G. S. HARRIS.

SPINNING FRAME BUILDER.

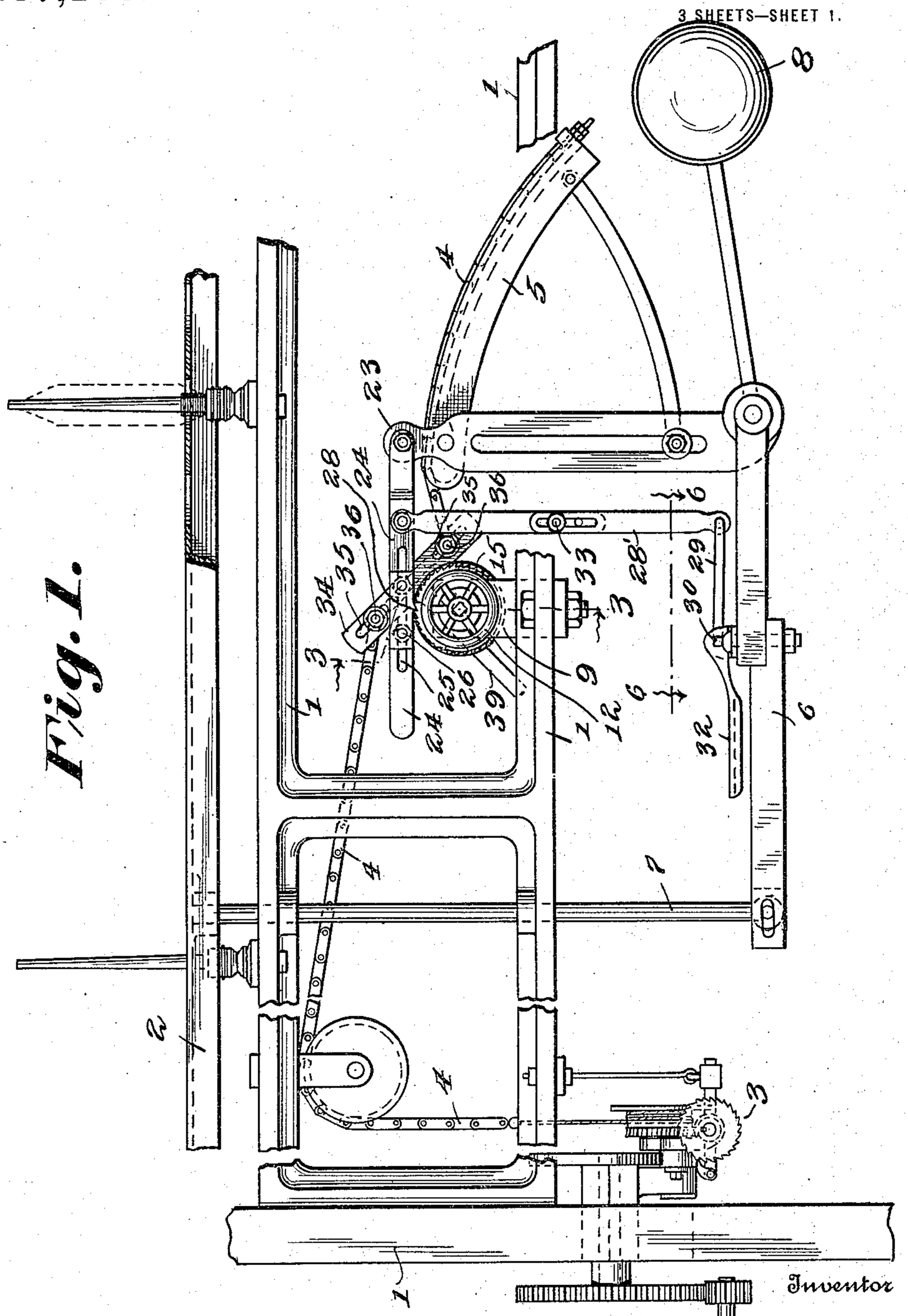
APPLICATION FILED APR. 23, 1914.

1,167,168.

Patented Jan. 4, 1916.

3 SHEETS—SHEET 1.

*Fig. 1.*



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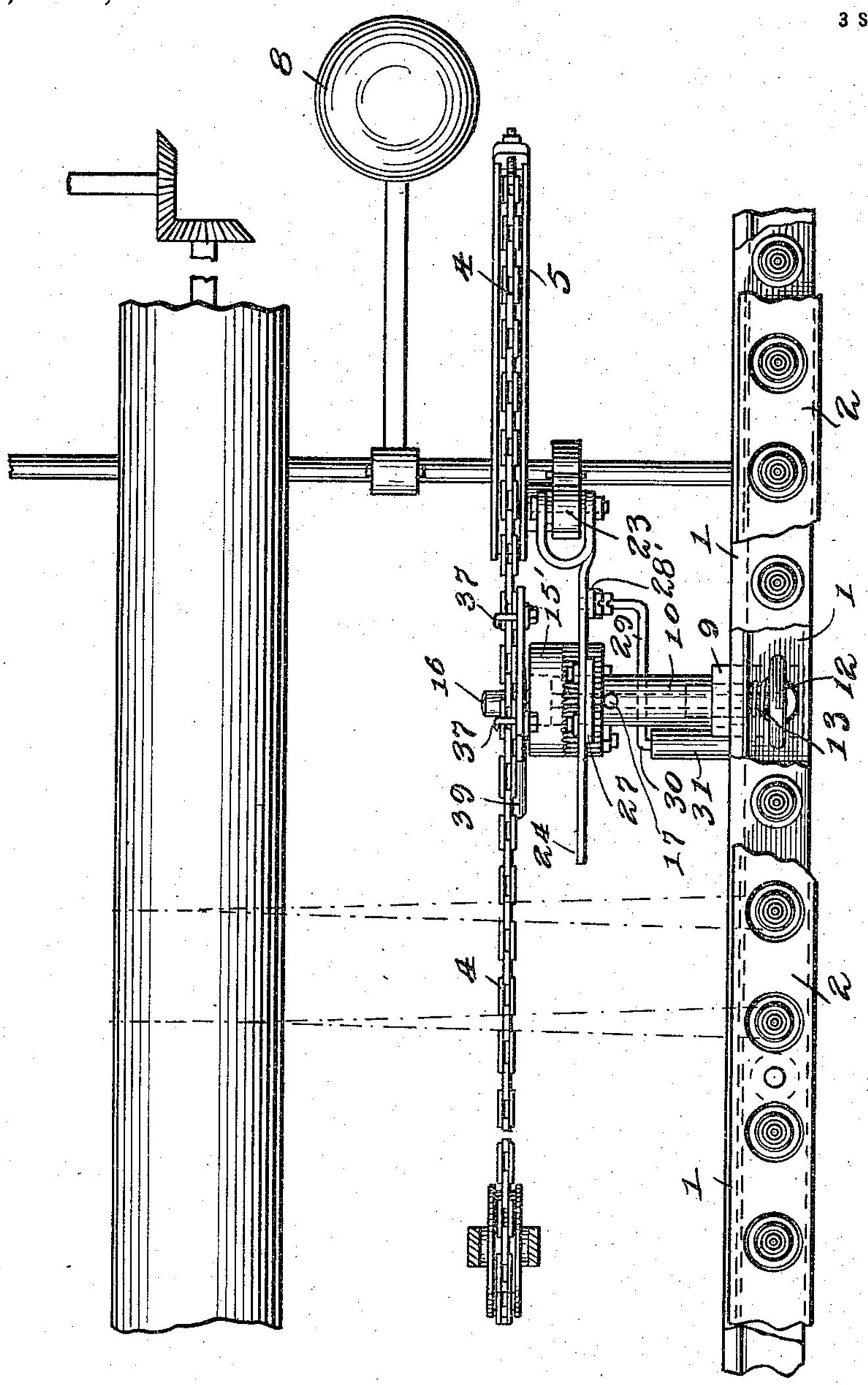
3 SHEETS—SHEET 2.

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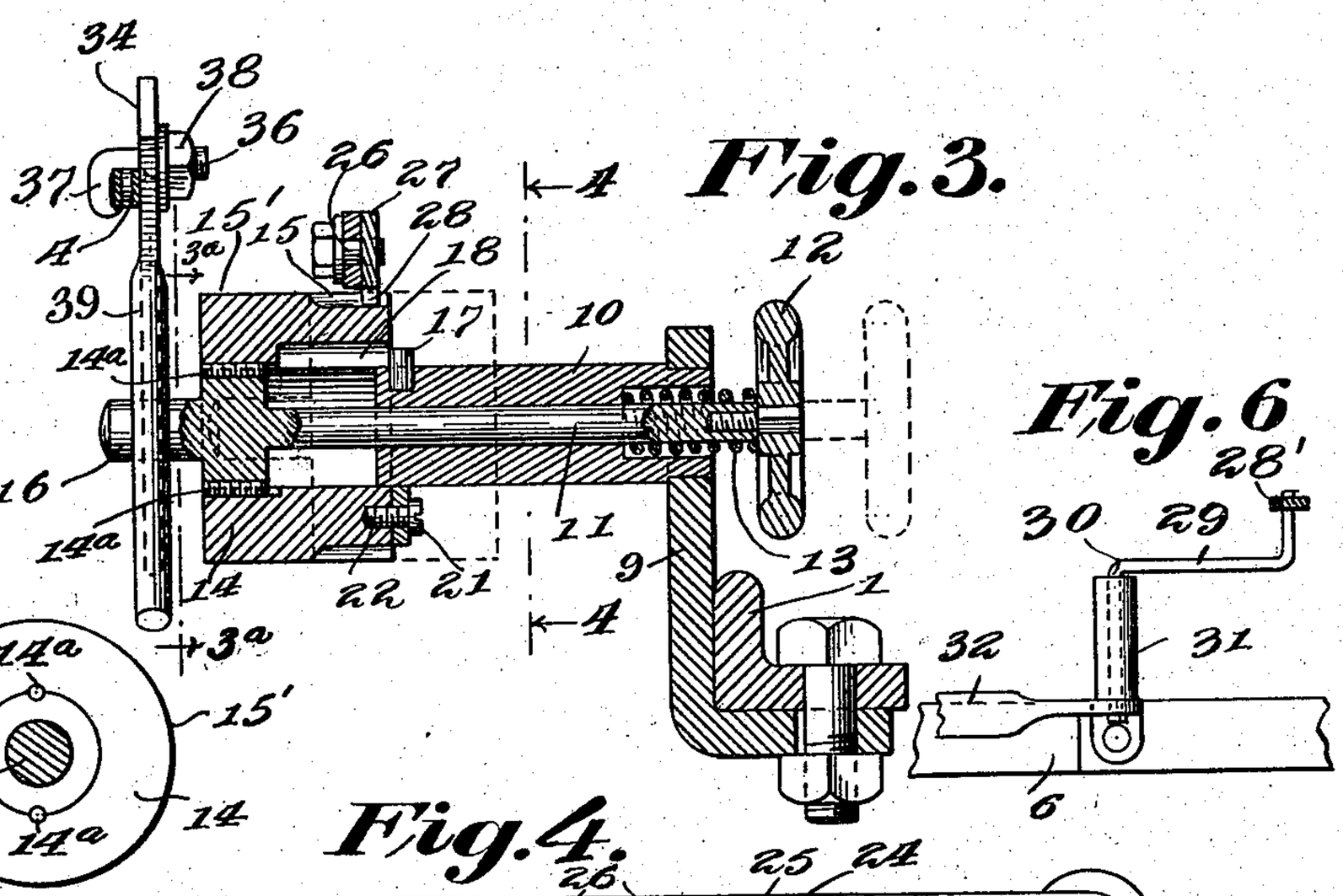


Fig. 3.

Fig. 6.

Fig. 4.

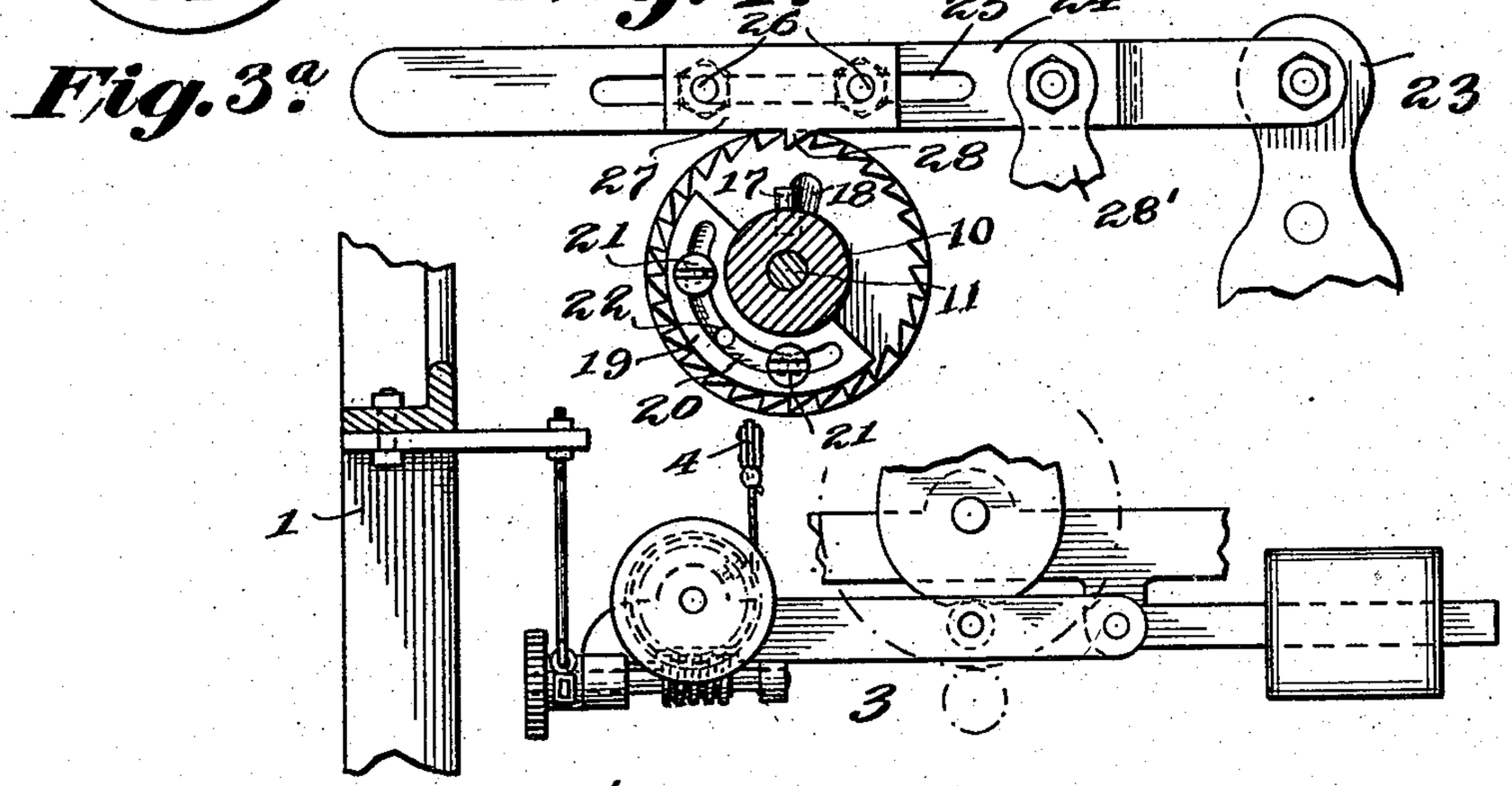


Fig. 3a.

Fig. 7.

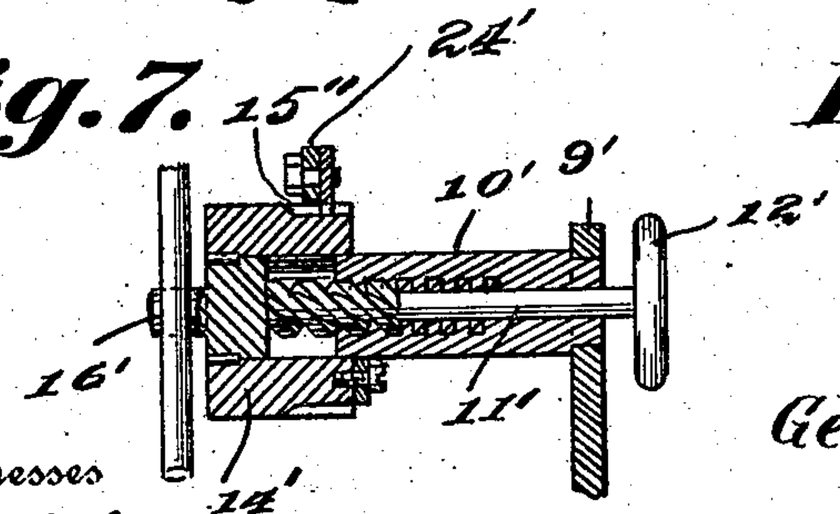


Fig. 5.

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# UNITED STATES PATENT OFFICE.

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## SPINNING-FRAME BUILDER.

1,167,168. Specification of Letters Patent. Patented Jan. 4, 1916.

Application filed April 23, 1914. Serial No. 833,919.

*To all whom it may concern:*

Be it known that I, GEORGE S. HARRIS, a citizen of the United States, residing at West Point, in the county of Troup and State of Georgia, have invented certain new and useful Improvements in Spinning-Frame Builders; 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.

This invention relates to improvements in the art of ring spinning machines, and more particularly to the actuating mechanism for the ring rail, and the object in view is the confining of the traverse during a predetermined number of layers and the automatic release thereof.

With this and further objects in view as will in part hereinafter become apparent and in part be stated, the invention comprises certain novel constructions, combinations and arrangements of parts as will be hereinafter specified and claimed.

In the accompanying drawings,—Figure 1 is a view in side elevation of a ring spinning frame have applied thereto mechanism embodying the features of the present invention, parts being broken away. Fig. 2 is a top plan view thereof. Fig. 3 is an enlarged detail vertical section, the section being taken on the planes indicated by line 3—3 of Fig. 1. Fig. 3ª is a detail section on line 3ª—3ª of Fig. 3. Fig. 4 is a view in side elevation of the parts seen in Fig. 3. Fig. 5 is an elevation of the builder motion let-off. Fig. 6 is a fragmentary, detail, vertical section taken on the plane indicated by line 6—6 of Fig. 1 and looking downwardly. Fig. 7 is a view similar to Fig. 3 of a modified embodiment of the parts.

Referring to the drawings by numerals, 1 indicates an ordinary spinning frame which may be, so far as the present invention is concerned, of any type, the same being seen in the form of a ring spinning frame which is provided with the usual ring rail 2, builder motion let-off 3, cable or chain 4, quadrant 5, lever 6, lifter rod 7 and counterbalance weight 8. All of these parts are of common and well known construction, and ordinarily would act to shift the ring rail 2 in a manner for effecting the usual traverse and gain in the filling of bobbins.

The present invention contemplates the provision of means for varying the movement of the ring rail so that instead of having the regular traverse, when at its lowermost position, the ring rail is caused to have a much shorter traverse until a "bunch" is built at the lower end of the bobbin, and then the ring rail is caused to have its regular full traverse throughout the remainder of the filling of the bobbin.

A bracket 9 is fixed to frame 1, and carries a horizontally disposed sleeve 10 in which is journaled a shaft 11, the outer end of which is provided with a handle 12, preferably of the wheel type. A spring 13 is interposed between the handle 12 and a portion of sleeve 10 and presses the handle in a direction for causing the shaft 11 to move outwardly when free to have longitudinal travel. The inner end portion of shaft 11 is fixed to a cylinder 14 having a portion of its periphery formed into a ratchet 15 and having a smooth peripheral portion indicated at 15′ formed integral or otherwise fixed to the inner end of the cylinder 14 and projecting inwardly therefrom is a stub shaft 16. As a matter of convenience of manufacture, the shaft 11 may simply be formed with an enlargement with which the shaft 16 is formed integral and onto which the cylinder 14 is fixed by keys 14ª. Obviously the parts may be produced by other appropriate methods of manufacture. The cylinder 14 has a bore of a diameter adapted to receive the inner end portion of the sleeve 10, so that the cylinder may slide freely along and surrounding sleeve 10 when the parts are free for such movement. A lug or detent 17 extends outwardly from the sleeve 10 beyond the circle described by the bore of cylinder 14, so that the lug is adapted to engage the outer face of the cylinder and to retain the same against outward movement during such engagement. The inner portion of the cylinder 14, however, is provided with a longitudinal groove 18 proportioned to receive the detent 17 and to allow the cylinder 14 to slide thereover, so that the cylinder is free to move outwardly to the extent controlled by the length of the groove 18 when the said groove is brought into register with the detent 17. As clearly seen in Fig. 4, the outer face of the cylinder 14 is provided with an adjustable segmental stop consisting of an arcuate plate 19 having a longitudinal, central slot 20 through which

extends the bolts 21, 21, threaded into the end of the cylinder 14. The bolts 21 are threaded into apertures 22 in the cylinder 14, of which there are a greater number than the number of bolts so that the bolts may be adjusted and thus allow a greater amount of adjustment of the stop than that afforded by the length of the slot, although for all ordinary purposes the adjustment effective by the excess length of the slot over the distance between the bolts will suffice.

Upstanding from the vertical support of the quadrant 5 is a bracket 23, to which is pivotally connected a pawl 24 disposed to engage the ratchet 15. The pawl 24 consists of a pivoted lever having a longitudinal slot 25 engaged by adjusting bolts 26 carrying a plate 27 having a ratchet tooth 28. The bolts 26 are adapted to be adjusted along the slot 25 for varying the relative location of the tooth 28 with respect to the teeth of ratchet 15, whereby a single stroke of the pawl may be caused to move the ratchet a distance equal to a greater or less number of teeth of the ratchet varying from one tooth at each step to four teeth or more according to the relative sizes of the teeth of the ratchet and the tooth of the pawl, and proportional to the circumference of cylinder 14. A link 28′ pivotally engages pawl 24 between the pivotal connection of the pawl with bracket 23 and the tooth 28, the said link extending downwardly to and engaging an actuating lever consisting of a crank arm 29 fixed to or formed integral with a rock shaft 30 journaled in a sleeve 31. The sleeve 31 is fixed as a bracket to the lifter rod lever 6 and an actuating treadle 32 engages the outer end of shaft 30 so that when said treadle is depressed the shaft will be revolved for lifting the link engaging end of arm 29, and thus lift link 28′ and pawl 24 for moving the pawl out of engagement with the ratchet. To enable longitudinal adjustment, the link 28′ is preferably formed in two sections united by a pin and slot connection 33.

Coöperating with chain 4 is a deflecting lever which consists of a flat bar, or other straight link, 34 having longitudinal slots 35, 35, through which extend bolts 36, 36, each having a hook-shaped end portion 37 engaging the chain 4 and adapted to be clamped against the chain by the action of the nuts 38 threaded on the other end of the respective bolts 36, and disposed at the opposite side of plate 34 from the location of chain 4, whereby the chain 4 is adapted to be clamped against the plate 34 at the points of the bolts 36. Thus the section of the chain between the two bolts 36 is rendered equal to being perfectly rigid with the plate 34. A deflecting lever 39 is fixed to plate 34 and consists merely of a shaft formed integral with or appropriately fixed to plate 34, and extending with the longitudinal axis of the lever substantially at right angles to the longitudinal axis of the shaft. Other angular relations might be assumed for effecting varying degrees in the deflection of the chain 4, but for the purposes of disclosing a preferred embodiment the relative disposition of the parts named is found effective. The lever 39 extends obliquely across the shaft 16, the oblique disposition of the lever being caused by the location of the clamping bolts 36 nearer the quadrant 5 in the length of chain 4 than should the said bolts be located if the lever were to assume an upright position. The degree of incline from the vertical may be varied by adjustment of the bolts 36 and will be proportioned in practice according to the extent of deflection of chain 4 desired with each stroke of the chain. The extent of deflection may also be varied by including a greater or less portion of the chain between the clamping bolts, as by adjusting the bolts longitudinally of their slots 35.

In operation, the let-off mechanism 3 is actuated in the usual manner, and the chain 4 is thus reciprocated and given its regular gain at each successive stroke for actuating the quadrant 5 and thus through lever 6 and rod 7 and with the aid of the counter-balance weight 8 reciprocating the ring rail 2 in the usual manner, except that at the beginning of the operation of the ring rail, when it is in its lowermost position, the deflector lever 39, at each reciprocation of chain 4, strikes against the detent or stub shaft 16 and is tilted thereby causing the plate 34 to assume the position shown in Fig. 1, so that the chain 4 is deflected thereby to the extent desired for suppressing that portion of the stroke in excess of what is desired in the way of traverse of the ring rail, so that the traverse is suppressed or shortened during as many strokes of the ring rail as occur while the detent 16 is in position for engaging lever 39. The number of such strokes may be varied by varying the extent to which the cylinder 14 must be revolved before the slot 18 registers with detent 17, and also by varying the number of teeth passed by the tooth 28 with each reciprocation of pawl 24. In starting the operation the operator presses the wheel 12 inwardly from the position indicated in dotted lines in Fig. 3 to the position indicated in full lines therein, and then revolves the shaft 11 together with cylinder 14 until the end of stop 19 strikes detent 17, the stop having been set for the required number of reciprocations before the release of the lever 39 is accomplished. The operation of winding yarn on the bobbins begins and continues with the short traverse producing the bunch at the lower end of the bobbin until the pawl 24 has moved the

ratchet 15 a distance sufficient for causing groove 18 to register with detent 17, and thereupon the cylinder 14 suddenly springs outwardly under the action of the spring 13 and the detent 16 is thus moved out of the path of lever 39, as clearly indicated in dotted lines in Fig. 3, so that the said lever 39 is free to assume any position necessary to enable plate 34 to remain on a right line with chain 4 and to thus not interfere with the action of or deflect the chain so that as soon as detent 16 moves out of the path of deflecting lever 39 the quadrant 5 will have its full stroke with each stroke of the let-off mechanism, and the ring rail will thus be given its full traverse and from then on until the filling of the bobbins is completed the operation of the mechanism is just the same as if the deflector were not present at all.

At certain times during the operation of the structure it may become desirable to manually control the movement of ring rail 2, and to attain this result the treadle 32 is provided, which may be depressed by the foot of the operator and whose foot can at the same time be caused to actuate the lever 6 and thus shift the ring rail 2 as desired, the actuation of the treadle 32 causing the link 28′ to be lifted and the pawl 24 thus moved out of operative position, so that the manual actuation of the ring rail will not interfere with the relative position of the parts or their continued relative action when the foot of the operator is removed. It is to be noted that when the cylinder 14 moves outwardly under the action of spring 13, the pawl 24 will not effect any further action since the tooth 28 will have been relatively brought to a position in engagement with the smooth peripheral portion 15′ of cylinder 14. To effect this movement of the tooth 28, the inner terminus of each recess formed by the ratchet teeth 15 is curved outwardly, as clearly seen in Fig. 3, so that when the cylinder 14 moves from the full line position in Fig. 3, to the dotted line position, the tooth 28 will readily ride up the incline and assume a position out of engagement with the ratchet.

The deflection of the chain 4 as the same is reciprocated takes up a proportional amount of the reciprocation and proportionally detracts from the otherwise full stroke of the quadrant so that the traverse of ring rail 2 is suppressed or reduced proportionally. Thus an appropriate bunch is formed at the lower end of each bobbin. This mechanism is especially well adapted for filling bobbins adapted for use with feelers requiring slotted bobbins. With this type of feeler the yarn wound over the slot in the bobbin prevents the feeler from entering the slot, but when the yarn in unwinding exposes the slot the feeler enters and causes the loom to automatically transfer a new bobbin to the shuttle. One of the essential objects of the present improvement is to wind the yarn on the bobbin below the point where the feeler enters the slot until the required amount of yarn has been wound on and then the ring rail is automatically allowed to have its full traverse for winding yarn over the slot where the feeler enters. The invention is also well adapted for winding bobbins for the feelers of regular looms, since by its use a feeler bunch can be built at the base of the bobbin of any predetermined size, and the mechanism can then be released, as by the automatic outward movement of cylinder 14 for allowing the ring rail to have its full stroke and to thus continue to regularly wind on the yarn.

The means for causing the stub shaft or detent 16 to move out of the path of the deflecting lever is capable of considerable variation or modification as will be obvious, one modified form being seen in Fig. 7 wherein the parts have been given reference characters corresponding to those of the main showing but primed to indicate their reference to a modification and the same description applies. A sleeve 10′ is provided in which shaft 11′ is threaded, the outer end of the shaft being provided with a handle 12′. No spring is employed and the shaft 11′ is caused to move to its inner position by rotating handle 12′ in a direction to screw the shaft inwardly. Cylinder 14′ is formed with ratchet 15″ engaged by the pawl 24′. No lug or detent is needed to prevent outer movement of cylinder 14′. The cylinder is provided with the stub shaft or detent 16′, which is moved laterally outwardly when the pawl 24′ revolves cylinder 14′ and thus causes shaft 11′ to be threaded outwardly along sleeve 10′.

What I claim is:—

1. In builder mechanism, the combination, with a movable yarn guide, and a builder cable connected to actuate the guide, of means extending substantially parallel to and engaging an intermediate portion of the cable without interruption of the cable for rendering the same rigid, means for actuating the cable, means for imparting an angular movement to the rigid portion of the cable relative to movements of the cable, and means for releasing the last named means for eliminating the angular movement.

2. In builder mechanism, the combination, with a movable yarn guide, and a builder cable connected to actuate the guide, of means extending substantially parallel to and engaging an intermediate portion of the cable without interruption of the cable for rendering the same rigid, said means being adjustable along the cable, means for actu-

ating the cable, and means for imparting an angular movement to the rigid portion of the cable relative to movements of the cable.

3. In builder mechanism, the combination, with a movable yarn guide, and a builder cable connected to actuate the guide, of means extending substantially parallel to and engaging an intermediate portion of the cable without interruption of the cable for rendering the same rigid, said means being adjustable along the cable, means for actuating the cable, a deflecting lever connected to the cable engaging means, and a detent extending into the path of the deflecting lever for causing the same to move angularly and thus deflect the rigid portion of the cable.

4. In builder mechanism, the combination, with a movable yarn guide, a builder cable connected to actuate the guide, and means for actuating the cable, of a rigid plate extending along the cable, means adjustable along the plate for clamping the cable to the plate for rendering the clamped portion of the cable rigid, a deflector lever engaging the plate, and means in the path of the lever for deflecting the same during movement of the cable.

5. In the builder mechanism, the combination, with a movable yarn guide, a builder cable connected to actuate the guide, and means for actuating the cable, of a rigid plate extending along the cable, means adjustable along the plate for clamping the cable to the plate for rendering the clamped portion of the cable rigid a deflector lever engaging the plate, means in the path of the lever for deflecting the same during movement of the cable, and means for moving the lever deflecting means out of the path of the lever relative to movements of the cable.

6. In builder mechanism, the combination, with a movable yarn guide, a builder cable connected to actuate the guide, and means for actuating the cable, of a deflecting lever connected to the cable and moving therewith, means in the path of the lever for imparting angular movements to the lever for deflecting the cable relative to movements thereto, and cable actuated means for moving the lever tilting means out of the path of the lever.

7. In builder mechanism, the combination, with a yarn guide, a builder cable for actuating the same and means for actuating the builder cable, of means extending from the cable for deflecting the same, a detent projecting in the path of the deflecting means for effecting deflecting action thereof, and a pawl and ratchet mechanism disposed for being actuated by the cable for withdrawing the detent from the path of the deflecting means.

8. In builder mechanism, the combination, with a yarn guide, a builder cable for actuating the same and means for actuating the builder cable, of means extending from the cable for deflecting the same, a detent projecting in the path of the deflecting means for effecting deflecting action thereof, a ratchet carrying the detent, and a pawl connected to be actuated by the cable and engaging the ratchet for actuating the same for moving the detent out of the path of the deflecting means.

9. In builder mechanism, the combination, with a yarn guide, a builder cable for actuating the same and means for actuating the builder cable, of means extending from the cable for deflecting the same, a detent projecting in the path of the deflecting means for effecting deflecting action thereof, a ratchet carrying the detent, and shiftable laterally relative to the deflecting means for moving the detent out of the path thereof, and a cable-actuated pawl engaging the ratchet for actuating the same.

10. In builder mechanism, the combination, with a yarn guide, a builder cable for actuating the same and means for actuating the builder cable, of means extending from the cable for deflecting the same, a detent projecting in the path of the deflecting means for effecting deflecting action thereof, a ratchet carrying the detent and shiftable laterally relative to the deflecting means for moving the detent out of the path thereof, a cable-actuated pawl engaging the ratchet for actuating the same, a spring pressing the ratchet laterally, and a releasable detent adapted for release on a predetermined amount of actuation of the ratchet by the pawl.

11. In builder mechanism the combination, with a yarn guide, a cable for moving the same, and means for actuating the cable, of means extending substantially parallel to and engaging the cable for deflecting the cable for varying the movements of the guide, a detent extending into the path of the deflecting means for effecting actuation thereof, and adjustable means for removing the detent from the path of the deflecting means.

12. In builder mechanism, the combination, with a yarn guide, a cable for moving the same, and means for actuating the cable, of means for deflecting the cable for varying the movements of the guide, a detent extending into the path of the deflecting means for actuating the same, a spring-pressed ratchet carrying the detent and adapted to be moved under the action of the spring pressure for removing the detent from the path of the deflecting means, a releasable stop for preventing movement of the ratchet under spring pressure, the said stop being adapted at a predetermined

point for releasing the ratchet, an adjustable gage for varying the point of release, and a cable-actuated pawl engaging the ratchet and adapted to move the same to the point of release.

13. In builder mechanism, the combination, with a yarn guide, a cable for guiding the same, and means for actuating the cable, of means for deflecting the cable for varying the movements of the guide, a detent extending into the path of the deflecting means for effecting actuation thereof, a ratchet-wheel carrying the detent, a spring pressing the ratchet-wheel laterally in a direction for moving the same to a position with the detent out of the path of the deflecting means, the ratchet having a recess opening at one face, a stop engaging the face of the ratchet at which said recess opens, the said stop being adapted to prevent lateral movement of the ratchet under spring pressure while the stop is not in register with the aperture, an adjustable gage carried by the face of the ratchet engaged by the stop for controlling the possible relative adjustment of the ratchet relative to the stop thereby controlling the distance of travel of the ratchet necessary for bringing the recess into register with the stop, a cable-actuated pawl engaging the ratchet for moving the same relative to movements of the cable for bringing the recess of the ratchet into register with the stop and thereby causing the ratchet to be moved by the spring for moving the detent out of the path of the deflecting means.

14. In builder mechanism, the combination, with a yarn guide, a cable for actuating the same, and means for actuating the cable, of means for deflecting the cable for modifying the motion transmitted thereby to the yarn guide, and means for manually temporarily suppressing the transmission of motion from the cable to the yarn guide without varying the relative action of the deflecting means when the manually-actuated means is released.

15. In builder mechanism, the combination, with a yarn guide, a cable for actuating the same, and means for actuating the cable, of means for deflecting the cable for varying the motion transmitted therefrom to the yarn guide, and a pawl for releasing the deflecting means and thereby eliminate further deflection, and manually actuated means for releasing the pawl.

16. In builder mechanism, the combination, with a yarn guide, a cable for actuating the same, and means for actuating the cable, of means for deflecting the cable for varying the motion transmitted therefrom to the yarn guide, a pawl for controlling actuations of the cable deflecting means, a link engaging the pawl, and a treadle connected to the link and adapted to be manually-actuated for releasing the pawl.

17. In builder mechanism, the combination, with a yarn guide, a lifter rod for actuating the guide, a lifter lever for actuating the rod, a sector and counter-balance weight for actuating the lever, a cable for actuating the sector and means for actuating the cable, of means for deflecting the cable for varying movements of the sector relative to movements of the cable, means controlling the deflector, a ratchet governing the controlling means, a pawl actuated by the sector and engaging the ratchet, and a treadle pivoted to the lifter lever and connected with the pawl for lifting the pawl out of engagement with the ratchet when the treadle is actuated.

18. In a builder mechanism, the combination of a movable yarn guide, a builder motion, a flexible connection between the yarn guide and builder motion, a deflecting lever secured to the flexible connection and movable therewith, means in the path of the lever as it is moved with the flexible connection for imparting angular movement to the lever, and automatic means for freeing the lever from said first-named means after said lever has been given a predetermined number of angular movements.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE S. HARRIS.

Witnesses:
GEO. S. COBB,
ED TURNER.