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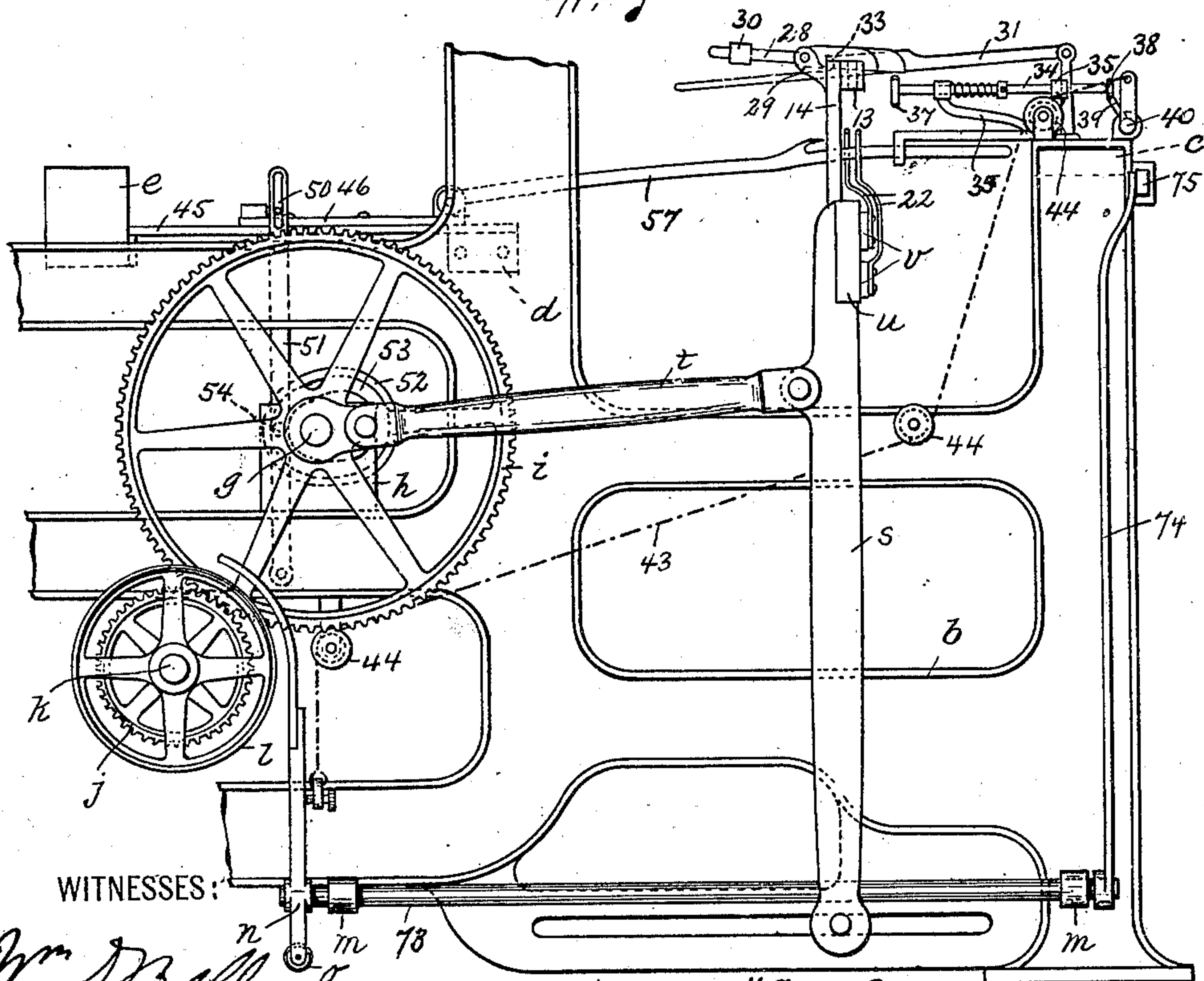
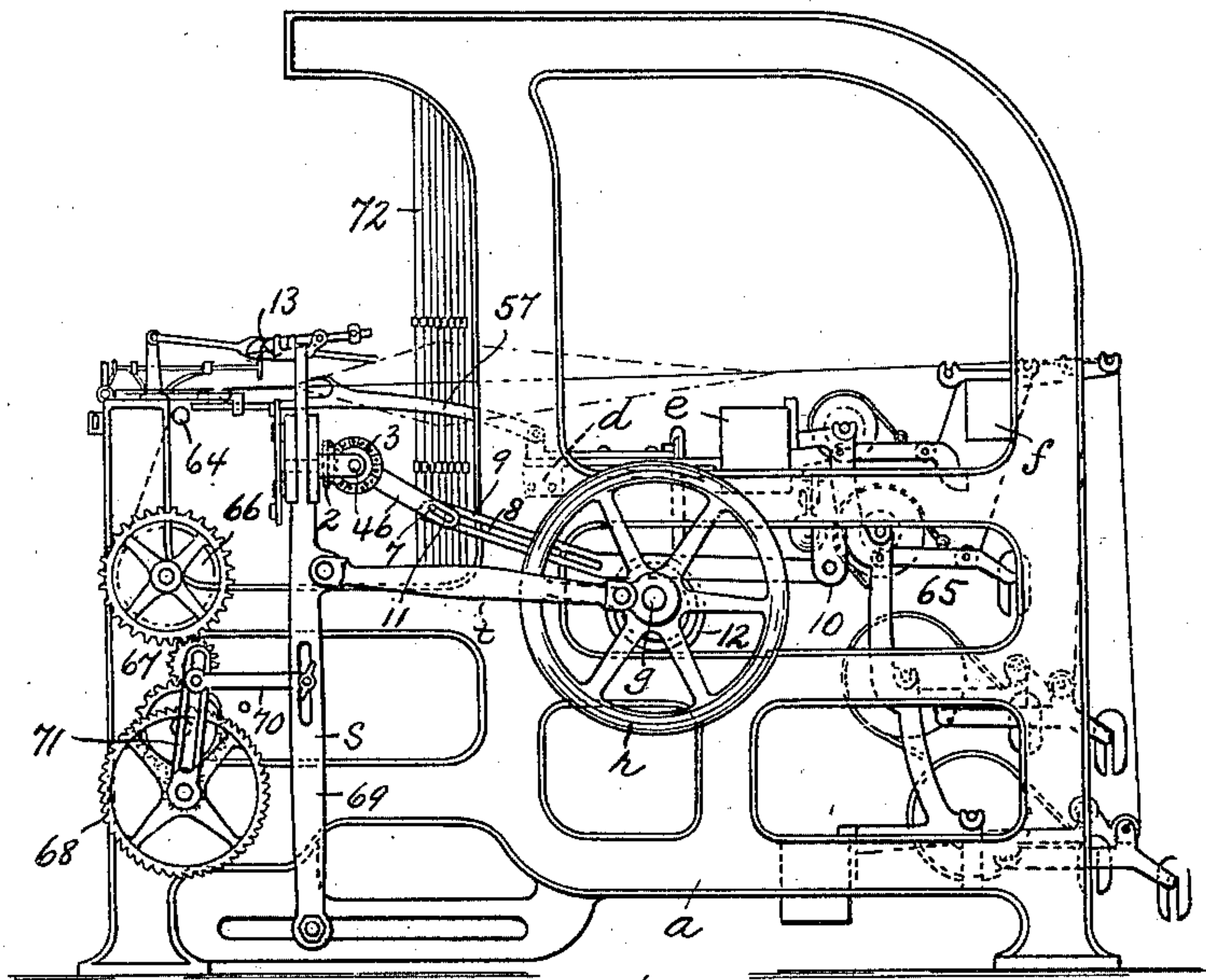
Patented Nov. 27, 1900.

W. V. GEE.
NEEDLE LOOM.

(Application filed Feb. 9, 1900.)

(No Model.)

3 Sheets—Sheet 1.



WITNESSES:

Wm. D. Bell
Robert J. Pollitt

Fig. 2. Wm. V. See BY

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ATTORNEYS.

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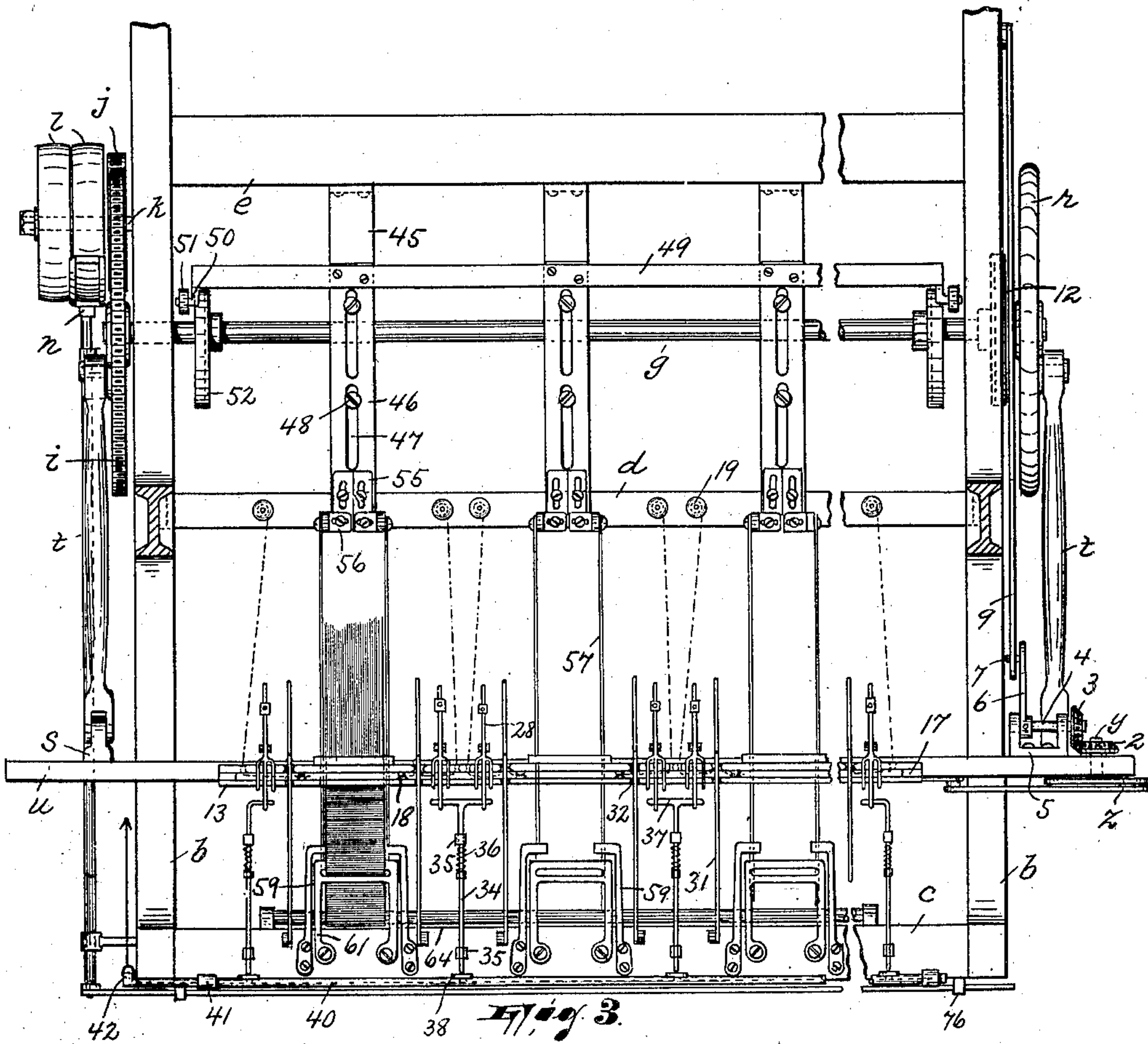
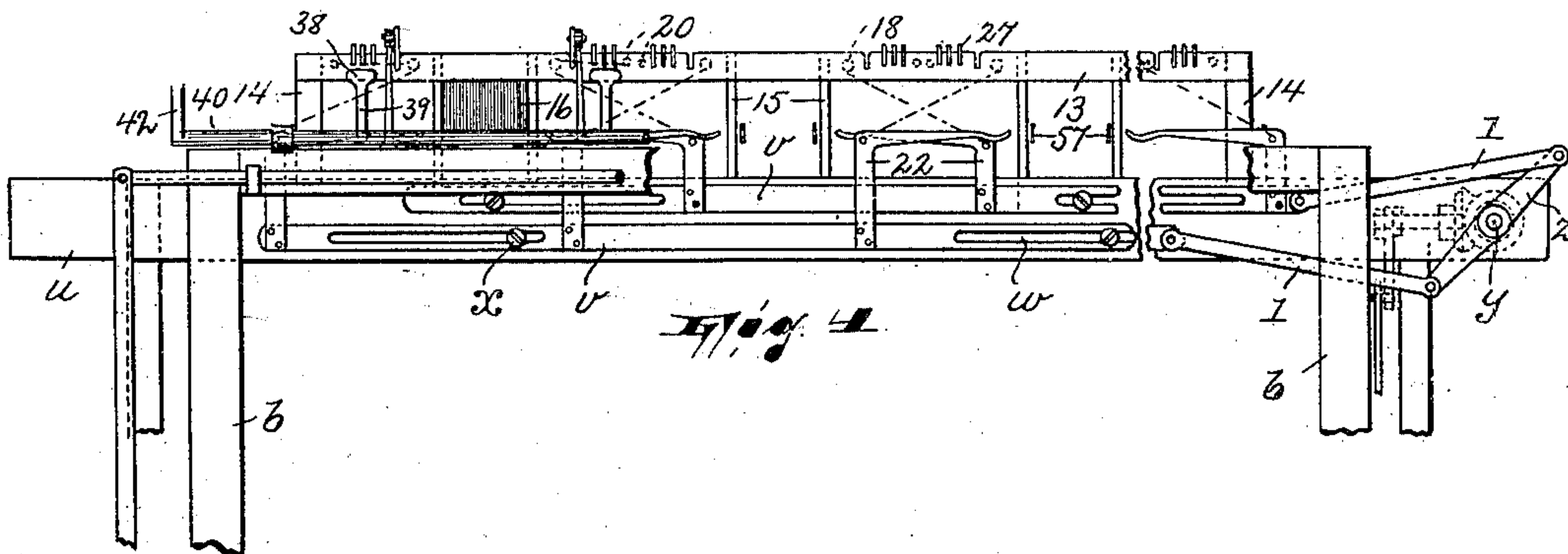
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(No Model.)

3 Sheets—Sheet 2.



WITNESSES:

J. M. Bell
Robert J. Tollett

INVENTOR

Wm. V. Gee

BY

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No. 662,717.

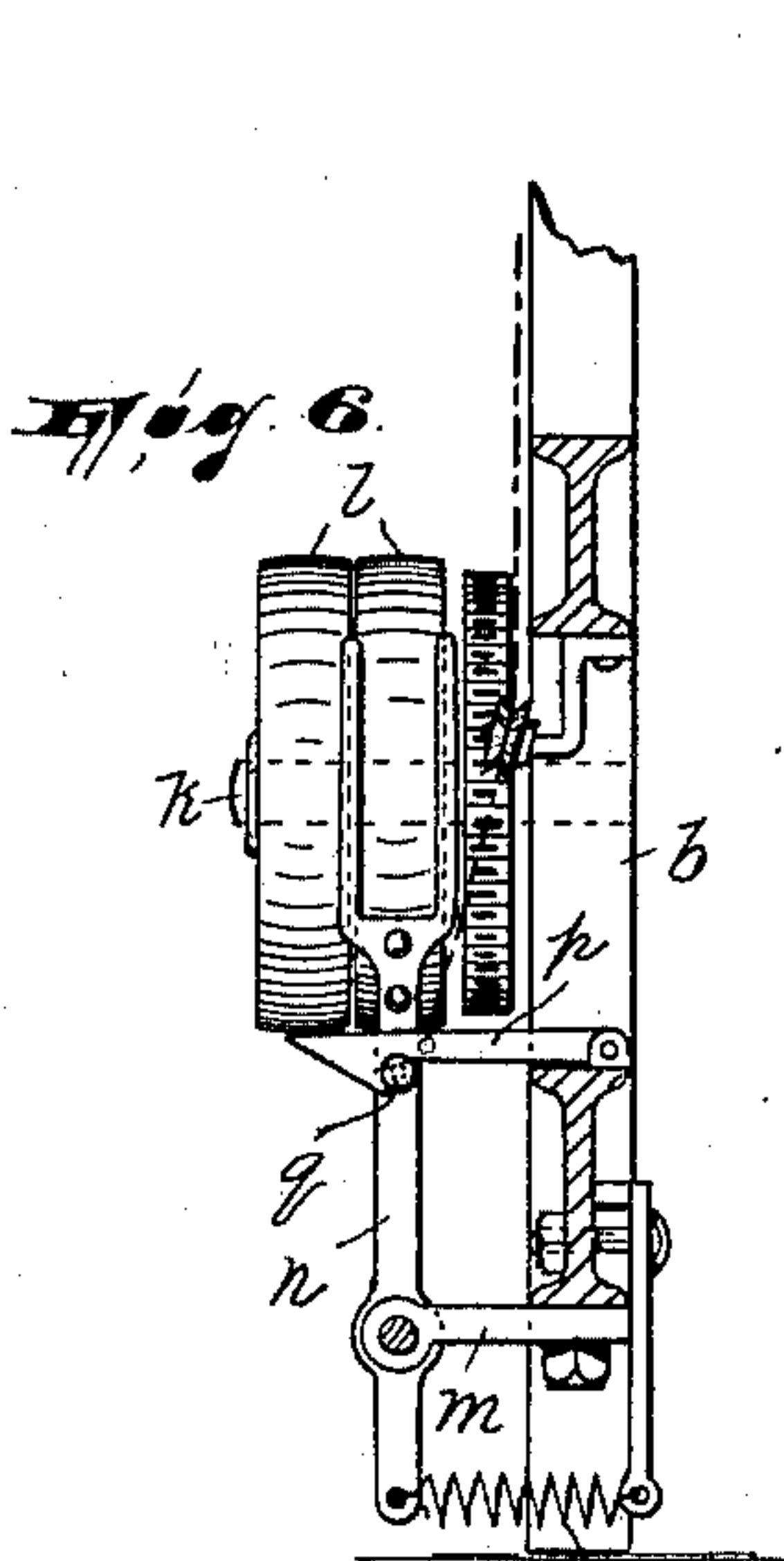
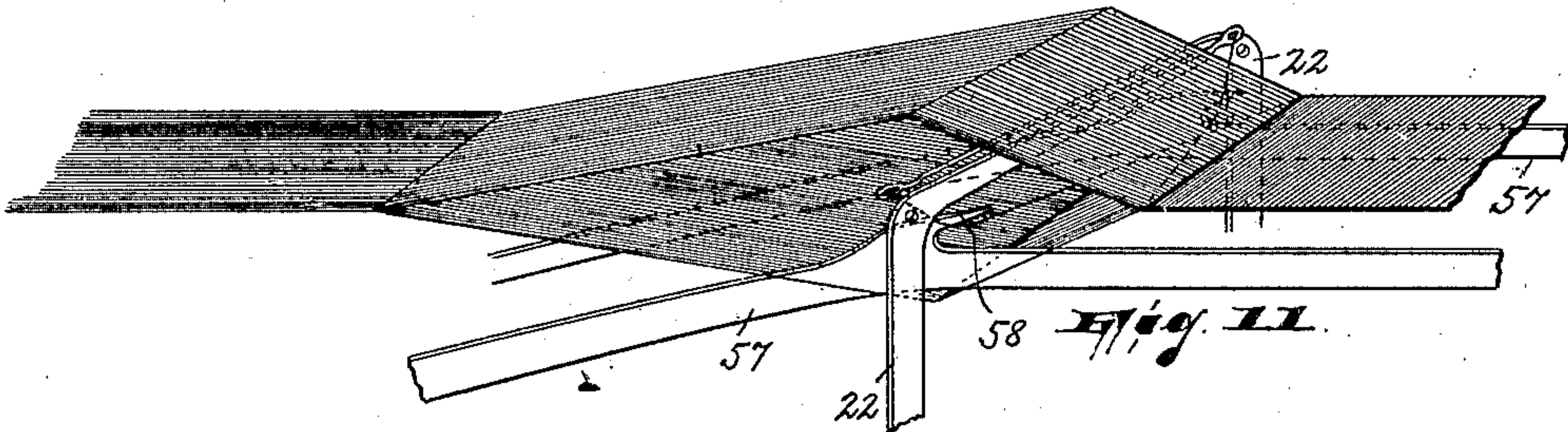
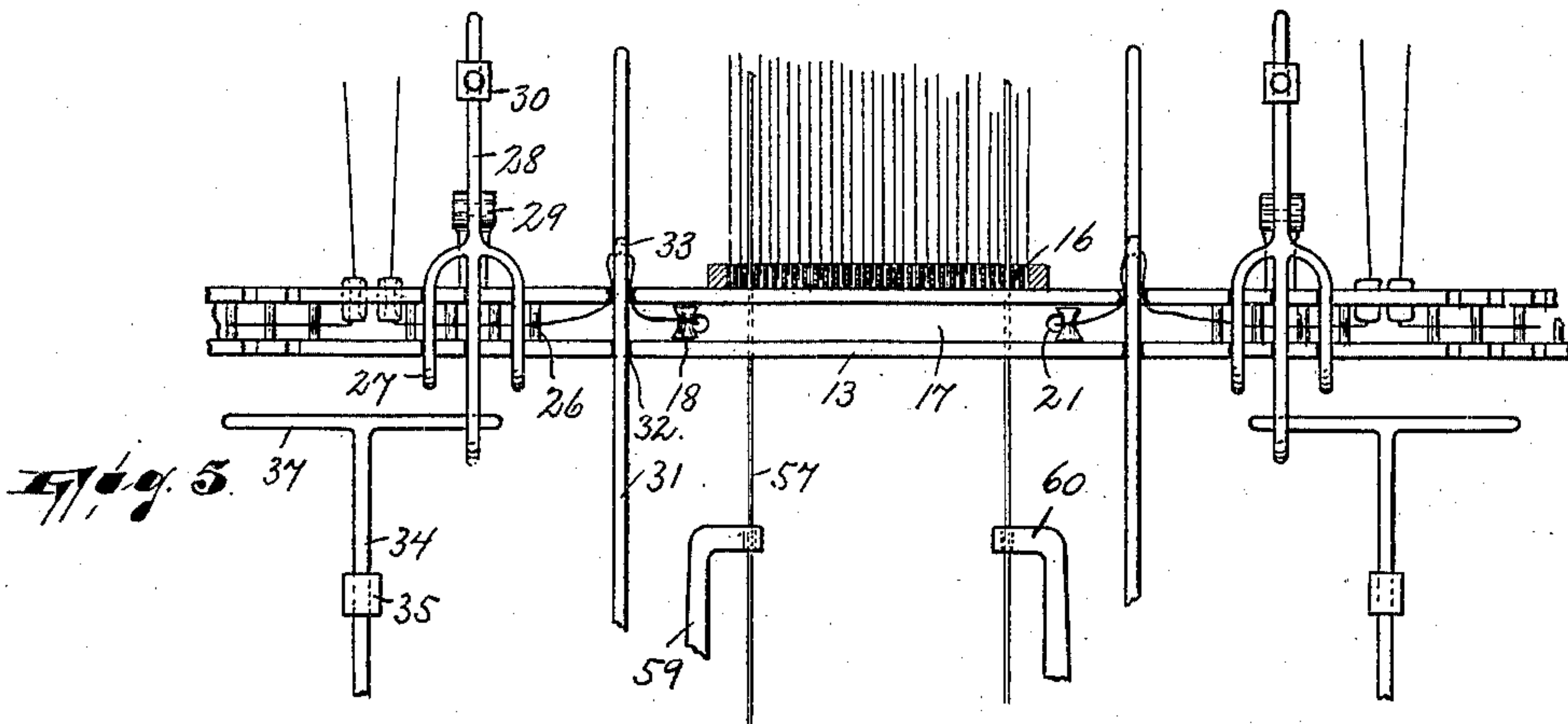
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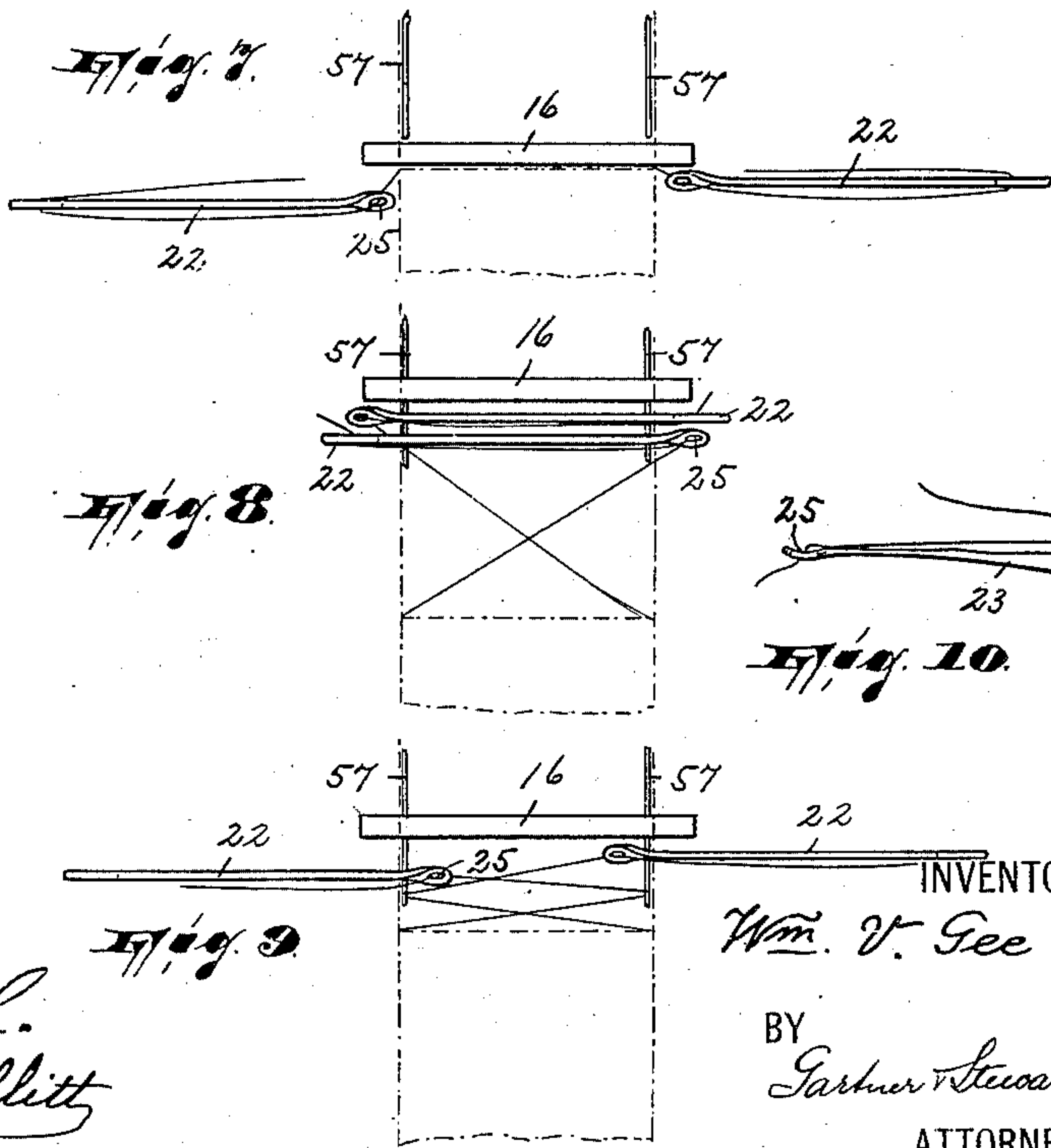
(No Model.)

3 Sheets—Sheet 3.



WITNESSES:

Wm. D. Bell.
Robert J. Tollitt



INVENTOR,

Wm. V. Gee

BY

Garner & Stearns

ATTORNEYS

UNITED STATES PATENT OFFICE.

WILLIAM V. GEE, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO
SCHAUM & UHLINGER, OF SAME PLACE.

NEEDLE-LOOM.

SPECIFICATION forming part of Letters Patent No. 662,717, dated November 27, 1900.

Application filed February 9, 1900. Serial No. 4,608. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM V. GEE, a citizen of the United States, residing in Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Needle-Looms; 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, reference being had to the accompanying drawings, and to characters of reference marked thereon, which form a part of this specification.

This invention relates to looms, and it has reference particularly to the class of such machines known as "needle-looms."

The invention consists in the improved needle-loom and in the combination and arrangements of its several parts and groups of mechanisms, substantially as will be hereinafter pointed out and finally embodied in the clauses of the claim.

I have fully illustrated my invention in the accompanying drawings, where the improvements are represented as applied to a narrow-ware loom, though they are as well adapted to a loom of the broad-goods type.

In said drawings, Figure 1 is a view of one end of my improved loom. Fig. 2 is an enlarged view of a portion of the other end thereof. Fig. 3 is a horizontal sectional view taken in a plane slightly above that of the warp. Fig. 4 is a view in front elevation of that portion of the loom which includes the batten and accessory mechanism. Fig. 5 is a top plan view, slightly enlarged, of a portion of what is shown in Fig. 4. Fig. 6 is a view in front elevation of the belt-shifting mechanism, showing a portion of a certain automatic means for actuating the same. Figs. 7, 8, and 9 show the relative positions of the needles at various stages of their operation. Fig. 10 is a detail view of one of the filler-carrying needles; and Fig. 11 is a perspective view of the shed and the two sets of needles, showing the manner in which the loops are formed in the filler.

a indicates the main frame of the loom, comprising in its structure uprights *b*, which are

connected by a series of horizontal beams *c*, *d*, *e*, and *f*.

g designates the main drive-shaft of the loom, the same being journaled in brackets *h* on the uprights *b*. On one end of this shaft is secured a gear *i*, with which meshes a pinion *j*, which is journaled on a stub-shaft *k*, projecting from the end upright *b*. The stub-shaft *k* carries two pulleys *l*, the one of which is fast while the other is loose on said shaft. *m* designates brackets which project from said end upright *b* and in which is fulcrumed a belt-shifting fork *n*, whose bifurcated end extends opposite to said pulleys, while its other end is controlled by a spiral spring *o*, connecting it with a projection of said bracket. *p* is a pawl pivoted to the upright and adapted to engage a pin *q* on the fork to maintain the latter opposite the fast pulley, which is the one next to the frame. On the other end of the shaft *g* is secured a fly-wheel *r*, said fly-wheel and the gear *i* being adapted to reciprocate the lay-swords *s* of the loom, said lay-swords being fulcrumed at their lower ends in the uprights of the loom-frame and being connected to said gear and fly-wheel through the medium of pitmen *t*. The lay-swords *s* carry a batten *u*, to the front face of which is secured, the one above the other, a pair of bars *v*, said bars having longitudinal slots *w*, through which project screws or pins *x*, whose heads keep the bars in place, the latter thus being free to reciprocate longitudinally of the batten. In one end of the batten is journaled a short shaft *y*, which carries at one of its ends a lever *z*, secured at about its center to said shaft and pivotally connected to the bars *v* through the medium of connecting-rods *l*. The other end of the shaft *y* carries a bevel-pinion 2, with the teeth of which intermesh the teeth of another bevel-pinion 3, mounted on a rock-shaft 4, that has bearings in a bracket 5, secured to the back of the end portion of the batten. The shaft 4 carries an arm 6, rigidly secured thereto and provided with a pin 7, engaging a slot 8 in a lever 9, said lever being fulcrumed in a bracket 10, suspended from a portion of the adjoining end frame of the loom. The pin 7 is arranged in a slot 11 of the arm, so as to be adjusted therein. The lever 9 is actuated

from the shaft *g* through the medium of a slotted cam 12, secured on said shaft, its slot being engaged by a pin on the lever. It will be observed that the connection between the arm 6 and the lever which is afforded in the slot 8 and pin 7 is provided so that the batten may swing unobstructed by said lever, the connection at the same time being such a one that the movements of the lever are effectively transmitted to the arm.

13 is a horizontal bar which is sustained above the batten *u* by means of uprights 14 and pairs of vertical strips 15. The reeds 16 are secured in position between the members of these several pairs of strips, as shown in Fig. 4 or Fig. 5. The upper surface of this bar is provided with a longitudinal slot 17, and in said slot is arranged in proximity to and each side of each reed a small pulley 18. The weft-thread or filler is taken from bobbins 19, arranged on the beam *d*, through pairs of openings 20, disposed in the bar intermediate the reeds, and thence extending the one in one direction and the other in the other direction over the pulley 18 and thence downwardly through orifices 21 in said bar to the filler-carrying needles. Said needles are designated by the reference character 22, and, as seen in Fig. 10, they consist of an L-shaped piece of metal secured to the bars *v*, with their shank portions 23 extending those on one bar in one direction and those on the other bar in the other direction, but all in the same plane. Each needle has two eyes, the one, 24, at the rear end of its shank and extending horizontally and the other, 25, at the forward end of its shank and extending vertically. The thread extends first through the eye 24 and then through the eye 25.

Between the openings 20 and the pulleys 18 each filler or weft-thread extends over a series of pins 26, bridging the slot in the bar 13 and alternating with the fingers 27 of a forked lever 28, which is fulcrumed upon a bracket 29, projecting rearwardly from the bar, and the adjustment of which may be effected by a weight 30, which its free end carries. Each forked lever and series of pins together constitute a tension device for the thread.

31 designates rods which are fulcrumed upon the top of the beam *c* and project rearwardly, resting in notches 32, formed in the top of the bar 13. Between each tension device and the orifice each weft-thread extends over the corresponding rod 31, being adapted to be engaged by a projection 33. The action which the rods 31 is adapted to exert upon the filler will be hereinafter explained.

In order to stop the working of the loom should a thread break, I have provided a series of push-rods 34, mounted in brackets 35, which the beam *c* carries, and actuated by springs 36. The inner end of each push-rod is provided with an enlargement or head 37, being adapted to be engaged by the adjoining forked lever 28 in case the corresponding

thread should break, while the outer or free end of said push-rod is adapted to engage the enlarged end 38 of one of a series of arms 39, projecting from a rock-shaft 40, which is journaled in brackets 41, mounted on the beam *c*. A crank 42 on the end of the shaft 40 is connected to the pawl *p*, above described, through the medium of a cord or other flexible connection 43, passing over suitably-arranged pulleys 44.

The beams *d* and *e* are connected by a series of parallel plates 45, arranged opposite the several reeds, and resting on said plates and adapted to reciprocate thereon are carriages 46, each carriage having longitudinal slots 47, penetrated by pins 48, mounted in the corresponding plate, so as to be guided on said plate. The several carriages are connected together by means of a transversely-extending strip 49, which has a slot-and-pin connection 50 with the upper ends of levers 51, that are fulcrumed in the end uprights *b* of the loom-frame. These levers are vibrated by means of slotted cams 52, with the slots of which pins 53 54 on the levers engage. To the forward end of each carriage is adjustably secured a pair of small plates 55, and upon these plates is in turn adjustably secured a pair of blocks 56. In said blocks are fulcrumed the rear ends of the looping-needles 57. Each looping-needle is perfectly flat, as best shown in Fig. 11, and it is provided near its middle portion with an upwardly-extending spur or hook 58. The needle extends through the reed, preferably between the second and third dents thereof, (there being, of course, two of these needles, one at each side of the reed and arranged to correspond and cooperate with the filler-carrying needles,) and its free end is maintained for true reciprocation in a guiding-arm 59, which projects rearwardly from the beam *c* and a projection 60 of which it penetrates. There is, of course, a pair of these guiding-arms for each pair of looping-needles, as best shown in Fig. 3.

Between each pair of guiding-arms is disposed a bracket 61, having a slot 62, through which the finished goods 63 is adapted to extend before passing over a bar 64.

Any suitable let-off mechanism 65 may be employed. That which I have shown in the accompanying drawings is a let-off mechanism of the construction patented to Otto W. Schaum under Letters Patent No. 625,206, of May 16, 1899. Likewise any suitable take-up mechanism is employed. The take-up mechanism shown in the drawings consists of a beam 66, upon which the cloth is wound and which is rotated by a train of gearing 67, controlled by a ratchet 68, which is in turn actuated by one of the lay-swords 69 through the medium of a pitman 70 and an arm 71, that is rigidly secured to said ratchet.

72 is the harness, the same being adapted to be controlled by any suitable shedding mechanism.

The operation of the loom is as follows: As shown in the drawings, the batten is in its forward position, the reeds having just beaten up the weft. Just before the beating-up occurred the looping-needles withdrew, releasing the loops which they had coacted, with the filler-carrying needles, to form. As the batten recedes, therefore, so do the looping-needles, the latter, however, keeping slightly in advance in the receding movement of the former. When the batten has reached its rearward position, then the filler-carrying needles enter the sheds, which have meantime been formed in the several warps by the harness 72, and as they approach the limits of their advanced movements the spurs of the looping-needles (which now move forward, again beginning the return movement ahead of the batten) are projected through the reeds, coacting with said filler-carrying needles to produce the loops in the manner seen in Fig. 11. Having looped the threads on the spurs of the looping-needles, the other needles quickly withdraw from the sheds under the actuation of the oscillatory lever *z*. The action of the filler-carrying needles consists of intermittent and properly-timed thrusts occurring, as stated, at the time when the batten is retracted. The batten now begins again to move forward. Simultaneously, of course, as the batten advances the looping-needles advance, keeping a little ahead of the former until just before the time for the reeds to beat up the loops maintained by said needles, whereupon the latter again begin their return movement, the consequent movement of the reeds and looping-needles in relatively opposite directions resulting in slipping the loops off the spurs of the latter. The action of the looping-needles so that they may properly coact with the batten and the filler-carrying needles is of course dependent upon the shape of the cams 52, which actuate said needles through the medium of the levers 51, the bar 49, and the reciprocary carriages 46, upon which said needles are mounted. As fast as the goods is produced it is of course wound on the take-up roller 66 by the action of the take-up mechanism, which, like the let-off mechanism, is being meanwhile actuated. The crossing of the warp-threads in changing the sheds occurs between the time when each beating up is effected and the time when the needles 22 begin to again carry the filler through the sheds and the loops are formed therein. The needles 22 draw off from the bobbins the necessary amount of filler each time they retract. This is because in their rest positions—*i. e.*, that shown in Fig. 4—their eyes 24 are farthest from the orifices 21 in the bar 13. The filler taken off is maintained taut by the coacting forked levers 28 and pins 26. However, should a thread break, the next time the batten swings back the corresponding forked lever will drop and engage the interposed push-rod 34, effecting the shifting of the driving-belt in the

manner set forth. The looping-needles being disposed so as to penetrate the reeds two or three dents from the side edges of each of them, it will be seen upon a view of Fig. 11 that when the shed is open the looping-needles each extend between two of the corresponding threads near the edges of the warps, the spurs of said needles being in the openings formed by the sheds. Now as each spur 58 has appreciable vertical thickness, when the looping-needle retracts, since the latter is close to the edge of the warp, the extreme end portion of the loop is left protruding from the goods after the loop has been beaten up. The series of these extreme projecting portions of the loop is what goes to make up the selvage of the goods.

In order to insure evenness and uniformity in the selvage, the rods 31, which have been already described, exert pulls upon the threads, so as to withdraw from the shed the superfluous portion of the filler.

If desired, of course, the shifting-fork may be operated manually, in which case the rock-shaft 73, which carries said fork at one of its ends, may carry a vertically-extending lever 74 at the other of its ends, to which is connected a sliding rod 75, movable in brackets 76, mounted in the front portion of the loom.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a loom, the combination of a reed, a looping device projecting substantially in the direction of longitudinal extension of the warp and toward the finished goods, and carrying means, one for the reed and the other for the looping device, movable each independently of the other, said looping device being disposed close to the reed, and the reed being movable relatively to the looping device to bring its front face in advance, and to the rear, of the extremity of the looping device, alternately, substantially as described.

2. In a loom, the combination of a reed, a looping device projecting substantially in the direction of longitudinal extension of the warp and toward the finished goods, and carrying means, one for the reed and the other for the looping device, movable each independently of the other, said looping device being disposed close to the reed, and said reed and the looping device being movable with their carrying means in opposite directions to bring the front face of said reed in advance, and to the rear, of the extremity of the looping device, alternately, substantially as described.

3. In a loom, the combination of a reed, a looping device projecting through the reed substantially in the direction of longitudinal extension of the warp and toward the finished goods, and carrying means, one for the reed and the other for the looping device, movable each independently of the other, said reed and the looping device being movable with their carrying means in opposite

directions to bring the front face of said reed in advance, and to the rear, of the extremity of the looping device, alternately, substantially as described.

4. In a loom, the combination of a reed, looping devices having spurs and projecting through the reed substantially in the direction of longitudinal extension of the warp and toward the finished goods, and carrying means, one for the reed and the other for the looping device, movable each independently of the other, said reed and the looping device being movable with their carrying means in opposite directions to bring the front face of said reed in advance, and to the rear, of the extremity of the spur, alternately, substantially as described.

5. In a loom, the combination, with the frame comprising a horizontal beam and with warp-controlling mechanism, of a batten disposed near said beam, longitudinally-movable looping - needles having spurs and mounted independently of said batten, filler-carrying needles carried by said batten, the spurs of said looping-needles and the filler-carrying needles being adapted to coact, means for actuating said needles, and guiding means for said looping-needles engaging the same at one end and arranged on said beam, said needles being pivotally mounted at their other ends, substantially as described.

6. In a loom, the combination, with the frame comprising a horizontal beam and with warp - controlling mechanism, of a movable batten disposed near said beam, longitudinally-movable and horizontal looping-needles extending over and transversely of said batten and having spurs, filler-carrying needles carried by said batten and movable transversely of said looping-needles, the spurs of said looping-needles and the filler-carrying needles being adapted to coact, means for actuating the filler-carrying needles, guiding means for said looping-needles arranged on said beam and engaging the forward ends of said needles, and means for actuating said looping-needles connected to the rear ends thereof, substantially as described.

7. In a loom, the combination, with the frame comprising horizontal beams, and with warp-controlling mechanism, of a movable batten disposed between certain of said beams, longitudinally-movable and horizontal looping-needles extending over and transversely of said batten and having spurs, filler-carrying needles carried by said batten and movable transversely of said looping-needles, the spurs of said looping-needles and the filler-carrying needles being adapted to coact, means for actuating said filler-carrying needles, guiding means for said looping-needles arranged on a beam on one side of said batten, a carriage operatively guided on a beam on the other side of said batten, said looping-needles being connected to said carriage, means for reciprocating the car-

riage, and means for reciprocating the batten, substantially as described.

8. In a loom, the combination, with the frame comprising horizontal beams, and with warp-controlling mechanism, of a movable batten, longitudinally-movable and horizontal looping-needles extending over and transversely of said batten and having spurs, filler-carrying needles carried by said batten and movable transversely of said looping-needles, the spurs of said looping-needles and the filler-carrying needles being adapted to coact, means for actuating said filler-carrying needles, guiding means for said looping-needles arranged on one of said beams, parallel plates connecting the beams, a movable structure adapted to reciprocate on said plates, said looping-needles being connected to said movable structure, means for reciprocating said movable structure, and means for reciprocating the batten, substantially as described.

9. In a loom, the combination, with a frame comprising a horizontal beam and with warp-controlling mechanism, of a movable batten disposed near said beam, longitudinally-movable and horizontal looping-needles extending over and transversely of said batten and having spurs, filler-carrying needles carried by said batten and movable transversely of the looping-needles, means for actuating said needles, guiding means for said looping-needles mounted on said beam, said beam being arranged on one side of the batten, and supporting means for the looping-needles disposed on the other side of said batten, substantially as described.

10. In a loom, the combination, with the batten, of reciprocating bars arranged on said batten, an oscillating member, rods connecting said member and the bars, a shaft journaled in said batten, gearing connecting said shaft and said member, means for rocking said shaft, and needles carried by said bars, substantially as described.

11. In a loom, the combination, with the frame and with coacting filler-carrying and looping needles, of a reciprocating batten, a bar arranged on said batten, a drive-shaft, operative connection between said drive-shaft and said needles and the batten, respectively, driving means for said shaft, thread-supplying means for said filler-carrying needles, thread-guides on said bar, a beam disposed parallel to the batten and constituting a portion of said frame, tension devices mounted on said bar, rods projecting from said beam and engaging the thread between said guides, a rock-shaft mounted on said beam and provided with projections, push-rods also mounted on said beam, adapted to be engaged by said tension devices and to engage the projections of the rock-shaft to actuate the latter, and means, controlled by rock-shaft, for disconnecting said shaft from its driving means, substantially as described.

12. In a loom, the combination, with warp-

controlling mechanism, of coacting looping and filler-carrying needles movable the one into operative proximity to the other to form loops of filler in the sheds of the warp, and means for actuating said needles, the loop-forming portion of the looping-needle being of appreciable thickness and being adapted, in forming the loops, to be disposed in proximity to and inside of the edge line of the warp, substantially as described.

13. In a loom, the combination, with a movable batten, a bar sustained on said batten, filler-carrying needles mounted on said batten, thread-supplying means, said bar having guides for the threads, and devices projecting from a stationary part of the loom and adapted to engage the thread between said guiding devices, substantially as described.

14. In a loom, the combination of a reed, a looping-needle, and carrying means, one for the reed and the other for the needle, movable each independently of the other, the point of said needle being adapted to be projected

through the reed and to have its protruding portion engaged by, and maintain, loops in the filler, and said reed being movable past the point end of said needle from the other end thereof, substantially as described.

15. In a loom, the combination of a reed, a looping-needle extending through the same and having a spur, and carrying means, one for the reed and the other for the needle, movable each independently of the other, the spur of said needle being adapted to be projected through the reed and to have its protruding portion engaged by, and maintain, loops in the filler, and said reed being movable past the point end of said spur from the other end thereof, substantially as described.

In testimony that I claim the foregoing I have hereunto set my hand this 30th day of January, 1900.

WILLIAM V. GEE.

Witnesses:

WM. B. HILT,

WINFIELD SUMMERS.