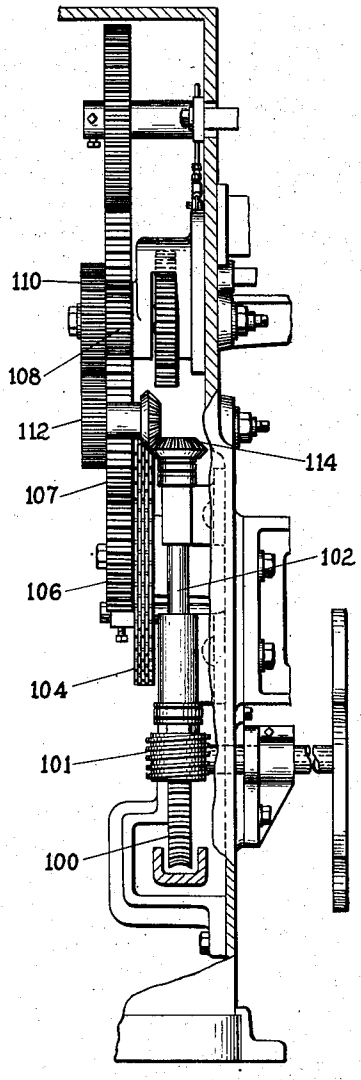


Fig. 15

Fig. 2



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BUNCH BUILDING MECHANISM

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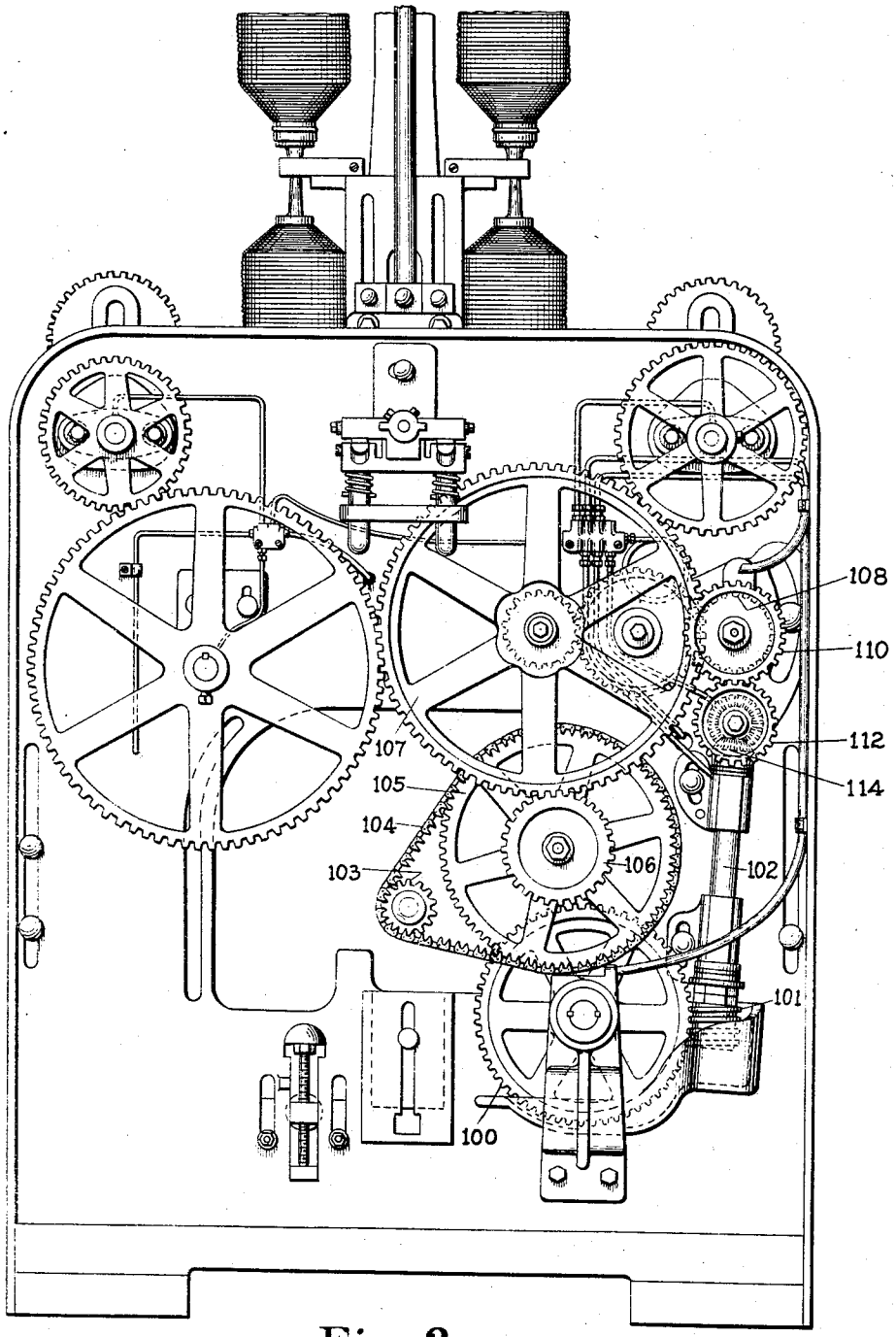


Fig. 3

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BUNCH BUILDING MECHANISM

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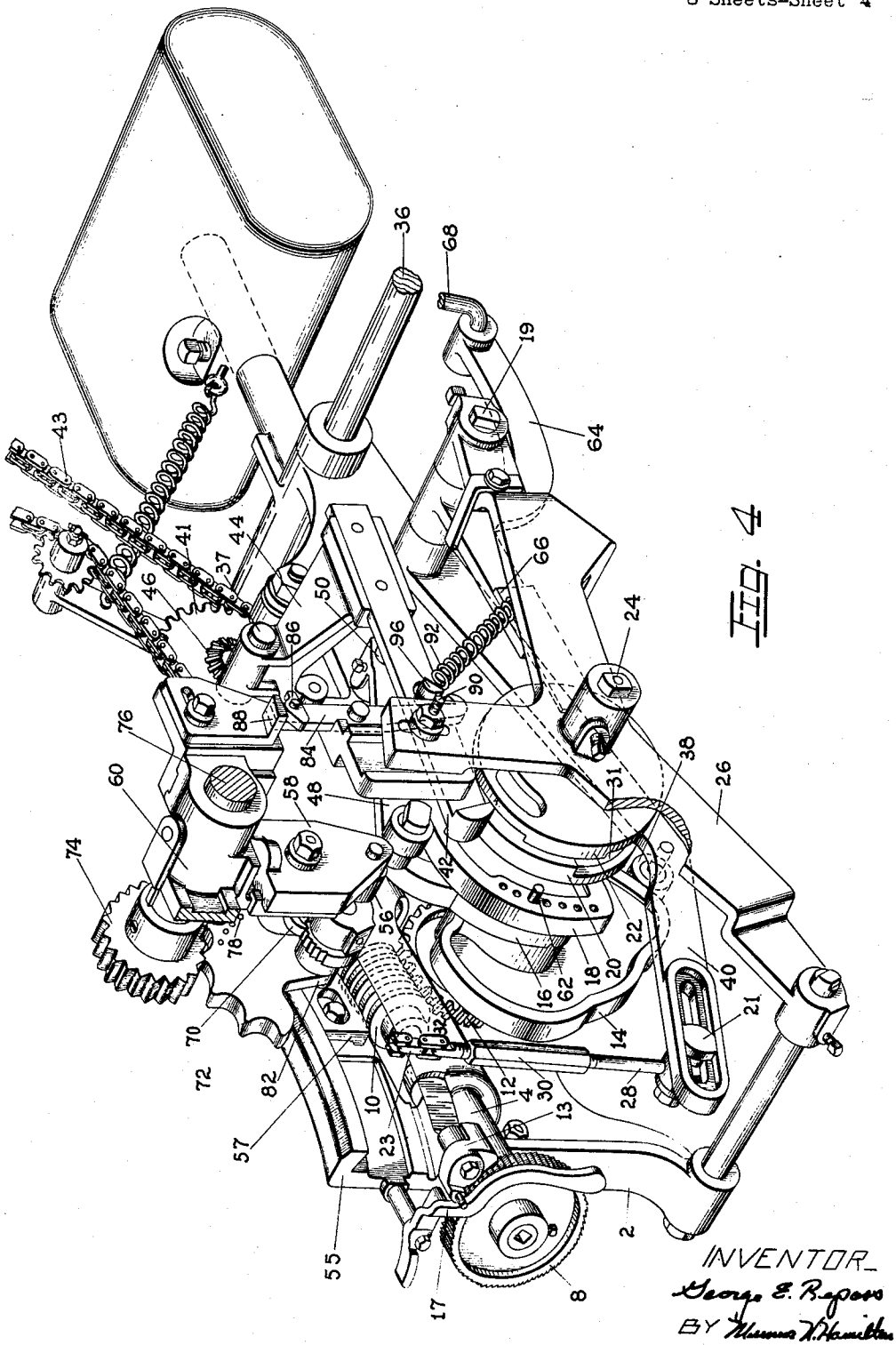


FIG. 4

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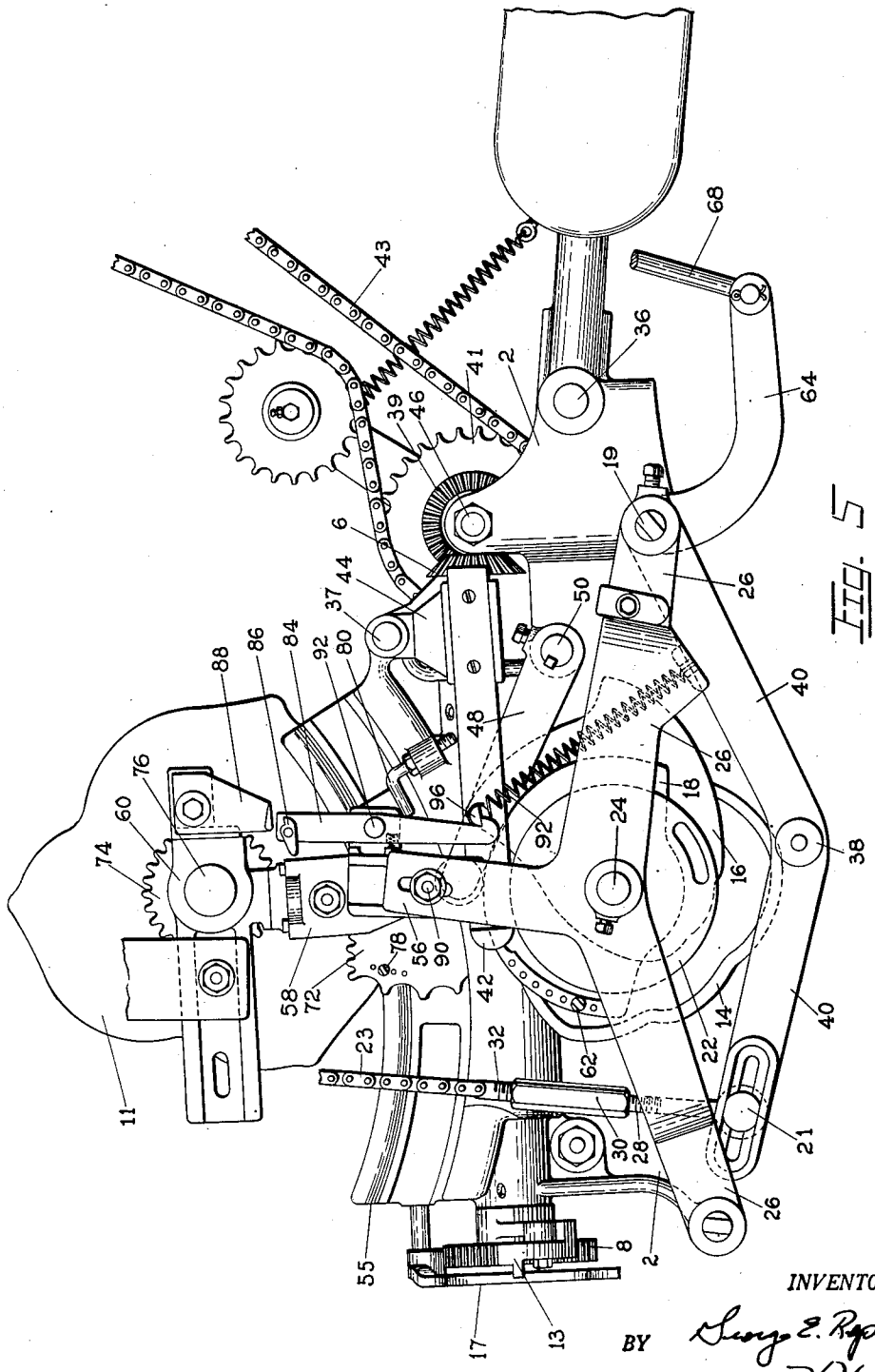


FIG. 5

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BUNCH BUILDING MECHANISM

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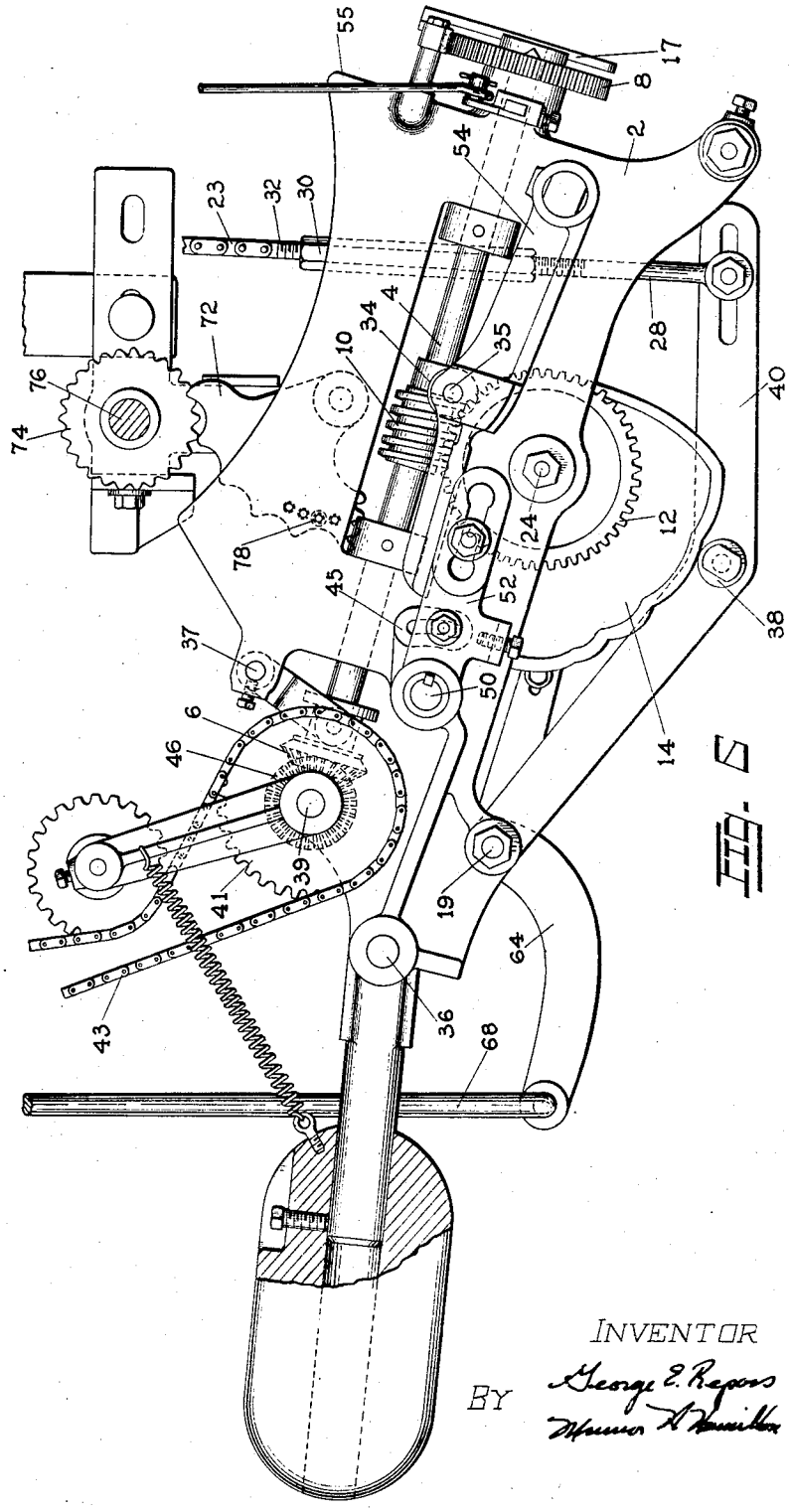


FIG. 6

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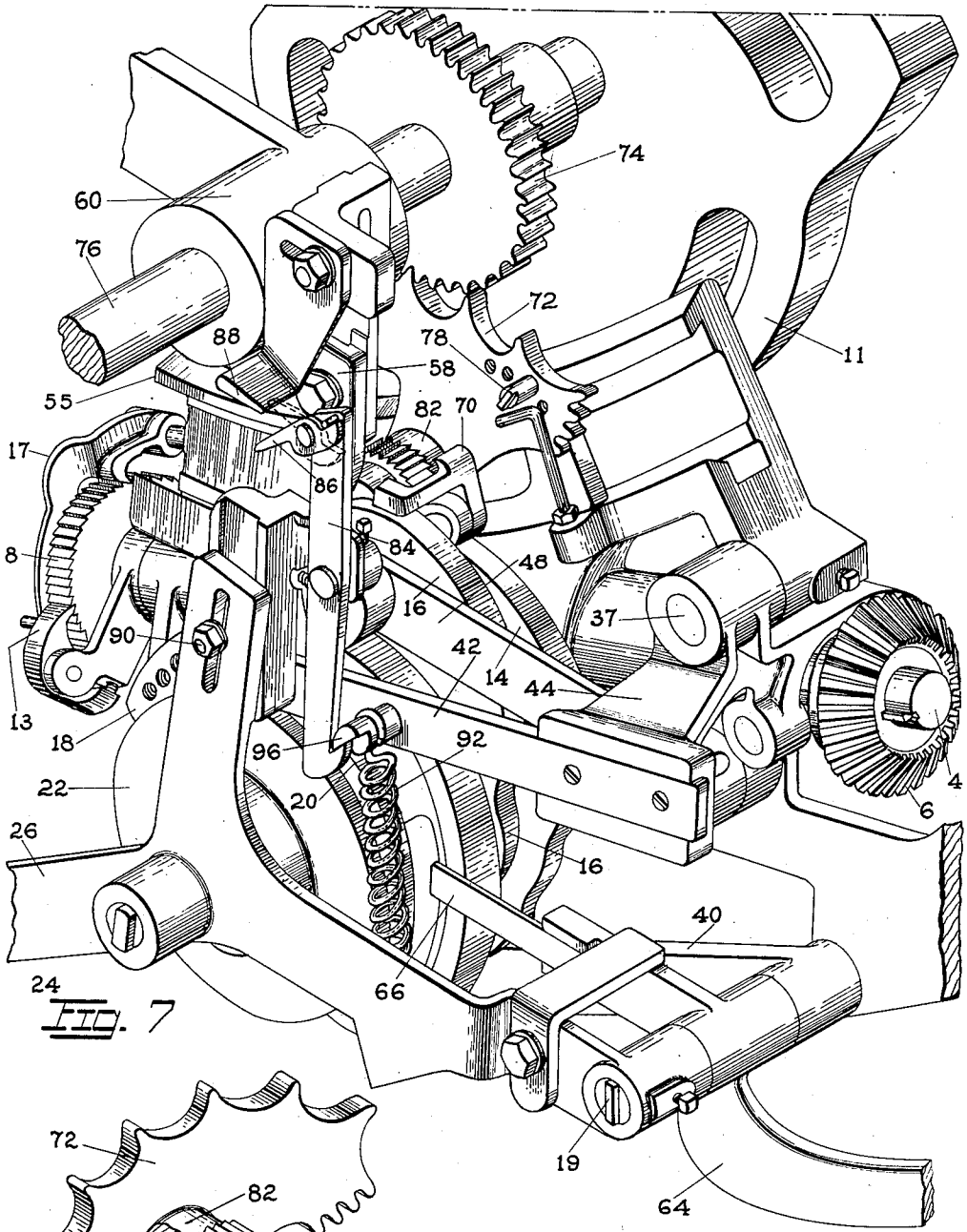


FIG. 7

FIG. 8

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BUNCH BUILDING MECHANISM

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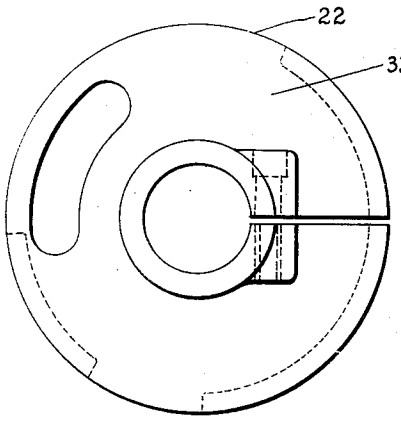


FIG. 9

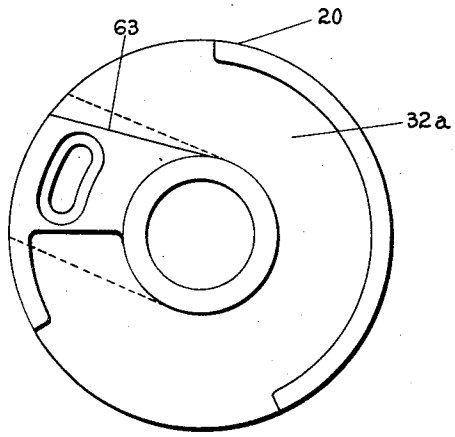


FIG. 10

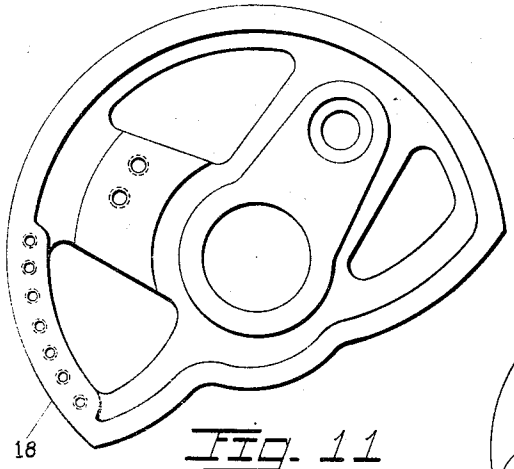


FIG. 11

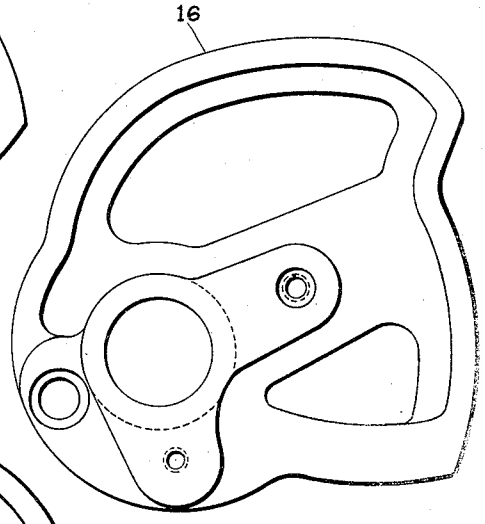


FIG. 12

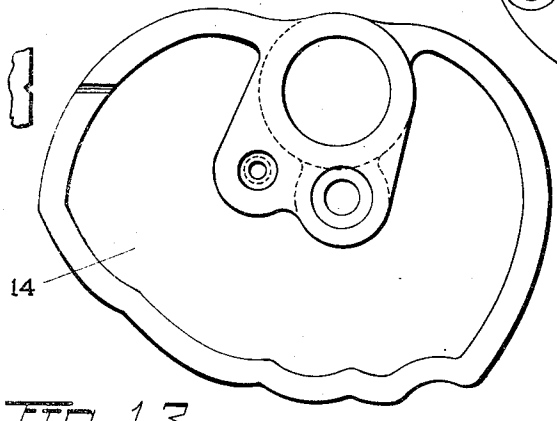


FIG. 13

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Patented June 26, 1951

2,558,198

UNITED STATES PATENT OFFICE

2,558,198

BUNCH BUILDING MECHANISM

George E. Repass, Hopedale, Mass., assignor to Draper Corporation, Hopedale, Mass., a corporation of Maine

Application April 30, 1947, Serial No. 744,821

22 Claims. (Cl. 242—43.7)

1

This invention relates to spinning, and more particularly to an improved builder mechanism of the type employed in spinning frames to form a top bunch of filling on a bobbin tip.

After a bobbin has been made on a spinning frame, it is customary to install a number of these bobbins by hand in a bobbin battery where each free end of filling is held preparatory to transfer to a shuttle. Hand installation involves considerable labor and as a result there has developed a demand for more efficient or less costly bobbin installation, preferably such as may be serviced by automatic conveyors or feeding mechanisms. To facilitate mechanical handling of bobbins, it has been proposed to form, at the tip of the bobbin, a top bunch of filling which may be easily engaged by mechanical grippers and which is easily slipped off over the bobbin extremity to provide a free end. Top bunch builder mechanisms heretofore provided for this purpose have proven unsatisfactory, owing to a combination of factors.

Such builder mechanisms depend upon raising the ring rail into an extreme elevated position to form a top bunch. In lowering the ring rail to a starting position, breaking of the filling occurs very frequently. Some top punch builder mechanisms which have sought to avoid this latter difficulty are of such a cumbersome nature as to discourage their use. The difficulty here is made greater by reason of the fact that conventional spinning frame construction leaves only a limited amount of space between itself and the supporting floor for mounting and operating the builder mechanism the conventional filling cam and draft chain construction of which cannot be altered for practical reasons. It will readily be seen therefore that additional structure to carry out new builder movements is greatly limited by the space available. It should also be observed that there is some variance in the several standard types of frame. Thus in the well known Whitin frame design, the builder mechanism is arranged at the front of the frame while in the Saco-Lowell type of frame the builder mechanism is located at the rear of the frame. The result of this is to limit even further the design of a builder mechanism which is adapted for use with both types of frame.

An object of the invention therefore is to deal with the problem indicated, and to provide an improved builder mechanism of very compact nature by means of which a top bunch of filling may be smoothly formed on a bobbin in a position to facilitate either manual or automatic

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handling and installation of the bobbin in a loom bobbin battery.

It is also an object of the invention to combine the operation of building a top bunch with other desirable builder movements such as those relating to building a reserve bunch of filling, to eliminate hand operations in resetting pick wheel mechanism, to return the ring rail to a starting position and the like. Other objects and novel features will appear from the following description of the invention.

In the accompanying drawings:

Fig. 1 is a front elevational view illustrating the builder mechanism of the invention mounted in a spinning frame;

Fig. 2 is a side elevational view illustrating driving means located in the frame;

Fig. 3 is an elevational view further illustrating the driving means for the builder mechanism;

Fig. 4 is a perspective view of the builder mechanism removed from the frame;

Fig. 5 is a view of the builder in side elevation;

Fig. 6 is another elevational view of the builder viewed from an opposite side;

Fig. 7 is a detail perspective view further illustrating the cam members of the invention;

Fig. 8 is a detail perspective view of clutch mechanism;

Figs. 9–13 inclusive are elevational views of cam members;

Fig. 14 is a fragmentary detail perspective view of a ring rail and bobbin; and

Fig. 15 is a fragmentary view of a bobbin with a top bunch formed thereon.

I have found that when building a top bunch, thread breaking may be almost entirely eliminated if the filling leading from the top bunch to the ring rail traveler is at all times protected from excessive tension. This I find can be achieved by providing an automatic ring rail lowering mechanism, and by combining with this mechanism a novel top bunch builder mechanism which is timed to perform its function immediately after completion of the main package and just before the ring rail is lowered so that the two operations are blended one into another.

The general plan of my improved builder mechanism includes a building lever with which is associated the well known filling cam construction and a pick motion of the type common to builder mechanisms. I have further combined with the building lever a supporting bracket arranged in spaced-apart relation to the lever and secured so that the two elements con-

stitute a frame. In this frame are very compactly arranged a series of unique cam members operating in timed relation to one another and operatively connected to driving gear means by means of which the top bunch building movement is most effectively brought into action during a succession of builder movements. This general structure by means of its exceedingly well integrated nature is well adapted for use with any of the common makes of spinning frames. The specific form of builder illustrated in the drawings is especially designed for use with a spinning frame of the type manufactured by the Whitin Machine Works, and the following detailed description is rendered with reference to the latter type of frame.

Referring more in detail to the drawings, Fig. 1 illustrates a spinning frame showing bobbins of roving running through the drafting rolls down through the usual thread guides. The strands are passed through travelers 1, rotatably mounted in rings in a ring rail 3, and then around the bobbins 5. A builder mechanism makes a main package on the bobbins by means of a traversing action of the ring rail, with each successive reciprocation being advanced upwardly to provide a plurality of overlapping layers. The builder mechanism is indicated at the lower left-hand side of Fig. 1 and operates a link mechanism which in turn raises and lowers the ring rail.

Rigidly supported between the frame and an upright extending outwardly from the bottom of the frame is a shaft 36, Figs. 4 and 5, on which is pivotally mounted a building lever 2 which carries at one extremity a rod and counterweight normally tending to maintain this end of the lever in a relatively lower position than its opposite end. Mounted in the building lever 2 is a shaft 4 (Fig. 6) which has a bevel gear 6 slidably mounted at one end. At the opposite end of shaft 4 is secured a pick wheel 8. A trundle roll 34 is mounted on a stub shaft 35 supported in a roller stand 54 adjustably secured at one side of the building lever 2. The trundle roll is acted upon by a filling cam 11 which causes the building lever to rock on shaft 36. The cam 11 is fixed to a shaft 76 journaled through the frame.

At a point outside the frame, the shaft 76 has fixed thereon a gear 100 driven by a worm 101 on a vertical shaft 102 (Fig. 3). Motive power for driving the shaft 102 is supplied by a motor located at an opposite end of the frame from that shown in Fig. 3, acting through a gear train running from gear 103, to chain 104, to jack gear 105. On the same shaft with jack gear 105 is a small gear 106 driving a large intermediate gear 107 which in turn drives gears 108, 110, 112 and a bevel gear rotatable therewith and in mesh with a bevel gear 114 on the upper end of shaft 102.

At one side of the building lever and in spaced-apart relation thereto I have provided a bracket 26 (Fig. 4), consisting of a forwardly extending member which corresponds somewhat in length and shape to the forward end of the building lever, an upright section, and a rearwardly extending arm. The bracket is mounted on one end of a stub shaft 24 the other end of which is received in the building lever 2. The building lever bracket and stub shaft combine to provide a supporting frame. Within this frame and fixed to the stub shaft is a worm wheel 12 driven by a worm 10, keyed to the central portion of shaft 4 immediately above the worm wheel. The worm wheel is constructed with an extended hub portion surrounding the stub shaft 24 and upon which is mounted a series of cam elements consisting of spaced-apart cams 14, 16 and 18, and two adjustable timing discs 20 and 22 secured in timed relation to one another.

As the trundle roll 34 is acted upon by the filling cam 11 and the builder moves up and down on shaft 36, the pick wheel is slowly rotated by means of a conventional pawl 13. A second hold back pawl 17 maintains the pick wheel in whatever position it is moved by the action of the pawl 13. This pick movement is adjustable to vary the amount of rotation of shaft 4 and, being of conventional character, requires no further discussion here.

Rotation of the pick wheel and shaft 4 a few degrees with each oscillation of the builder actuates the worm 10 and worm wheel 12, thus turning the cam 14 and other members on shaft 24 a short distance. The cam 14 engages against a cam roller 38 (Fig. 6) carried by a filling arm 40 pivotally mounted on a stub shaft 19. Shaft 19 is supported at one end in the builder lever 2 and at the opposite end in the bracket 26 (Fig. 4).

The filling arm 40 is formed with a slotted extremity in which is adjustably secured a slide 21 attached to which are link members 28, 30 and 32. The latter link member 32 has its upper extremity connected to a draft chain 23 which is in turn fastened to a conventional ring rail lifting mechanism consisting of arms 25 and 27 and ring rail lifter rod 29 (Fig. 1).

As the builder moves up and down, the filling arm 40, therefore, through the link mechanism and chains, imparts a traversing motion to the ring rail which advances progressively, thus laying each layer of filling slightly higher than the preceding layer, in response to the pick wheel movement until the bobbin is filled to a predetermined point.

In accordance with the invention, I combine with the builder movements noted, mechanism for building a top bunch of filling immediately the main package has been completed. This mechanism includes the cams 16 and 18, timing discs 20 and 22 already referred to, and several other elements. The timing discs are formed with annular rim portions which are arranged edge to edge to provide a space between the two discs. Each of the rim portions is further cut away along adjacent points to form a slot 31. The inner sides of the discs are formed with cam surfaces 32*a*, 33 (Figs. 9 and 10).

Engaging against the rim portions of the discs 20 and 22 is a timing arm 42 provided with a beveled head which slides on the rim portions and is of a size suitable for allowing this member to pass through the slot 31. The opposite end of the timing arm 42 is secured to a timing arm support 44 pivotally mounted on a stub shaft 37 in the building lever 2. The timing arm support 44 is formed with a forked portion which surrounds the shaft 4 and engages against the gear 6 (Fig. 6).

The timing discs 20 and 22 are arranged on the shaft 24 in a position so chosen that at the point where the main body of filling is completed on a bobbin, the beveled head of the timing arm 42 may drop through the slot 31, moving the timing arm support 44 relative to the shaft 4 which engages the bevel gear 6 with a bevel gear 46. The gear 46 is mounted on a shaft 39 and is constantly driven by means of a sprocket 41 and chain 43 which is in turn driven from the gear-

ing already referred to, located at the end of the spinning frame.

When the two gears mesh the shaft 4 is rotated more rapidly than by the pick wheel 8. This rotates the cams at a relatively faster rate and as cam 18 turns it allows a timing cam follower lever 48 to drop, rotating a shaft 50 to which it is keyed. The shaft 50 is received through the building lever and has keyed to its opposite ends a trundle roll control mechanism 52. This mechanism consists of a link adjustably fastened at its intermediate portion to a slotted lug 45 and, at its extremity, is detachably secured to the trundle roll stand 54.

When shaft 50 is rotated as the roll on arm 48 follows the contour of cam 18, the control member 52 is pivoted downwardly, thus lowering the trundle roll stand 54 and allowing trundle roll 34 to drop away from the filling cam 11. This permits the ring rail to rise until arm 25 hits an adjustable stop on the spinning frame and thus builds a top bunch 47 as shown in Fig. 15. A small number of turns are applied to the bobbin with the ring rail in this position, for example twelve turns, and means are then resorted to for lowering the ring rail without delay and before the spinning frame is knocked off.

Return of the ring rail while the frame is still in motion is controlled by rotation of the cam 14, which as it turns, forces the filling arm 40 downwardly thus permitting the ring rail to descend. Cam 16 also contacts a cam roller 56 fastened to a cam follower support 58, in turn suspended from a cam shaft bearing member 60 (Fig. 4). This forces the building lever down to a still lower point and thus carries the ring rail below the butt of the bobbin, at which point the operation of the spinning frame may be halted.

Cam 18 is provided with a knock-off pin 62 adjustably fixed on its outer rim. As the cam revolves in timed relation to movement of the cam 16 against the roller 56, this pin comes into contact with a knock-off lever end 66 adjustably mounted in a knock-off lever 64, forcing it downward. Knock-off lever 64 pivots on a stud 19 and its outer end is connected to knock-off rod 68 which operates the knock-off mechanism for the spinning frame.

During that part of the movement of cam 16 just described, this cam also places in an operative position a bunch builder quadrant mechanism for forming a reserve bunch of filling when the frame is again started. The quadrant mechanism includes a slotted annular segment 55 located slightly above and at one side of the worm 10. Within the slotted portion of the segment 55 is adjustably secured a sliding block 57 from which is supported a hub 82 carrying a quadrant member 72. The quadrant is normally held in a forward inoperative position against the action of a coiled spring carried inside of the hub 82, by means of a quadrant pawl 70. A quadrant driving gear 74 is fixed to the filling cam shaft 76 in a position adapted to engage a serrated edge of the quadrant as illustrated in Fig. 4.

During the movement of cam 16 occurring as the ring rail reaches its lowest position above described, a portion of the cam moves against a projection on the quadrant pawl 70, tripping this member and allowing the quadrant to spring rearwardly into an operative position.

When the building lever is at its lowest position, a notched latch attached to the treadle on the ring rail, locks the rail in place in the well known manner. After the completed bobbins are doffed, the rail is released by tripping the latch attachment from its locked position, leaving the spinning frame in position to start on a new set of bobbins.

As the frame is started with the builder in the lowest position described, the bevel gears 46 and 6, which are still in mesh, continue to revolve the cams rapidly. A portion of cam 14 presents a sinuous surface, and as this surface comes into contact with the filling arm roll 38, there is imparted to the ring rail an oscillating motion of very brief duration. The effect of this oscillating motion is to cross the yarn and tie it around the spindle at a point below the butt of the bobbin and at a time just prior to the beginning of building a reserve bunch at the lower end of the bobbin, as shown in Fig. 14.

An interval, suitable for this oscillating motion to tie the yarn around the spindle, is provided by the movement of the quadrant 72. At the completion of the oscillating movement, the bunch builder quadrant 72 contacts the quadrant driving gear 74, keyed to the cam shaft 76. In so doing the quadrant holds the trundle roll 34 out of full contact with the filling cam 11. As the quadrant driving gear 74 and quadrant serrations are engaged, there is also imparted to the builder a definitely limited traversing motion which builds a reserve bunch of filling around the bobbin. This operation is terminated by forward movement of the quadrant, which turns with the quadrant driving gear. As soon as the quadrant reaches an inoperative position, it is locked there by the quadrant pawl 70. When the quadrant moves ahead into this inoperative position, the trundle roll 34 moves into full contact with the filling cam 11 and the usual traversing action already described takes place until the main package is made.

Also provided is a stop pin 78 adjustably mounted in the quadrant in a position arranged to contact an adjustable stop pin 80 mounted in the builder frame. This stop pin controls the distance that the quadrant moves back under the driving gear and this determines the size of the reserve bunch of filling.

With further rotation of the cams 14, 16, 18, the timing arm 42 is forced against the camming surface 32*a*, 33 on the timing disc 20, and is thus raised, disengaging the bevel gear 6 from bevel gear 46. This then leaves the shaft 4 to be revolved by the pick mechanism described above.

A safety mechanism is provided which allows the timing arm 42 to drop and engage the bevel gears 46 and 6 only on the upstroke of the builder, thus assuring the same size bunch at the tip of each bobbin. As the builder rises, the timing lever latch 84, with the timing lever latch release 86 at its upper end, rises until contact is made with the latch trip bracket 88, which carries the latch out from under the pin 96 mounted on the timing arm 42 and allows the arm to drop between the timing discs. Movement of the timing arm between the discs can only occur after the slot 31 has come beneath the end of the arm during the rotation of the discs. The setting of the parts is such that the latch does not trip to release the lever until the slot 31 would permit it to drop; then it does function to assure that the change of gears occurs on the upstroke of the ring rail.

An important aspect of the mechanism described is the carefully controlled movement occurring smoothly and in rapid succession to elevate the ring rail into a top bunch builder

position and then start it back without breaking the filling. These movements are made possible by the combination of slotted cam discs and cam arm together with chain driving means for actuating a filling cam follower control. It should be observed that abrupt movement of the mechanism is avoided by camming the builder mechanism to raise the rail as the trundle roll drops away and permits the building lever to move to a higher position and to remain there just long enough for the tip bunch to be wound. With this there is also combined additional cam means for very gradually starting the ring rail downwardly without any sudden start such as would place a strain on the filling.

It is also pointed out that the same cams cooperate to carry out the operation of passing a few turns of filling around the bottom of the bobbin and simultaneously place the quadrant mechanism in an operative position to build a reserve bunch. The various other movements described place the frame in position to resume operation without any hand adjustments being necessary.

The arrangement of the cam elements with the bracket as described is especially desirable in modifying the operation of the builder for installation on a Saco-Lowell type of builder. Thus the entire cam assembly can be used in an inverted position and when changed in minor structural respects becomes easily adapted to this type of frame.

It will be evident that by mounting the several cam elements on a common supporting member extending laterally out from one side of the building lever and yet not projecting below it to any appreciable extent, a relatively small amount of operating space is necessary and installation in the spinning frame is facilitated. It is intended that various changes and modifications may be resorted to in keeping within the scope of the invention as defined by the appended claims.

I claim:

1. A builder mechanism for a spinning frame comprising a shaft, a building lever mounted on the shaft, means including a trundle roll and filling cam for oscillating the lever about the shaft to form a main package of filling on a bobbin, cam means for lowering the trundle roll out of contact with the filling cam for a short interval during which a top bunch is built, and cam means for immediately lowering the building lever while the spinning frame is in motion.

2. A builder mechanism for a spinning frame comprising a building lever mounted on a shaft in the spinning frame, a trundle roll secured to the lever, a filling cam supported from the spinning frame, said cam being adapted to engage against the trundle roll and effect oscillation of the lever about its shaft, a filling arm operatively connected to a ring rail in the said spinning frame and responsive to movement of the building lever, a pick actuated mechanism for controlling the traverse of the filling arm to build a main package of overlapping layers of filling on a bobbin, means for increasing the speed of the pick actuated mechanism, cam means rotated by the pick actuated mechanism, said cam means being effective when operating at a relatively faster speed, to lower the trundle roll away from the filling cam and cause the building lever and ring rail to move to a bunch building position.

3. A builder mechanism for a spinning frame comprising a building lever mounted on a shaft in the spinning frame, a trundle roll secured to the lever, a filling cam supported from the spinning frame, said cam being adapted to engage against the trundle roll and effect oscillation of the lever about its shaft, a filling arm operatively connected to a ring rail in the said spinning frame and responsive to movement of the building lever, a pick actuated mechanism for controlling the traverse of the filling arm to build a main package of overlapping layers of filling on a bobbin, a cam supporting stud mounted at one side of the building lever, cam disc members defining a slot between them mounted on the cam supporting stud, a timing arm having a widened head engaging said disc members, means operatively connected to the timing arm and comprising disengageable gears for increasing the speed of the pick actuated mechanism, a second cam follower lever engaging against a second cam located at one side of the said cam discs, said second cam follower lever having means effective upon movement thereof to lower the trundle roll and move the building lever into a top bunch building position, and a third cam means mounted on the cam supporting stud for lowering the entire building mechanism subsequent to building a top bunch.

4. A builder mechanism for a spinning frame comprising a building lever mounted on a shaft in the spinning frame, a trundle roll secured to the lever, filling cam means adapted to engage against the trundle roll and effect oscillation of the lever about its shaft, a filling arm operatively connected to a ring rail on the said spinning frame and responsive to movement of the building lever, a supporting stud projecting laterally from the building lever, a pick actuated motion adapted to change the traverse of the filling arm with respect to the building lever to build a main package on the bobbin, a worm wheel mounted on the stud, said worm wheel presenting a long hub, and cam means fixed on the hub for raising and lowering the building lever.

5. In a builder mechanism for a spinning frame, a building lever, a trundle roll adjustably secured to the lever, a filling cam engaging the trundle roll to effect oscillation of the lever, a filling arm pivotally secured in the building lever and responsive to oscillation of the lever, a filling arm cam for controlling the traverse of the filling arm, a pick actuated motion including a pick wheel and a driven shaft for varying the position of the said filling arm cam, disengageable gear means for increasing the speed of rotation of the driven shaft, timing cam means for placing the gear means in an operative position for a short interval, and cam means for causing the building lever to move into a top bunch building position during the said interval.

6. In a builder mechanism for a spinning frame a building lever, a trundle roll adjustably secured to the lever, a filling cam engaging the trundle roll to effect oscillation of the lever, a filling arm pivoted in the building lever and responsive to oscillation thereof, a filling arm cam for controlling the traverse of the filling arm, a pick actuated motion including a pick wheel and driven shaft for varying the position of said filling arm cam, disengageable gear means for increasing the speed of rotation of the driven shaft, timing cam means for placing the gear means in an operative position for a short interval, cam means for causing the building lever to move into a top bunch building position during the said interval, said latter

cam means being arranged on a cam support rotated in timed relation to the filling arm cam.

7. In a builder mechanism for a spinning frame a building lever, a trundle roll adjustably secured to the lever, a filling cam engaging the trundle roll to effect oscillation of the lever, a filling arm pivoted in the building lever and responsive to oscillation thereof, a filling arm cam for controlling the traverse of the filling arm, a pick actuated motion including a pick wheel and driven shaft for varying the position of said filling arm cam, disengageable gear means for increasing the speed of rotation of the driven shaft, timing cam means for placing the gear means in an operative position for a short interval, cam means for causing the building lever to move into a top bunch building position during the said interval, said latter cam means being arranged on a cam support rotated in timed relation to the filling arm cam, and a builder lowering cam positioned on the said cam support between the filling arm cam and the timing cam means.

8. In a builder mechanism a building lever pivotally mounted on a shaft, a bracket secured in spaced relation to the lever, a filling arm and a pivot means therefor for rotatively supporting the arm between the lever and bracket, means for oscillating the lever, a supporting shaft extending between the bracket and the lever, and cam means mounted on the supporting shaft for selectively controlling movement of both the building lever and filling arm.

9. In a builder mechanism for building a top bunch of filling, the combination with a building lever of a supporting member, cam means secured between the lever and supporting member for controlling movement of the lever, said cam means including a pair of discs having rim portions in symmetrically opposed relationship to one another, said rim portions being cut away to define widened slots at a part of the circumference thereof, cam portions formed on the inner surfaces of the discs adjacent the said slots, and a timing arm adapted to engage said discs.

10. A builder mechanism for a spinning frame comprising a shaft, a building lever mounted on the shaft, means consisting of a trundle roll and filling cam for oscillating the building lever on the shaft, a supporting member arranged in spaced relation to the building lever, cam means secured between the building lever and supporting means for moving the building lever into a top bunch building position, and cam means for building a reserve bunch of filling after the top bunch has been formed.

11. A builder mechanism for a spinning frame comprising a shaft, a building lever mounted on the shaft, means consisting of a trundle roll and filling cam for oscillating the building lever on the shaft, a supporting member arranged in spaced relation to the building lever, cam means secured between the building lever and supporting means for moving the building lever into a top bunch building position, and means for forming several turns of filling about the lower end of the bobbin.

12. A builder mechanism for a spinning frame comprising a shaft, a building lever mounted on the shaft, means consisting of a trundle roll and filling cam for oscillating the building lever on the shaft, a supporting member arranged in spaced relation to the building lever, cam means secured between the building lever and supporting means for moving the building lever into a top bunch building position, means for forming several turns of filling about the lower end of the bobbin, and means for forming a reserve bunch of filling.

13. In a builder mechanism a building lever pivotally mounted on a shaft, a bracket secured in spaced relation to the building lever, a filling arm and a pivot means therefor for rotatively supporting the arm between the lever and bracket, means for oscillating the lever, a shaft extending between the bracket and the lever, cam means for controlling movement of the building lever, said cam means including a pair of timing discs and a timing arm operatively positioned to be controlled by the discs, and means for securing the arm in a locked position.

14. In a builder mechanism a building lever pivotally mounted on a shaft, a bracket secured in spaced relation to the building lever, a filling arm and a pivot means therefor for rotatively supporting the arm between the lever and bracket, means for oscillating the lever, a shaft extending between the bracket and the lever, cam means for controlling movement of the building lever, said cam means including a pair of timing discs and a timing arm operatively positioned to be controlled by the discs, means for securing the arm in a locked position comprising a latch means, and a trip for said latch means for disengaging the timing arm from its locked position.

15. A builder mechanism for a spinning frame comprising a building lever mounted on a shaft in the spinning frame, a trundle roll secured to the lever, filling cam means supported from the spinning frame, said filling cam being adapted to engage against the trundle roll and effect oscillation of the lever about its shaft, a filling arm connected by a draft chain to lifter means for a ring rail in the said spinning frame, said filling arm being responsive to movement of the building lever, a shaft supported for rotation in the building lever and driven by a pick actuated motion, a worm mounted on the shaft, a worm wheel in mesh with the worm, a cam stud on which said worm wheel is mounted, said cam stud being supported at one end by the building lever, a bracket member attached to the other end of said stud, a filling arm cam rotatable on the cam stud and being attached to the worm wheel and effective upon the filling arm for changing its traverse relatively to movement of the building lever, gear means effective when in mesh for increasing the speed of the said shaft, and means comprising a cam element functioning upon said filling arm and control means therefor for moving the filling arm into an elevated position during at least a part of the relatively faster rotation of the driven shaft when said gears are in mesh, thereby to build a top bunch.

16. In a builder mechanism a shaft, a building lever pivotally mounted thereon, a bracket and means for securing said bracket in spaced relation to the lever, a filling arm rotatively supported between the bracket and the lever, and means including a traverse cam for oscillating the lever, said means for securing the bracket to the building lever including a shaft extending between the bracket and the lever, means for controlling the relative movements of the building lever and filling arm comprising cams mounted on the said shaft and including a pair of timing discs defining between them a slot of

varied width, a timing arm operatively connected for action upon and between said discs, and means affected by said timing arm and including a pick actuated motion and disengageable gears for driving said pick actuated motion at predetermined points in the cycle of operation of the said builder mechanism.

17. In a builder mechanism a building lever and a pivotal mounting therefor, a bracket and means including a shaft fixed at one end to the lever and at its other end to the bracket for maintaining the said bracket and lever in spaced relation, a filling arm and a pivot therefor adjacent the pivot for the building lever, cam means forming a driven unit on said shaft and including a timing cam, a filling arm controlling cam and a cam for moving the entire builder mechanism downwardly for winding a tail about a completed yarn package and for positioning the ring rail for winding a bunch at a point adjacent the lower end of the bobbin, and a pick actuated motion for rotating said cams.

18. In a builder mechanism a building lever and a pivotal mounting therefor, a bracket and means including a shaft fixed at one end to the lever and at its other end to the bracket for maintaining the said bracket and lever in spaced relation, a filling arm and a pivot therefor adjacent the pivot for the building lever, cam means forming a driven unit on said shaft and including a timing cam, a filling arm controlling cam and a cam for moving the entire builder mechanism downwardly for winding a tail about a completed yarn package and for positioning the ring rail for winding a bunch at a point adjacent the lower end of the bobbin, and means for rotating said cams comprising a pick shaft, a worm on said pick shaft and a worm wheel fixed for rotation with said cams and driven by said worm, pick means for rotating said pick shaft at a slow speed and gears and means controlled by said timing cam for intermeshing said gears at predetermined times to rotate said cams at a faster speed.

19. In a builder mechanism a building lever, a pivot about which said lever is mounted for swinging movement, a rotatable traverse cam and a trundle roll carried by said building lever and positioned to be engaged by said traverse cam for swinging the lever about its pivot during the building of the body portion of a thread package, said trundle roll being mounted on a second lever pivoted to the said building lever, and means for varying the relative position of said trundle roll with respect to the builder mechanism thereby to alter the effect of the traverse cam thereon which comprises a cam, means to rotate said cam in timed relation to the package building function, follower means engageable with said cam, and a third lever to which said follower means is attached, said third lever being interconnected through to said lever upon which the trundle roll is mounted for imparting the control movement derived from said cam to the trundle roll mounting lever.

20. In a builder mechanism a building lever, a pivot about which said lever is mounted for movement, a rotatable traverse cam and a trundle roll carried by said building lever and positioned to be engaged by said traverse cam for moving the lever about its pivot, a movable mounting means for said trundle roll, said mounting means being comprised as a functional part of the building lever, and means for moving the said mounting for the trundle roll to different positions with respect to the building lever in one of which the said roll is withdrawn from its usual proximity to the traverse cam, said means for moving the mounting as described comprising a cam, drive means for the cam and means for imparting movement of the cam to the mounting means which comprises a lever, a follower on said lever engageable by said cam and means movable by said lever and follower and interconnected to the said mounting means.

21. In a builder mechanism a building lever, a pivot about which said lever is mounted for swinging movement, a rotatable traverse cam and a trundle roll carried by said building lever and positioned to be engaged by said traverse cam for swinging the lever about its pivot, said trundle roll being mounted on a second lever pivoted to the said building lever, and means for varying the position of said roll relatively to the building mechanism thereby to alter the effect of the traverse cam thereon which comprises a cam carried by the builder lever, pick actuated means for rotating said cam, disengageable gears for driving said pick actuated means at predetermined times and follower means bearing upon said cam and interconnected to the said lever upon which the trundle roll is mounted for imparting the control derived from the cam to the movable mounting means.

22. In a builder mechanism of the type described, a building lever and a pivotal mounting therefor, a trundle roll carried by said building lever, a filling cam engageable with said trundle roll for swinging said building lever about its pivot to effect traversing of a yarn as it is wound to form a yarn package, and means effective upon termination of winding the yarn package for raising the traverse of the yarn toward the end of the package to wind a tip bunch slightly removed from the end of the main body of the yarn package, said means for winding a tip bunch comprising a cam, a pivot means carried by said builder lever upon which said cam is rotatable, pick actuated means for rotating said cam, a second pivot means carried by said builder lever, arms pivoted at said second pivot means, one of which carries a follower means resting on said cam and the other of which is effective upon said trundle roll to vary its position relatively to the building lever, timing cams and timing control means to govern the point in the cycle at which the trundle roll varying means becomes effective thereby to determine the point at which said tip bunch shall be formed and latch means governing the timing control means for preventing the start of formation of the tip bunch except during an upstroke of the traverse of the yarn.

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