

(No Model.)

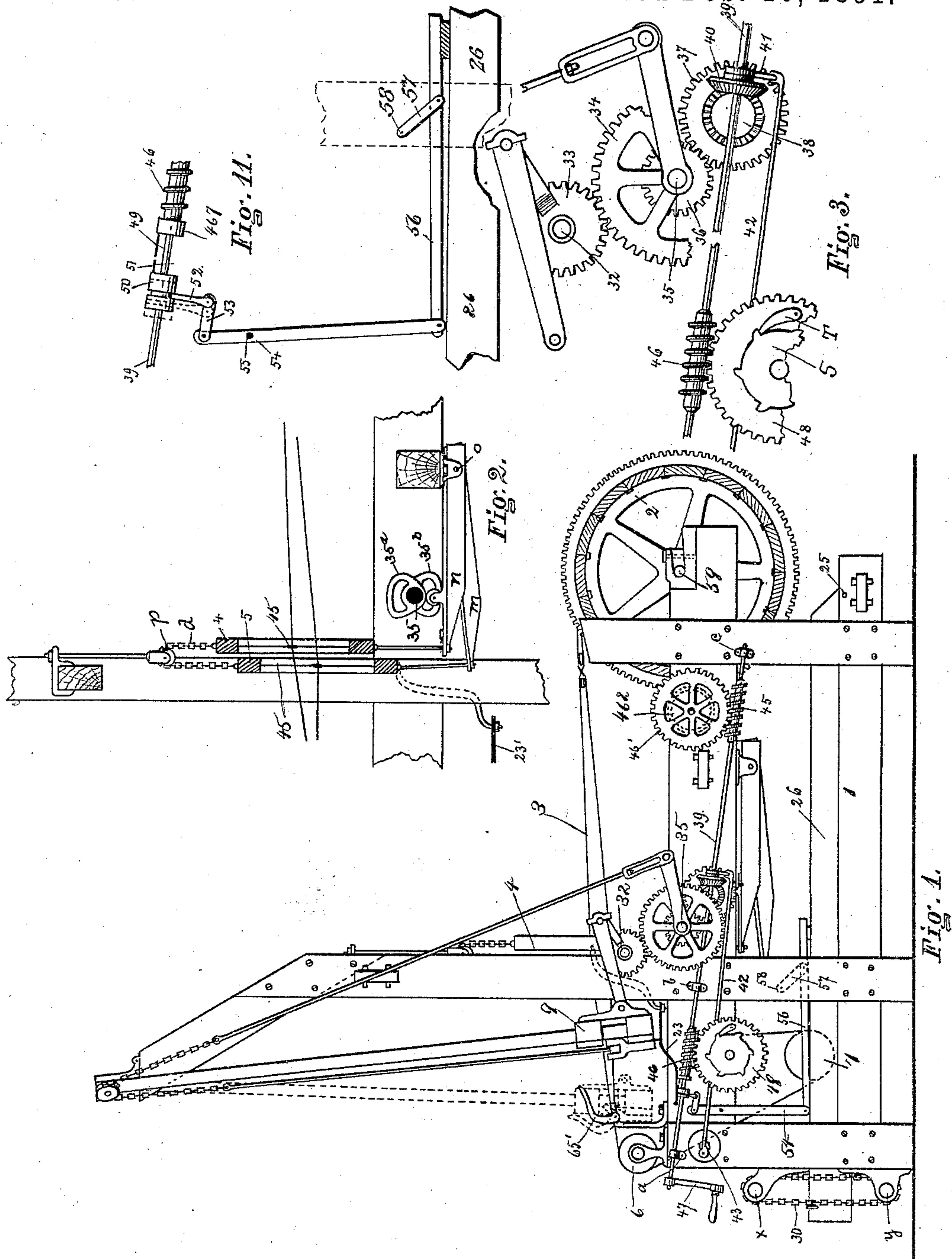
3 Sheets—Sheet 1.

C. S. STROWBRIDGE.

TAKE-UP AND LET-OFF MECHANISM FOR LOOMS FOR WEAVING WIRE.

No. 446,035.

Patented Feb. 10, 1891.



WITNESSES.

Rich. George.

Milton E. Robinson

INVENTOR.

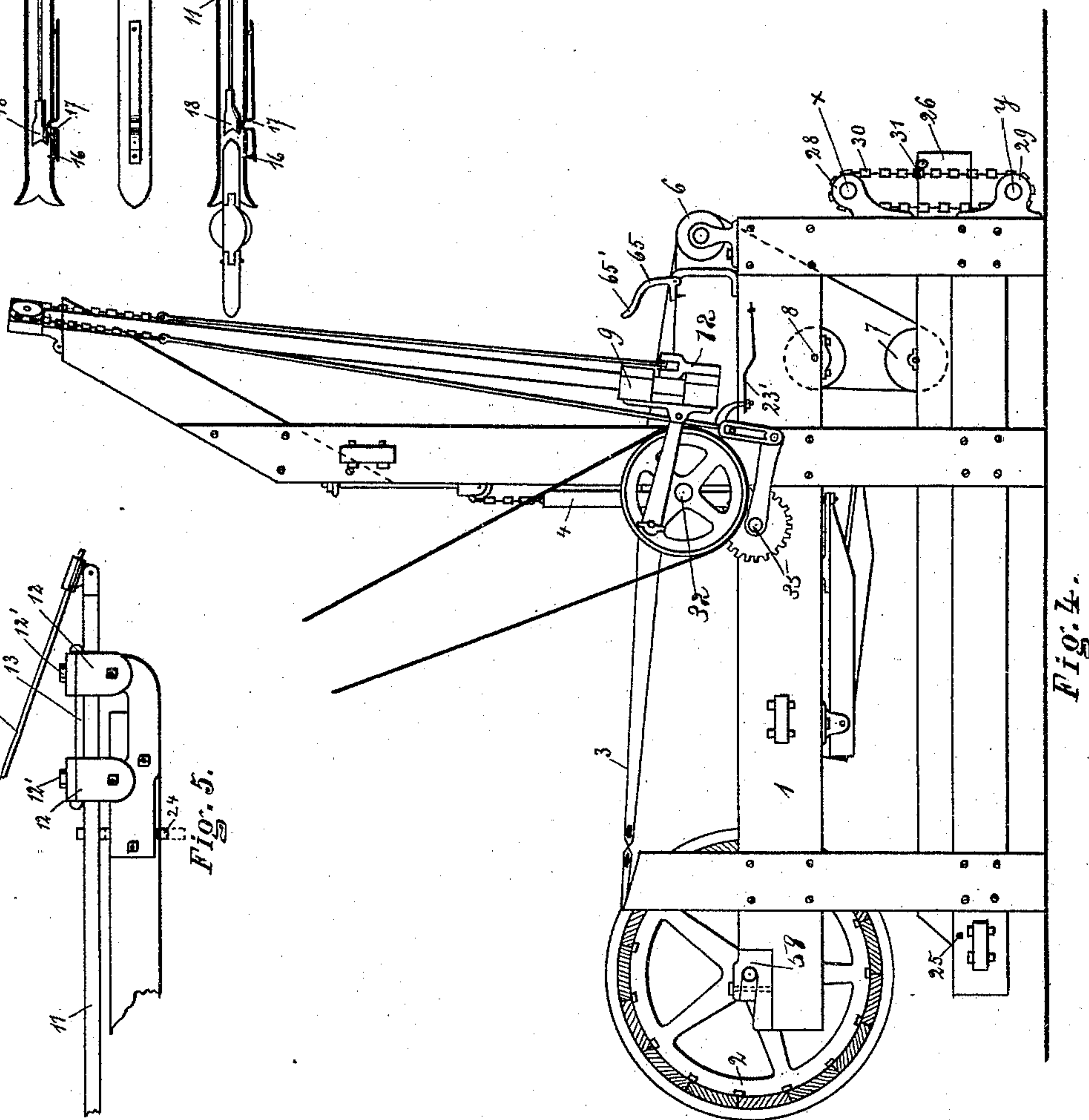
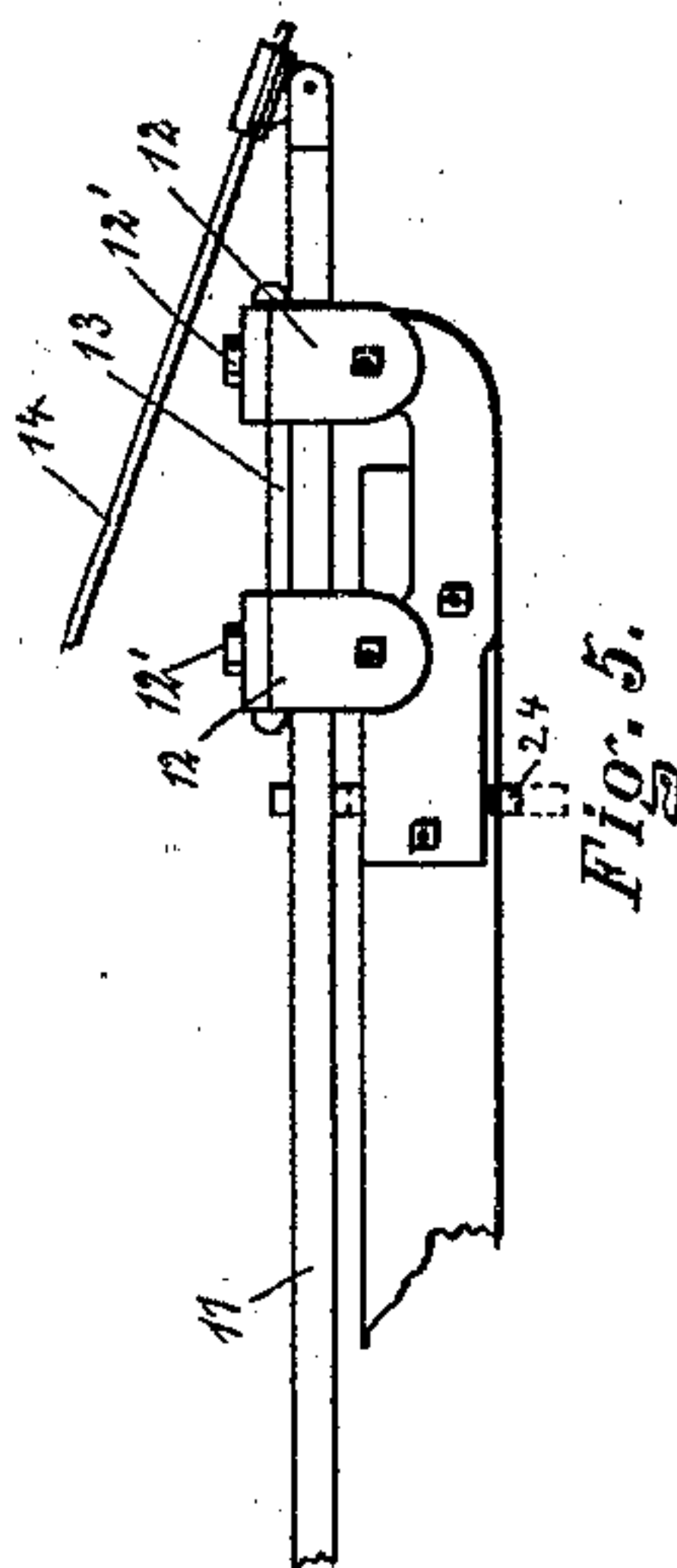
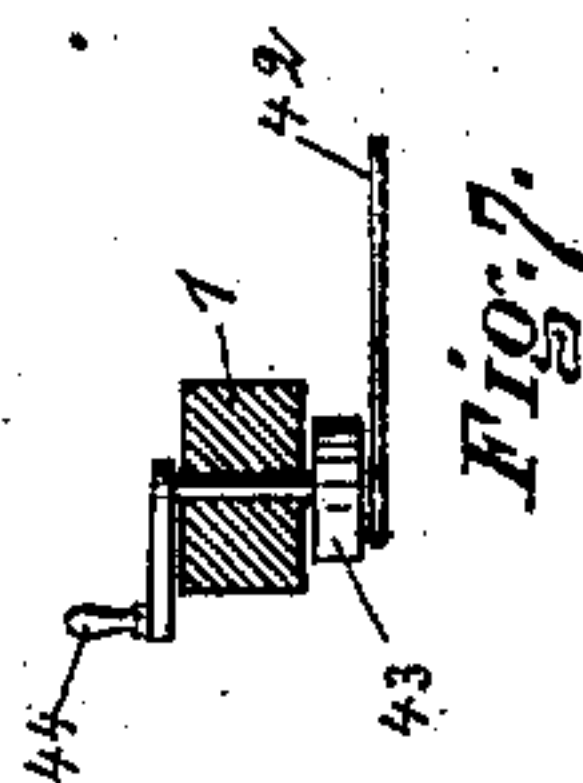
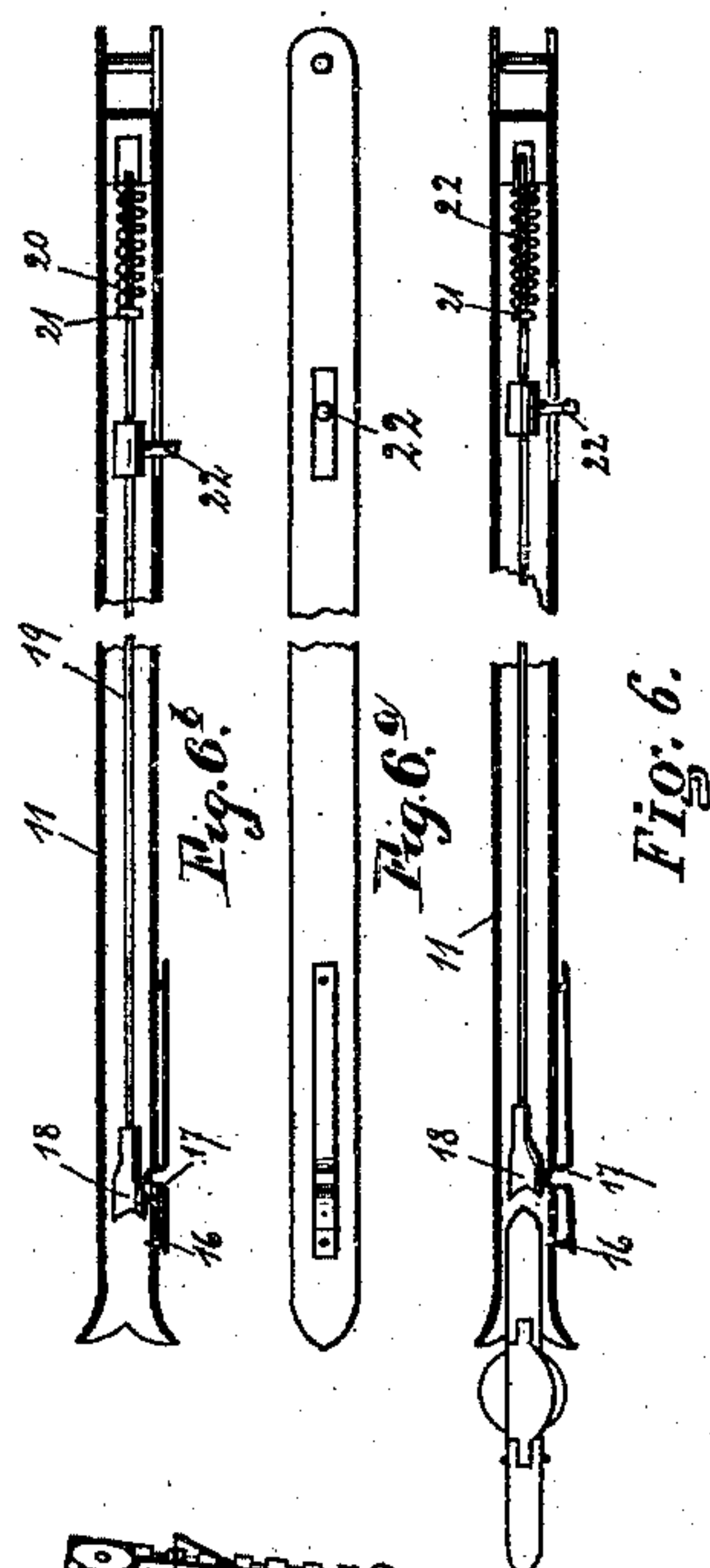
Clarence S. Strowbridge.
By Risley Perry
attys

3 Sheets—Sheet 2.

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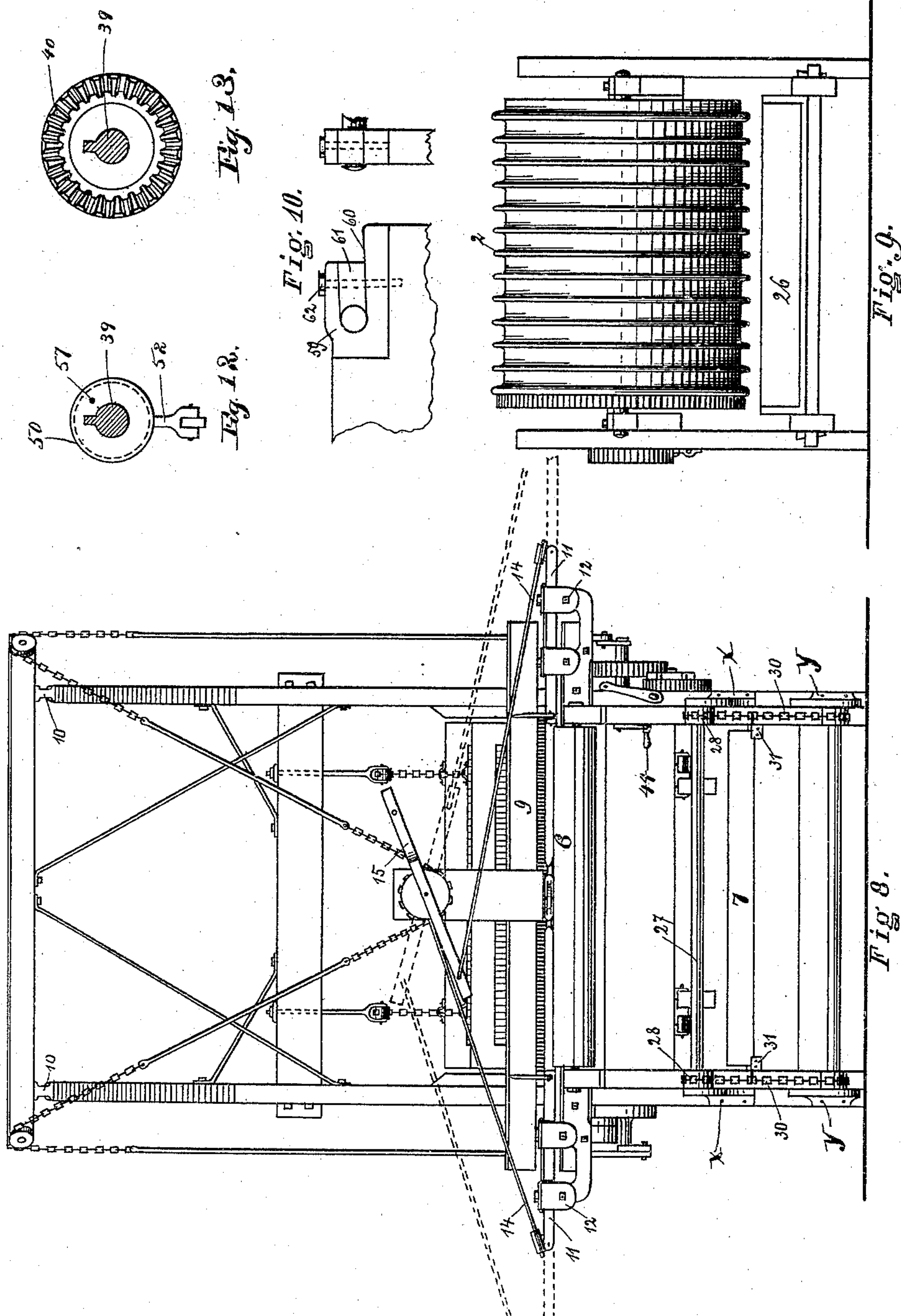
INVENTOR:
 Clarence S. Stroubridge
 By Ridley Perry
 atty.

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3 Sheets—Sheet 3.

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WITNESSES

Rich. George.

Milton E. Robinson

INVENTOR.

Charles S. Strowbridge
By Rialley & Perry
attys

UNITED STATES PATENT OFFICE.

CLARENCE S. STROWBRIDGE, OF HAMILTON, NEW YORK, ASSIGNOR TO THE
HAMILTON WIRE CLOTH COMPANY, LIMITED, OF SAME PLACE.

TAKE-UP AND LET-OFF MECHANISM FOR LOOMS FOR WEAVING WIRE.

SPECIFICATION forming part of Letters Patent No. 446,035, dated February 10, 1891.

Application filed February 7, 1890. Serial No. 339,559. (No model.)

To all whom it may concern:

Be it known that I, CLARENCE S. STROWBRIDGE, of Hamilton, in the county of Madison and State of New York, have invented certain new and useful Improvements in Take-Up and Let-Off Mechanisms for Looms for Weaving Wire; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form part of this specification.

My invention relates to improvements in looms for weaving wire and in particular features of construction.

In the drawings which accompany and form a part of this specification, and in which similar letters and figures of reference refer to like parts in the several figures, Figure 1 shows the right-hand side of the looms. Fig. 2 shows the mechanism for operating the heddles. Fig. 3 is a detail view showing portions of the mechanism for operating the cloth-roller and let-off cylinder. Fig. 4 shows the left-hand side of the looms. Figs. 5, 6, 6^a, and 6^b are detail views relating to the carrier rod or arm of the shuttle. Fig. 7 shows details of the mechanism for operating the cloth-roller and let-off reel. Fig. 8 shows a front end view of the looms. Fig. 9 shows the let-off cylinder and rear end of the frame. Fig. 10 shows details relating to the bearings of the let-off cylinder. Fig. 11 shows details of the mechanism for operating the cloth-roller and the connection between the mechanism for operating the cloth-roller and the gravitating frame. Fig. 12 shows an end view of the portion of the clutch for operating the cloth-roller and a cross-section of the shaft on which the clutch is mounted. Fig. 13 shows an end view of the gear for driving the let-off cylinder and a cross-section of the shaft on which the gear is mounted.

Referring more specifically to the reference numerals and letters marked on the drawings, the frame of the machine is indicated by 1.

2 indicates the let-off cylinder, mounted in

the bearings 59 at the rear end of the frame, from which the several wires constituting the warp 3 are drawn or let off. The warp passes through the ordinary heddles 45, held on heddle-frames 4 and 5, and thence to guide-roller 55 6, thence to tension-roller 7, and to cloth-roller 8.

9 is the lay, swinging on arms pivoted or hinged at 10 to upward extensions of the frame. On the lay are provided the usual 60 reed and also mechanism for operating the shuttle.

The shuttle-carrying arms are constructed as follows: 11 11 are carrier rods or arms, which operate the shuttle and pass through 65 guide clasps or bearings 12 12, Figs. 5 and 8, the two bearings on each end of the lay having the bearing-plate 13, which extends from one of the said bearings to the other and engages the carrier-arm on the upper surface 70 and holds it in a correct horizontal position in line with the opposite shuttle-carrying arm. This plate 13 is slightly turned up at each end to prevent lateral movement, and is engaged on top by set-screws 12' in the clasps 12, by 75 which the plate may be adjusted to the carrier-arm.

Each shuttle-carrying arm 11 is operated by a rod 14, which connects to an alternating reversing arm or lever 15, which is the ordinary arm used for this purpose and is operated in the usual way. 80

Each shuttle-carrying arm 11 is constructed hollow and is provided with a spring-catch 16 near the end which engages the shuttle, 85 the catch being adapted to engage in a recess or opening in the shuttle and secure it and to move it with the carrier-arm at certain times during the operation of the machine. The catch 16 is provided with a projection 17, 90 which projects into the hollow arm and is adapted to be engaged by movable block 18 inside of the hollow arm. The block 18 is provided with an inclined face, substantially as shown in Figs. 6 and 6^b, and is connected 95 by a rod 19 with spring 20, which rests on the closed end of the arm and presses against the collar or pin 21 on rod 19 to force block 18 toward the open end of the shuttle-carrying arm.

To the rod 19 is secured a pin 22, projecting to the outside of the hollow arm, for the purpose hereinafter described.

At the sides of the loom are tripping-levers 23 and 23', which are connected by arms or connections (shown in dotted lines in Figs. 1 and 4) to heddle-frames 4 and 5, respectively. When either of these tripping-levers is in its upper position, as determined by the relative positions of heddle-frames 4 and 5, it is adapted to engage pin 24, Fig. 5, mounted on the lay-beam, and force the same upward from the position shown in the dotted lines in Fig. 5 to that shown in full lines in the same figure. During the operation of the loom the relative adjustment of the parts is such that with each stroke of the shuttle-arms one of the pins 24 upon the opposite ends of the lay-beam will be in its upper position, and as the shuttle-carrying arm completes its inward stroke the pin 22 comes in contact with pin 24 and draws the block 18 with reference to the arm backward, the inclined face of the block acting on the projection 17 to hold the catch 16 out, so that it will release the shuttle, as in Fig. 6. The parts of the opposite shuttle-arm being in the reverse position from that just described, or in the position shown in Fig. 6^b, will become engaged with the shuttle, and the shuttle will be carried out with that particular shuttle-arm in that stroke. When the shuttle-arm starts on its outward stroke, the pin 22 becomes released from pin 24, and the spring 20 forces the block 18 off of the projection 17, allowing the catch 16 to assume its normal position.

To the rear of the loom-frame is pivoted at 25 a weighted gravitating frame 26, the front end of which is free to have a limited upward and downward swinging movement.

To the gravitating frame 26 is secured tension-roller 7, under which the cloth passes in its travel toward the cloth-roller.

In stationary bearings *x x* near the front end of the gravitating frame and secured to the frame of the loom (although this is not material) I mount shaft 27 on a higher plane than that to which the frame 26 may swing. On this shaft I mount two sprocket-wheels 28 adjacent to each front corner of the gravitating frame and rigidly secured thereto. Under each of the sprocket-wheels 28, running on suitable bearings *y y*, I provide pulleys or sprocket-wheels 29 29. Passing around the pulleys 29 and the sprocket-wheels 28 I provide endless chains 30. Projecting ears 31 are provided upon each side of the free end of frame 26, which ears are secured in the chain. By the foregoing mechanism the opposite sides of the gravitating frame are made to move simultaneously and evenly, thus producing an even tension across the cloth on roller 7.

The cloth-roller 8 and the let-off cylinder 32 are operated by the following mechanism: 32 is the power-shaft of the loom, which carries gear 33, meshing into gear 34 on counter-

shaft 35, which counter-shaft also carries gear 36, meshing into gear 37, which drives bevel-gear 38. Upon shaft 39 is mounted with a spline, so as to be laterally movable thereon, bevel-gear 40, which meshes into bevel-gear 38. The hub of gear 40 is provided with a groove, which is engaged by a fork or ring 41, mounted on a connecting-rod 42. Rod 42 is pivoted at its opposite end to a disk 43, which disk is secured on a short shaft extending through a portion of the frame, and to the opposite end of which is secured a crank 44 for operating the parts just described. Shaft 39 is mounted in bearings *a, b*, and *c* on the frame and is provided with a worm 45, rigidly secured thereon, which gears with a worm-wheel 46', mounted on a short shaft passing through a portion of the frame, which shaft has on its inner end a gear 46², (shown in dotted lines,) which meshes into the cogs shown on the circumference of cylinder 2 in Fig. 1. Upon the front end of the shaft 39 I provide a crank 47. The worm 46, mounted loosely on shaft 39, meshes into worm-wheel 48, mounted loosely on the shaft of the cloth-roller, and drives the same by dog T, pivoted to the worm-wheel engaging rack or ratchet-wheel S, secured to cloth-roller. On worm 46 is a collar in which is a projecting pin 49, Fig. 11. Mounted on shaft 39, adjacent to the worm 46, is a collar 50, splined to the shaft and capable of a lateral movement thereon, and provided with a projecting pin 51 and a groove engaged by the fork or ring 52. Fork 52 is connected by connecting-link 53 to lever 54, pivoted to the frame at 55. To the lower end of lever 54 is connected lever 56, which is pivoted to link 57, which link is pivoted at 58 to the frame of the loom.

The operation of the hereinbefore-described parts is as follows: The gear 40 being engaged with gear 38 and the loom in operation, the worms 45 and 46 are caused to rotate, the rotation of worm 45 allowing the warp-wires to be let off the cylinder 2 and the rotation of worm 46 causing the cloth-roll to rotate, taking up the cloth after it is woven. On account of the accumulation of the cloth on the cloth-roller the relative speed of the let-off cylinder and cloth-roller cannot be readily adjusted to feed the same, and the cloth passing under roller 7 on the gravitating frame 26 will cause the gravitating frame to be drawn upward. When the gravitating frame has passed upward to a certain point, it engages lever 56, which lever is carried toward the right, as indicated by the arrow in Fig. 11, by reason of the link 57 being pivoted at one end to the lever 56 and the other to the frame. The movement of the lever 56 operates lever 54, and through the connecting mechanism draws the pin 51, Fig. 11, out of engagement with pin 49, when the rotation of worm 46 ceases, as does also the rotation of the cloth-roller for the time being. When more cloth has been woven by the con-

tinued operation of the loom, it is taken up by the descent of the gravitating frame, and at a certain point in its descent the collar 50 is again thrown into engagement with worm 46 by the operation in the opposite direction of the parts heretofore described, and the cloth-roll is again rotated, the parts operating by the gravity of lever 56, or a hook or connection between it and the gravitating frame may be provided.

The collar and pin on the worm 46 and the sliding collar 50 and pin constitute a clutch for operating the worm 46. It will be observed, with reference to worm-wheels 46' and 48, that they resist in opposite directions, so that when both of the worms 45 and 46 are in operation they tend to equalize or counterbalance each other. Thus the necessity of heavy collars or shoulders on shaft 39 to resist lateral movement thereof is obviated and the friction reduced to the minimum. When it becomes necessary, through some defect in the weaving, to "back up" the loom, the crank 44 is brought upward and forward from the position shown in Fig. 8, so as to throw gear 40 out of engagement with gear 38. The shaft 39 can then be independently operated by turning crank 47 and the warp-wires be rewound onto the let-off cylinder 2 and the cloth let off of the cloth-roller, the arrangement of the mechanism for operating the cloth-roller and let-off cylinder being such that the warp can be backed up any desired distance, and the tension mechanism will properly and automatically perform its function as well with the warp moving backward as forward. When the machine has been sufficiently backed up, the handle 44 is allowed to return to its normal position, (shown in Fig. 8,) re-engaging gear 40 with gear 38.

The heddle-frames are operated by movements of cam-shaped pieces 35^a and 35^b, mounted on the shaft 35, the cam-pieces operating on lever-arms *n* and *m*, respectively, which levers are pivoted in the frame at *o* and have a connection between them and the heddle-frames 4 and 5, respectively. The heddle-frames are connected at their upper sides by a chain *d*, passing over a pulley *p*, secured to the frame, so that as one frame descends the other ascends, as is usual in this class of machines. It will be observed that the rod 42 and the point at which it is attached to the disk 43 and the center of disk 43 are all in the same line when gear 40 is engaged with gear 38, and thus the engagement of the gear 40 with gear 38 is by positive mechanism, and it is desirable on that account.

The box 59 is of improved construction, as shown in Fig. 10, being provided with an opening at the side, as shown, having an inclined face 60, inclining toward the bottom of the box and projecting out beyond the upper portion of the box, and having a removable piece 61, secured in position by pin 62. This construction of the box permits the let-off cylinder, which has to be frequently removed from

the machine, to be easily replaced. When it is placed on the inclined faces 60, the pin 62 and the block 61 being removed, it will automatically assume its place in the box. The piece 61 and pin 62 may then be replaced, securing it in position.

When it is desired to unload the cloth-roller 8 of the cloth that has been woven and accumulated upon it, the dog T is thrown out of engagement with the ratchet-wheel S, and the cloth may then be readily drawn off, and on proceeding again with the weaving it is only necessary to throw the dog T into engagement.

Upon the front end of the machine I provide, mounted in the usual manner upon each side of the web, a pricker 65, which is substantially of the ordinary construction, except that the upwardly-extending arm 65' thereof is of such a shape and length, as shown in Figs. 1 and 4, that it will be engaged by the lay-beam and operated thereby, as will be readily understood from the full and dotted lines in Fig. 1, thus obviating the necessity of a downwardly and outwardly extending projection on the lay-beam to operate the pricker as heretofore used, and, in adjusting the width of the cloth, obviating the necessity of adjusting the projection on the lay-beam to coincide with the position of the pricker.

It is evident that variations or changes in and from the construction hereinbefore described may be made without departing from the spirit of my invention or the equivalents of my construction.

What I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a loom, of the loom-frame, the cloth-roller, the guiding-roller, the gravitating frame for straining the warp, pivoted at one end in the loom-frame, the tension-roller secured on the gravitating frame parallel with the cloth-roller, a shaft mounted in stationary bearings above the free end of the gravitating frame, sprocket-wheels rigidly secured to the shaft adjacent to each side of the gravitating frame, pulleys below each of the sprocket-wheels, and an endless chain passing around the sprocket-wheel and pulley at each side and secured to the gravitating frame, substantially as set forth.

2. The combination, in a loom, of the loom-frame, the cloth-roller, the guiding-roller, the gravitating frame for straining the warp, pivoted at one end in the loom-frame, the tension-roller secured on the gravitating frame parallel with the cloth-roller, the shaft mounted in stationary bearings above the free end of the gravitating frame, sprocket-wheels rigidly secured to the shaft adjacent to each side of the gravitating frame, and endless chains passing round each of the sprocket-wheels at each side of and secured to the gravitating frame, as set forth.

3. The combination, in a loom, of the let-off cylinder 2, the cloth-roller 8, the guide-roller, the tension-roller 7, the gravitating

frame, the worm-gears 46' and 48, which operate the let-off cylinder and cloth-roller, respectively, the intermediate gears between gear 46' and the let-off cylinder, the worms
5 45 and 46, the shaft 39, on which the worms are mounted, (45 rigidly and 46 loosely,) the clutch for engaging the worm 46, the operative connections of the clutch extending to and operated by the gravitating frame, the
10 gear 40 for driving the shaft 39, the gear for driving the gear 40, the crank for operating the shaft 39 and the connecting-rod 42, and crank for throwing the gear 40 into and out of gear, substantially as set forth.
15 4. The combination, in a loom, of the let-off cylinder, the cloth-roller, the guide-roller, tension-roller, the gravitating frame, the gears for operating the cloth-roller and let-off, re-

spectively, the worms for operating the let-off cylinder and cloth-roller, the shaft carrying the worms, the one for operating the let-off cylinder being rigidly secured thereon and the one for operating the cloth-roller loosely mounted thereon, the clutch for engaging the worm which operates the cloth-roller, operative connections 52 53 54 56 57 between the clutch and gravitating frame, and the lever 57, pivoted to the frame and lever 56, substantially as set forth.

In witness whereof I have affixed my signature in presence of two witnesses.

CLARENCE S. STROWBRIDGE.

Witnesses:

GEO. G. SPERRY,
A. F. LINDSLEY.