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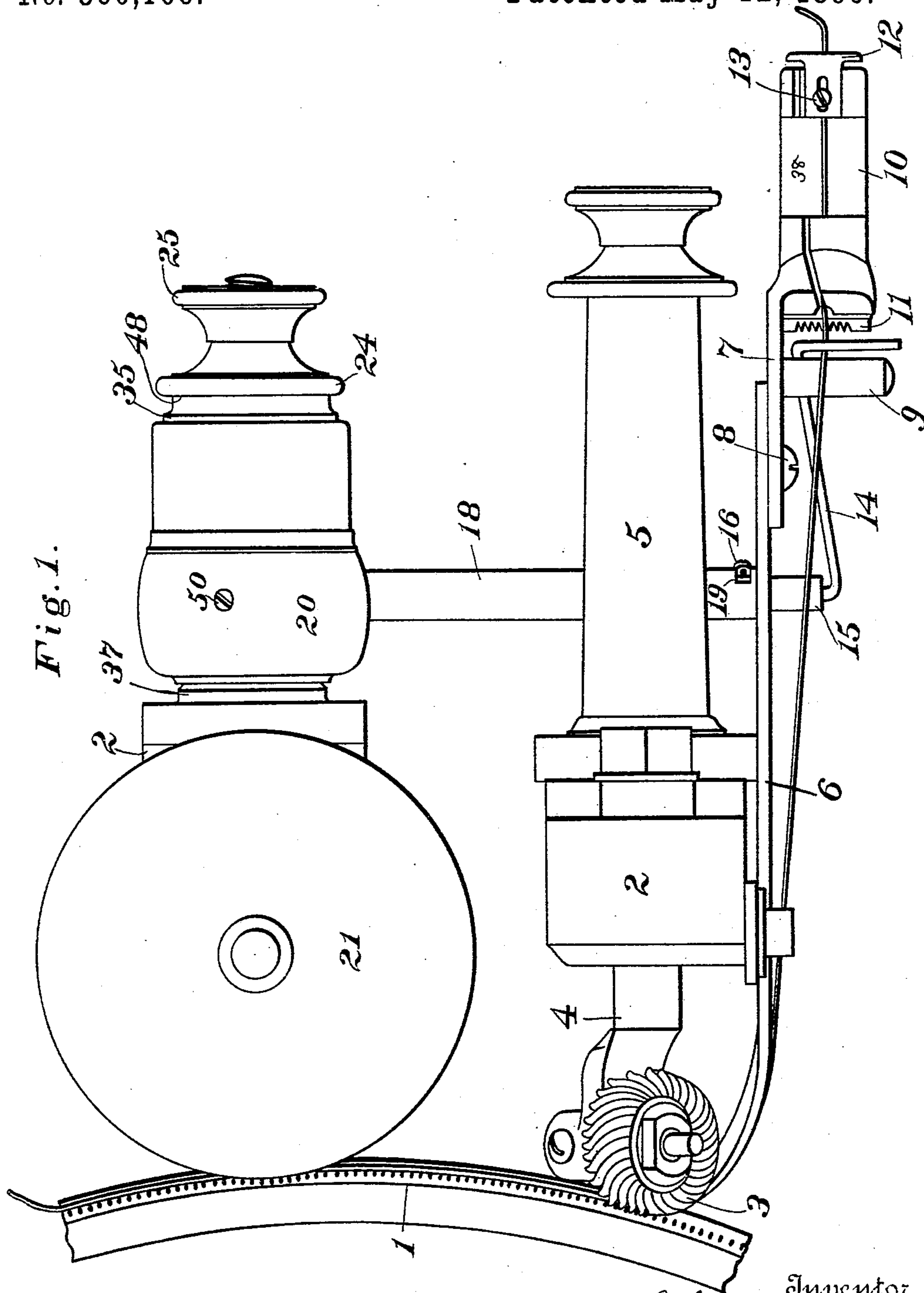
3 Sheets—Sheet 1.

A. PAUL.

QUARTER SAVER FOR KNITTING MACHINES.

No. 560,106.

Patented May 12, 1896.



Witnesses
James D. Smith
W. C. Grigsby

Inventor
Archibald Paul,
By Harvey Spalding and Sons,
Attorneys

(No Model.)

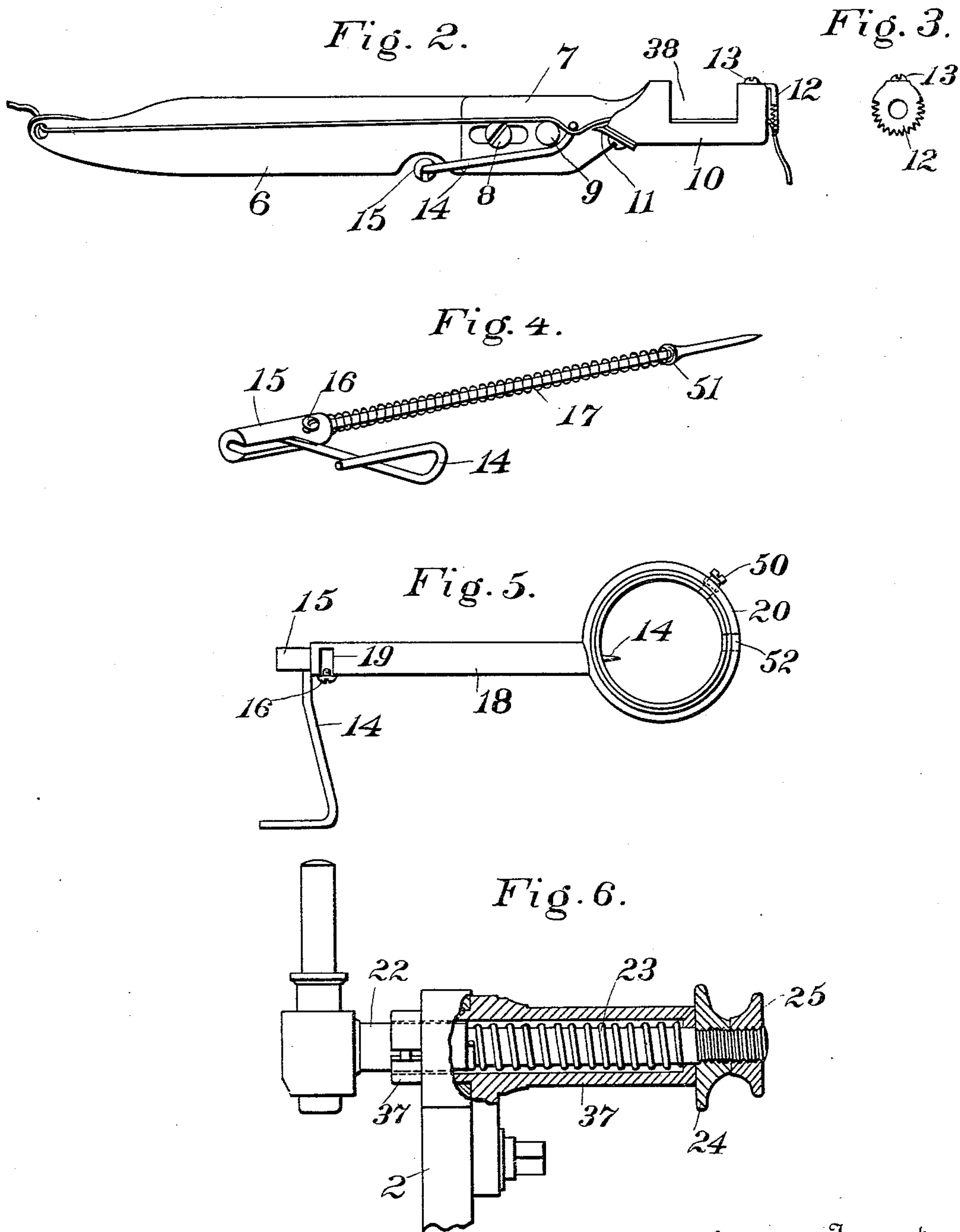
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3 Sheets—Sheet 3.

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Fig. 7.

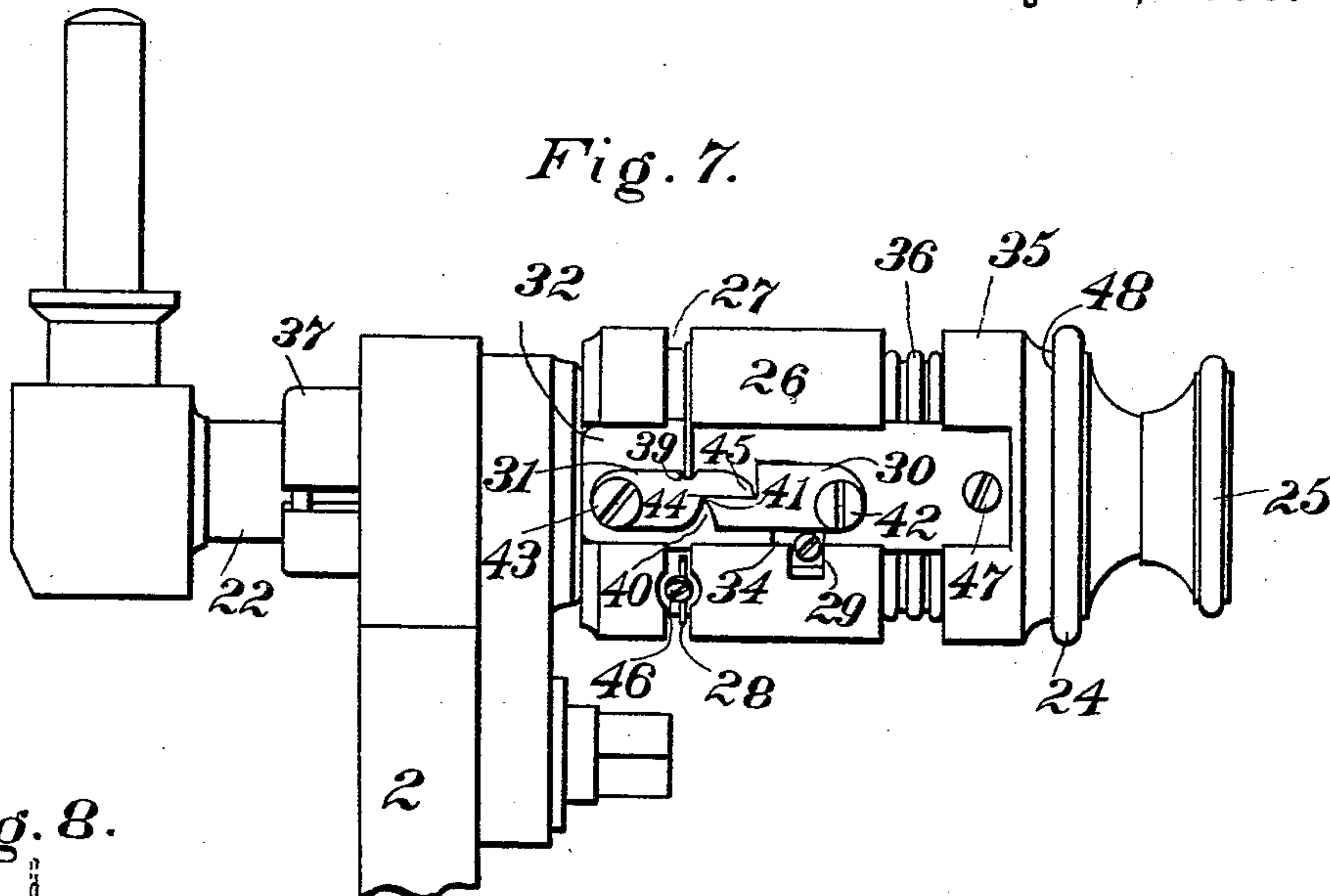


Fig. 8.

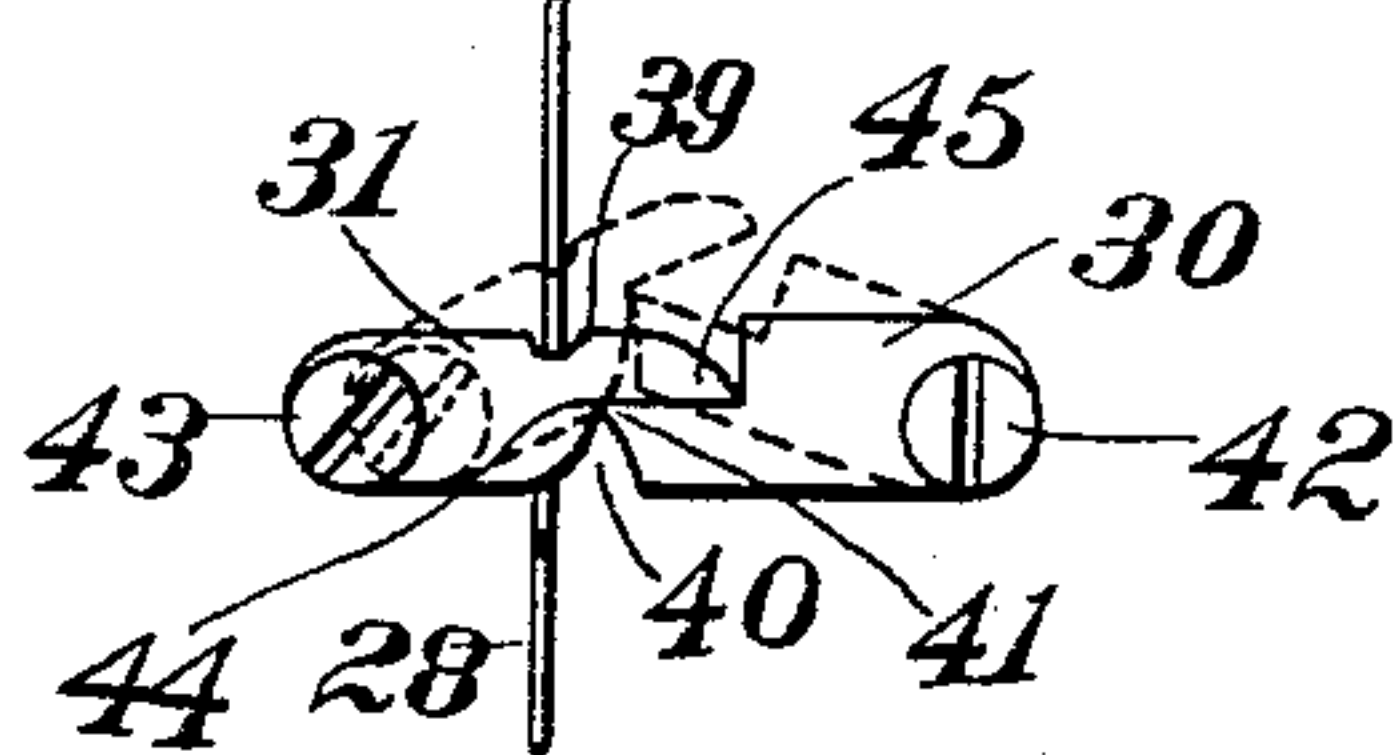


Fig. 9.

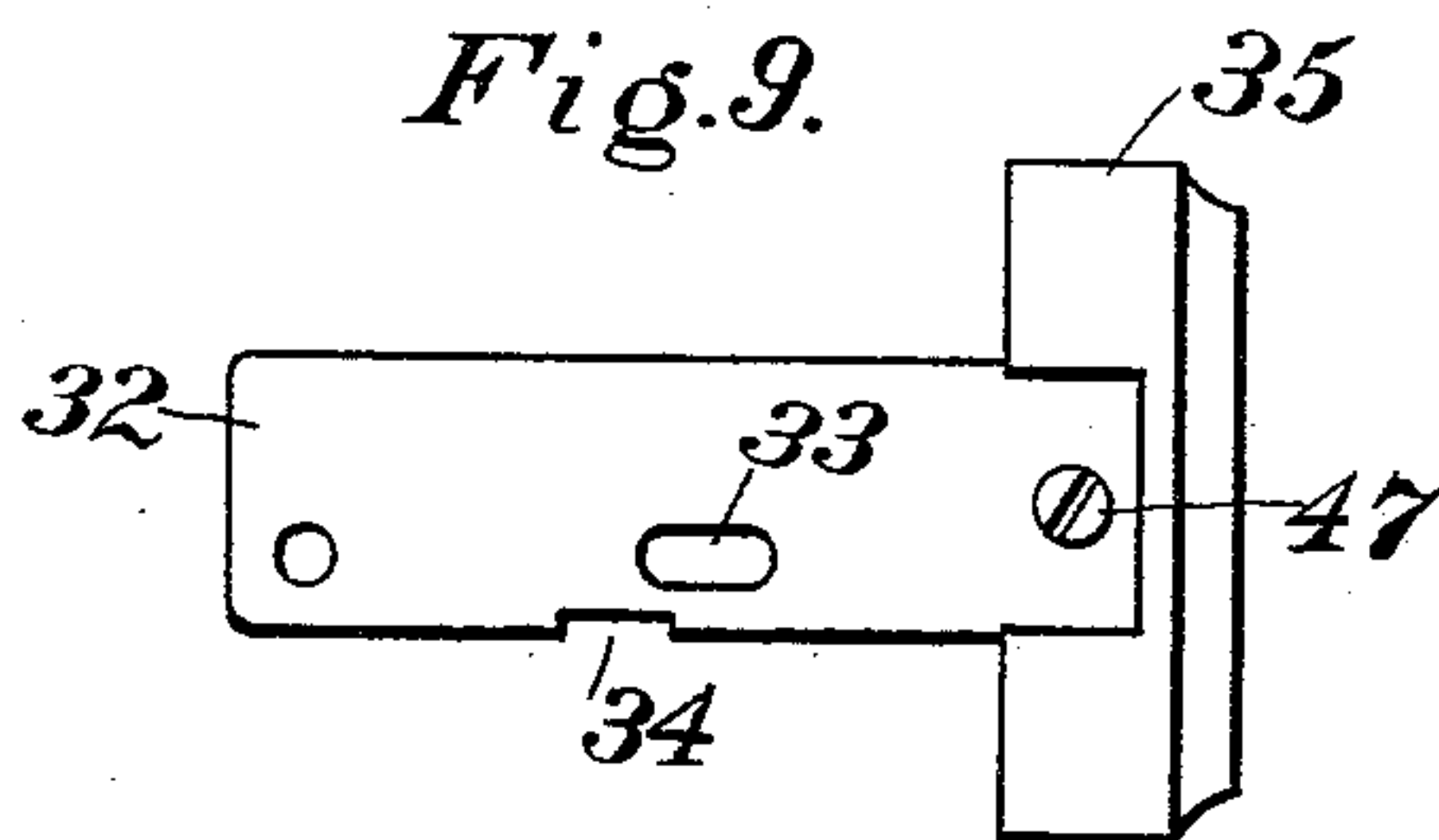


Fig. 10.

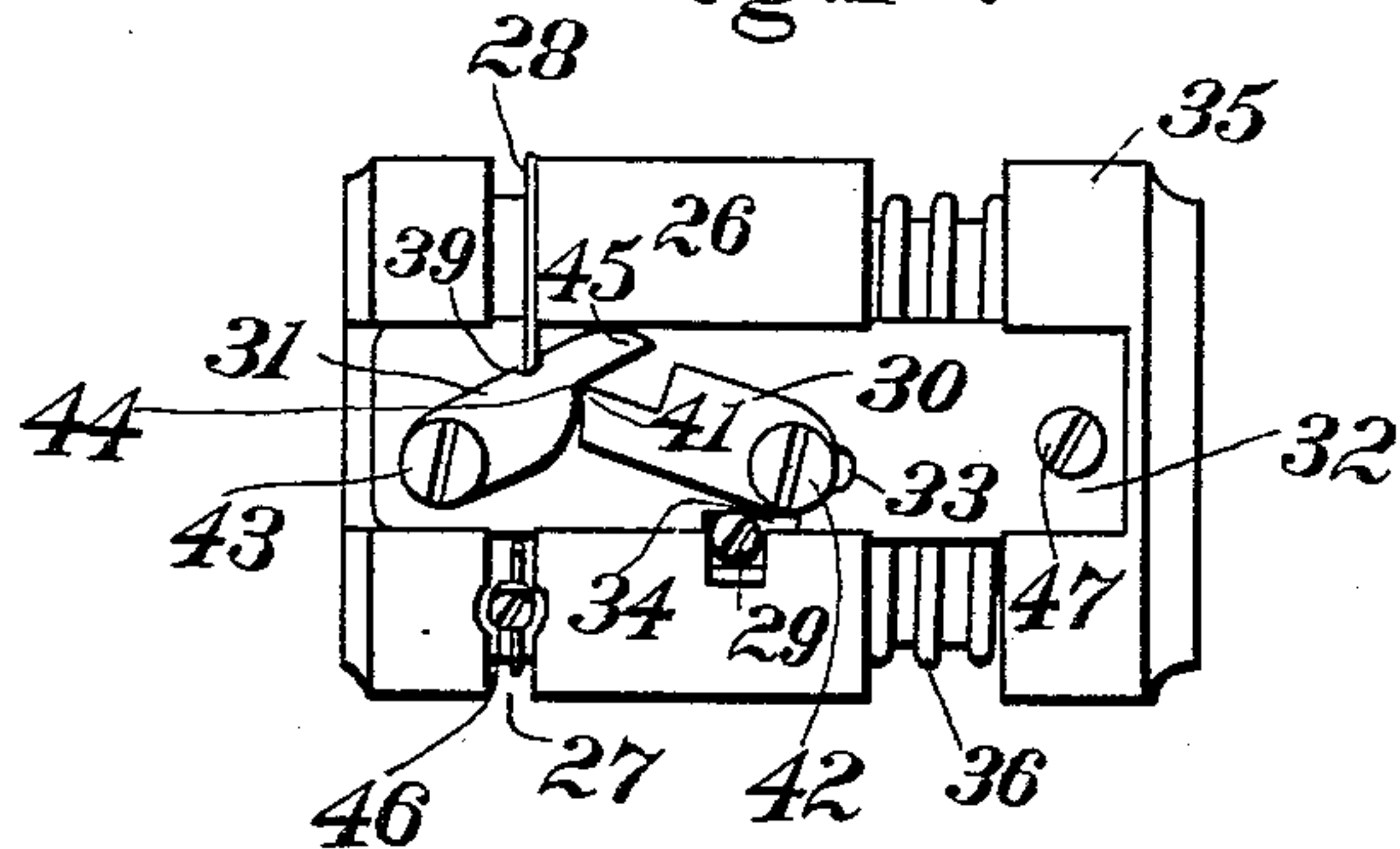
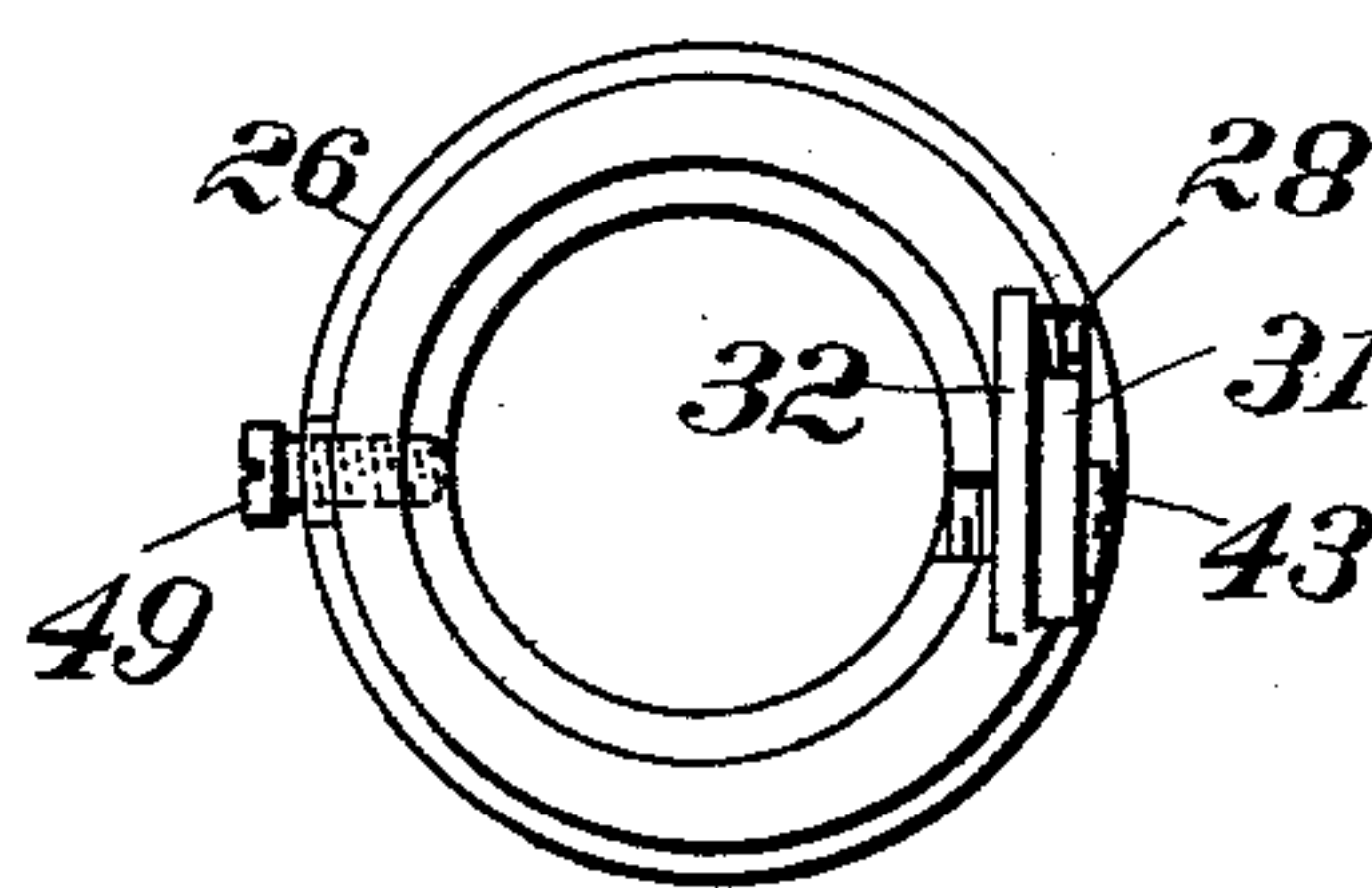


Fig. 11.



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UNITED STATES PATENT OFFICE.

ARCHIBALD PAUL, OF COHOES, NEW YORK, ASSIGNOR OF ONE-HALF TO
ALFRED I. WHITEHOUSE, OF SAME PLACE.

QUARTER-SAVER FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 560,106, dated May 12, 1896.

Application filed October 15, 1895. Serial No. 565,725. (No model.)

To all whom it may concern:

Be it known that I, ARCHIBALD PAUL, a citizen of the United States, residing at Cohoes, in the county of Albany and State of New York, have invented certain new and useful Improvements in Quarter-Savers for Knitting-Machines, of which the following is a specification.

My invention relates to knitting-machines, more intimately to knitting-machines equipped with spring-beard needles fixed upon a revoluble cylinder or needle-head.

My invention has for its object the improvement of devices known as "quarter-savers" for automatically withdrawing the presser-wheel from contact with the beards of the needles when the yarn breaks or the end upon a bobbin is reached.

Referring to the accompanying drawings, wherein like numerals represent corresponding parts throughout, Figure 1 represents a plan view showing the relative positions of the presser-wheel and retractive mechanism, needle-cylinder, bur-wheel or sinker, yarn-guide, outer and inner combs, drop-wire plunger, and the tube occupied by the plunger and supported by the outer sleeve upon presser-wheel standard. Fig. 2 represents a side view of the yarn-guide and extension, showing the recessed and split cylinder bearing the flat and round combs. Fig. 3 represents an end view of the outer or round comb. Fig. 4 represents a detached view of the customary construction of the plunger-wire and shows the spring by which it is driven and the adjustable longitudinally-slotted tube upon one end of which the drop-wire may be latched against the force of the spring. Fig. 5 represents the tube joined to the exterior sleeve or cover of the presser-wheel retractor and shows the circumferential slot in said tube, through which a set-screw engages the longitudinally-slotted tube for purposes of adjustment. In this figure may also be seen the position of the plunger-wire after being sprung or shot. Fig. 6 represents a side view of the presser-wheel rod with the wheel removed, showing also the cylinder bored for the passage of the rod, a part of the cylinder and of the frame supporting it being broken away and shown in section, enabling the at-

tachments and mode of operation of said rod to be seen. In this view the cover and retractor mechanism have been removed from about the cylinder just mentioned. Fig. 7 represents a side view of the presser-wheel standard, rod, and retractive mechanism, the outer sleeve or cover and the presser-wheel being absent. Fig. 8 represents a side view of the dogs constituting the retractor escape-ment, showing the spring employed to throw them into engagement with each other and in dotted lines the position of the dogs after disengagement. Fig. 9 represents a side view of the slotted sliding plate attached to one division of the hollow retractor-cylinder, the dogs being omitted. Fig. 10 represents a side view of both divisions of the retractor-cylinder, showing the coiled spring arranged between the divisions, the position of the sliding plate with the dogs disengaged, and the circumferential groove containing the spring governing the dogs. Fig. 11 represents an end view of the retractor-cylinder, showing the form of the broadened and inverted-T groove, wherein the slotted plate slides.

Referring to Fig. 1, numeral 1 represents the needle-cylinder, of ordinary pattern and operation, provided with spring-beard needles. 2 marks the main frame of the machine; 3, a bur-wheel or sinker; 4, the rod, provided with a projecting adjustable pin upon which the bur rotates. The rod 4 is made with a shoulder against which abuts a coiled spring encircling the rod, and both rod and spring are inclosed within a cylinder 5, bored to receive them. Adjusting and jam nuts are threaded upon the rod, and the adjusting-nut, reacting against the end of cylinder 5, compresses the spring and withdraws the rod or permits the spring to expand and to advance the rod, as desired. Further description of these parts is omitted for the reason that they are such as are commonly met with in cylinder knitting-machines. The rod is provided with a lug which enters a slot in the cylinder, and is thus prevented from rotating, while the cylinder is attached to slotted plates which can be adjusted and fixed either vertically or laterally upon the main frame.

6 represents the yarn-guide, having the slotted extension 7, which may be adjusted

and fixed by the set-screw 8. The extension supports the stud 9, together with the split and recessed cylinder 10, which is also bored lengthwise for the passage of the yarn, the cut or split extending from the surface of the cylinder to the bore. As customarily formed, cylinder 10 is provided with a recess 38, extending in depth from the surface of the cylinder to a point slightly beyond the axis and sufficient in length to permit the yarn to be readily picked up by the fingers between the two combs. (See Figs. 1 and 2.) At one end of the cylinder 10 is located the flat comb 11, provided with a suitable slot and adjustable by means of a set-screw. As ordinarily assembled, the comb 11 is inclined upward with relation to the plane of the base of the frame. The office of the comb 11 is to hold the thread taut and sustain the drop-wire while the attendant is tying on a new bobbin or slacking upon the thread, as more fully explained hereinafter. The outer or round comb 12 possesses a slot, which enables it to be adjusted toward or from the cylinder 10, and it is fixed by the set-screw 13 in the ordinary manner. (See Figs. 1, 2, and 3.) As the thread runs between the round comb 12 and the end of the cylinder 10, any tangles or hurtful obstructions are caught by the teeth, whereupon the thread is broken by the revolution of the needle-cylinder.

Referring to Figs. 1 and 4, number 14 represents the drop-wire plunger. As usually constructed, the drop-wire consists of two portions—a bent portion having a hook or turn which is arranged to rest upon the thread and a straight or plunger portion, the extremity of which is ordinarily tapering. A tube 15 surrounds the straight portion of the drop-wire and is provided with a set-screw 16. A coiled spring 17, encircling the straight portion of the drop-wire, abuts against the end of tube 15, and its opposite extremity meets a fixed collar 51 near the pointed end of the drop-wire. The tube 15 is slotted longitudinally from surface to bore for part of its length, as shown in Fig. 4, and the slot is wide enough to admit the bent portion of the drop-wire, as shown in Fig. 4.

18, Figs. 1 and 5, represents a second tube of such interior diameter as to inclose the plunger portion of the drop-wire with its encircling spring and to fit closely but movably about the tube 15. A circumferential slot 19 is cut from surface to bore of tube 18, near one end, and the set-screw 16 in the tube 15 engages the slot. This arrangement of parts allows the slotted end of tube 15 to project beyond the end of the tube 18 and assures its longitudinal adjustment therein. The tube 15 may also be partly rotated and fixed within the limits set by the slot 19. The tube 18 joins and is supported by the cover or sleeve 20 (see Figs. 1 and 5) upon the presser-wheel stand. Sleeve 20 has an orifice in its side through which a screw 50 passes to an inte-

rior part and serves to retain sleeve 20 in position.

21 represents an ordinary presser-wheel, (see Fig. 1,) revoluble upon an adjustable stud attached to rod 22, which possesses a shoulder and is encircled by a coiled spring 23, governed by the adjusting-nut 24 and the jam-nut 25. (See Fig. 6.) Rod 22, the spring, and nuts are of the usual form. One portion of the retractor-cylinder, Figs. 7 and 10, is represented by number 26, and it is provided with a broadened inverted-T groove (see Fig. 11) extending lengthwise along its exterior, and a circumferential groove 27, occupied by a spring 28, attached to the cylinder by screw 46, and further mentioned hereinafter, as will be also the set-screw 29, engaging a threaded aperture drilled into the cylinder 26. In Fig. 8 the right hand dog is numbered 30 and that upon the left hand 31. These dogs are formed from flat pieces of metal into the shapes shown in Fig. 8. As usually constructed, the dog 30 is provided with a projecting angle 41, which is brought into engagement with an entering angle or concavity 44 in dog 31 when the parts of the retractor are assembled. This contact remains practically unbroken. It will be noticed that the pivots 42 and 43 approach each other as cylinders 26 and 35 are separated, and that this lessening of the distance between the pivots maintains the dogs in contact as they turn upward into the positions shown by the broken lines in Fig. 8 and full lines in Fig. 10. One end of spring 28 enters notch 39 in dog 31, and as cylinder 35 is pressed toward cylinder 26 the reaction of spring 28 forces both dogs 30 and 31, by reason of their mutual engagement, into a horizontal position, or until their movement is arrested by the head of screw 29, the distance between pivots 42 and 43 meantime increasing. One position of the dogs at the limit of their downward movement, wherein their points of mutual contact and the centers of the pivots lie approximately in the same straight line, will successfully resist the force of spring 36, tending to separate cylinders 26 and 35. The spring 28 still exerts pressure upon dog 31, and aids in proportion to its elasticity in preserving the line of sustaining contacts. All the parts immediately concerned in the retractor escapement are constructed with a view to an adjustment which brings the contacts into proper alinement as dog 30 touches the head of screw 29. Below that position the dogs cannot pass, while above it they cannot resist the expansion of spring 36. As the plunger-wire 14 is shot into the converging space 40 its extremity strikes both dogs at once and acts as a wedge to raise the points of contact 41 and 44, throwing the dogs off center, as further explained hereinafter. It will be noticed that the point marked 45 of dog 31 does not touch the second dog at any time.

In Fig. 9 number 32 represents the sliding plate to which the left-hand dog 31 is pivoted. A slot 33 is cut through the sliding plate and is partly occupied by the pivot of the right-hand dog, which pivot passes into and engages a threaded aperture belonging to cylinder 26. In the same figure 34 marks a recess, usually in the edge of the plate 32 and partly occupied by set-screw 29, one of the offices of which is to limit the reciprocating movements of the sliding plate.

In Figs. 7, 9, and 10 number 35 represents the complemental portion of the retractor-cylinder, and the sliding plate is seen fixed to this portion by screw 47.

In Figs. 7 and 10 number 36 represents the main retractor-spring coiled between the two portions of the cylinder. This spring is considerably stronger than spring 23, already described, and in Figs. 6 and 7 number 37 represents the innermost cylinder through which the spring-operated presser-wheel rod passes and immediately about which the retractor-cylinder is fitted. The cylinder 37 has an internal shoulder at the outer end of the bore, against which spring 23 abuts, so that it tends to force the presser-wheel against the needles. (See Fig. 6.)

The assembling of the parts of my invention and its operation will now be readily understood. Upon the cylinder 37 (see Fig. 6) the grooved member 26 of the retractor-cylinder is placed and through a threaded orifice in its side a screw 49 engages a depression in cylinder 37, whereby cylinder 26 is held against rotation or displacement. The retaining-screw just mentioned may be reached from without through an aperture 52 in the side of cover or sleeve 20. The set-screw does not project beyond the surface of the last cylinder mentioned. The retractor-spring 36 and then cylinder 35 with the sliding plate attached are now placed upon cylinder 37 and rest movably thereabout. The sliding plate is inserted in the longitudinal groove of cylinder 26 and the screw 29 is set up in the recess 34 and retains cylinders 26 and 35 in position against the force of the spring 36. The right-hand dog is now attached by inserting its pivot through the slot 33 in plate 32 into a threaded orifice in cylinder 26. The left-hand dog is connected by its pivot to the sliding plate. One end of the spring 28 is attached in groove 27 by screw 46 and the other end engages a notch 39 in the left-hand dog. (See Figs. 8 and 10.) The portion 26 of the retractor being fixed to the cylinder 37, the movable portion 35 and the sliding plate are shot in a direction away from the needle-cylinder. Interiorly the cylinder 37 is occupied by the spring-operated rod 22, (see Figs. 6 and 7,) and the nut 24, having a face 48 of increased diameter set by nut 25 upon the rod, having been brought into contact with the movable cylinder 35 while the dogs were on center, will, upon their disengagement, carry back with it the rod and also the presser-

wheel from its position against the needles, as shown in Fig. 1.

In Fig. 8 will be noted wedge-shaped spaces immediately above and below the contact-points, the contour of the dogs when aligned leaving the vacant places so formed. The point of the plunger is shown projecting through and into the cover in Fig. 5. With the retractive mechanism assembled as described the sleeve or cover 20, Figs. 1 and 5, to which is attached the tube 18, is placed over and fixed to the stationary portion 26 of the retractor by screw 50, let through the side of the cover into the cylindrical portion 26. The plunger-wire may now be placed in tube 18 and the set-screw 16 passed through the slot 19 into tube 15, Fig. 5. It will be observed that the plunger-wire may be partly withdrawn against the force of spring 17 from the position shown in Fig. 5, and that its return may be prevented by turning the bend in the wire away from the slot and beyond the outer end of tube 15. Now, if the yarn be passed through the teeth of the outer comb, through the bore of cylinder 10, and over stud 9 along guide 6 to the serving devices, it will be seen that the weight of the bent arm of the drop-wire plunger may be sustained by the thread between the stud 9 and cylinder 10, over and through which the thread runs immediately above the flat comb 11. While the needle-cylinder is stationary the tension of the yarn is relaxed and the falling drop-wire brings the yarn between the teeth of comb 11, from which it is again drawn as the thread becomes taut. Thus the plunging of the drop-wire is prevented while a new bobbin is being connected or it is desired to slack the thread for any purpose. Suppose, however, a bunch of waste runs with the yarn into the outer comb 12, and the thread is thus necessarily snapped, the end passes along too rapidly to catch the flat comb, the drop-wire falls, the bent arm enters the slot in tube 15, the point of the plunger is driven between the dogs, and the presser-wheel is almost instantly retracted. It has been explained that the tube 15 may be turned within the tube 18 and fixed by the set-screw within the limits of slot 19. This special adjustment may be utilized to increase or decrease the interval of time between the breaking of the thread and the plunging of the drop-wire.

I do not limit myself to the exact form and arrangement shown herein, but may desire to vary the same without leaving the purview of my invention.

Having thus described my improvement in quarter-savers, what I claim, and desire to protect by Letters Patent, is—

1. In a quarter-saver for knitting-machines the combination of a drop-wire plunger consisting of a straight portion provided with a tapering extremity, and an arm having a lateral extension, a coiled spring adapted to encircle the straight portion of said plunger, a tube having a bore formed to fit the straight

portion of the plunger movably, said tube provided with a longitudinal slot adapted to admit the arm of said plunger, means attached to the plunger for confining said spring between it and said tube, an outer tube constructed to inclose the straight portion of the plunger together with the coiled spring and the slotted tube, and means for adjusting and fixing said slotted tube within said outer tube, substantially as described.

2. In a quarter-saver for knitting-machines, retractor mechanism comprising a hollow cylinder grooved longitudinally and circumferentially, a plate having a lengthwise slot and a recess, said plate constructed to fit movably within the longitudinal groove of said cylinder, a second hollow cylinder adapted for attachment to said plate, a coiled spring, dogs constructed substantially as shown and described and adapted for pivotal attachment to said grooved cylinder and plate, means for limiting the movement of said dogs and plate, and a circularly-curved spring adapted for arrangement within the circumferential groove of said grooved cylinder to aline said dogs, substantially as set forth.

3. A quarter-saver for knitting-machines comprising a drop-wire plunger consisting of a straight portion provided with a tapering extremity, and an arm having a lateral extension, a coiled spring adapted to encircle the straight portion of said plunger, a tube having a bore formed to fit the straight portion of the plunger movably, said tube provided with a longitudinal slot adapted to admit the arm of said plunger, means attached to the plunger for confining said spring between it and said tube, an outer tube constructed to inclose the straight portion of the plunger together with the coiled spring and slotted tube, and means for adjusting and fixing said slotted tube within said outer tube, retractor mechanism comprising a hollow cylinder grooved longitudinally and circumferentially, a plate having a lengthwise slot and a recess, said plate constructed to fit movably within the longitudinal groove of said cylinder, a second hollow cylinder adapted for attachment to said plate, a coiled spring, dogs constructed substantially as shown and described and adapted for pivotal attachment to said grooved cylinder and plate, means for limiting the movement of said dogs and plate, a circularly-curved spring adapted for arrangement within the circumferential groove of said grooved cylinder to aline said dogs, a sleeve or cover constructed for attachment to said outer tube and to inclose said cylinders, and means for fixing said cover upon said grooved cylinder, substantially as set forth.

4. A quarter-saver for knitting-machines comprising a drop-wire plunger consisting of a straight portion provided with a tapering extremity, and an arm having a lateral extension, a coiled spring adapted to encircle the straight portion of said plunger, a tube having a bore formed to fit the straight portion

of the plunger movably, said tube provided with a longitudinal slot adapted to admit the arm of said plunger, means attached to the plunger for confining said spring between it and said tube, an outer tube constructed to inclose the straight portion of the plunger together with the coiled spring and slotted tube, and means for adjusting and fixing said slotted tube within said outer tube, retractor mechanism comprising a hollow cylinder grooved longitudinally and circumferentially, a plate having a lengthwise slot and a recess, said plate constructed to fit movably within the longitudinal groove of said cylinder, a second hollow cylinder adapted for attachment to said plate, a coiled spring, dogs constructed substantially as shown and described and adapted for pivotal attachment to said grooved cylinder and plate, means for limiting the movement of said dogs and plate, a circularly-curved spring adapted for arrangement within the circumferential groove of said grooved cylinder to aline said dogs, a sleeve or cover constructed for attachment to said outer tube and to inclose said cylinders, means for fixing said cover upon said grooved cylinder, a hollow inner cylinder having an internal shoulder and constructed to fit the cylinders of the retractor mechanism interiorly, means for detachably fixing said grooved cylinder upon said inner cylinder, a presser-wheel-carrying rod having a shoulder and a threaded portion, nuts adapted to engage the threaded portion of said rod, and a spiral spring constructed to encircle the said rod, substantially as set forth.

5. A quarter-saver for knitting-machines comprising a drop-wire plunger consisting of a straight portion provided with a tapering extremity, and an arm having a lateral extension, a coiled spring adapted to encircle the straight portion of said plunger, a tube having a bore formed to fit the straight portion of the plunger movably, said tube provided with a longitudinal slot adapted to admit the arm of said plunger, means attached to the plunger for confining said spring between it and said tube, an outer tube constructed to inclose the straight portion of the plunger together with the coiled spring and slotted tube, and means for adjusting and fixing said slotted tube within said outer tube, retractor mechanism comprising a hollow cylinder grooved longitudinally and circumferentially, a plate having a lengthwise slot and a recess, said plate constructed to fit movably within the longitudinal groove of said cylinder, a second hollow cylinder adapted for attachment to said plate, a coiled spring, dogs constructed substantially as shown and described and adapted for pivotal attachment to said grooved cylinder and plate, means for limiting the movement of said dogs and plate, a circularly-curved spring adapted for arrangement within the circumferential groove of said grooved cylinder to aline said dogs, a sleeve or cover constructed for attachment to

said outer tube and to inclose said cylinders, means for fixing said cover upon said grooved cylinder, a hollow inner cylinder having an internal shoulder and constructed to fit the
 5 cylinders of the retractor mechanism interiorly, means for detachably fixing said grooved cylinder upon said inner cylinder, a presser-wheel-carrying rod having a shoulder and a threaded portion, nuts adapted to engage the
 10 threaded portion of said rod, a spiral spring constructed to encircle the said rod, and a yarn-guide having a yarn-support and provided at one end with an adjustable comb whereby imperfections in yarn may be inter-
 15 cepted, substantially as set forth.

6. A quarter-saver for knitting-machines comprising a drop-wire plunger consisting of a straight portion provided with a tapering extremity, and an arm having a lateral ex-
 20 tension, a coiled spring adapted to encircle the straight portion of said plunger, a tube having a bore formed to fit the straight portion of the plunger movably, said tube provided with a longitudinal slot adapted to ad-
 25 mit the arm of said plunger, means attached to the plunger for confining said spring between it and said tube, an outer tube constructed to inclose the straight portion of the plunger together with the coiled spring and
 30 slotted tube, and means for adjusting and fixing said slotted tube within said outer tube, retractor mechanism comprising a hollow cylinder grooved longitudinally and circumferentially, a plate having a lengthwise slot and
 35 a recess, said plate constructed to fit movably within the longitudinal groove of said cylin-

der, a second hollow cylinder adapted for attachment to said plate, a coiled spring, dogs constructed substantially as shown and de-
 40 scribed and adapted for pivotal attachment to said grooved cylinder and plate, means for limiting the movement of said dogs and plate, a circularly-curved spring adapted for ar-
 45 rangement within the circumferential groove of said grooved cylinder to aline said dogs, a sleeve or cover constructed for attachment to said outer tube and to inclose said cylinders, means for fixing said cover upon said grooved
 50 cylinder, a hollow inner cylinder having an internal shoulder and constructed to fit the cylinders of the retractor mechanism interiorly, means for detachably fixing said grooved cylinder upon said inner cylinder, a presser-wheel-carrying rod having a shoulder and a
 55 threaded portion, nuts adapted to engage the threaded portion of said rod, a spiral spring constructed to encircle the said rod, and a yarn-guide consisting of a main portion and an adjustable portion, the said adjustable
 60 portion having a yarn-support, a recessed and split cylinder provided with a central bore, an adjustable annular comb, an adjustable flat comb, and means for attaching said combs to said split cylinder, substantially as set
 65 forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

ARCHIBALD PAUL.

Witnesses:

JAS. O'CONNOR,
 A. I. WHITEHOUSE.