

(No Model.)

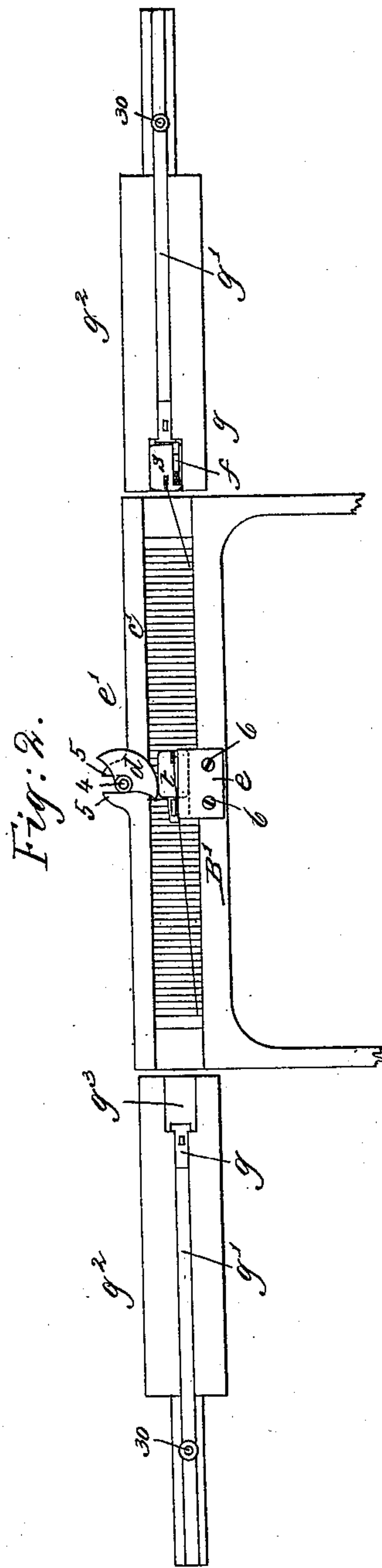
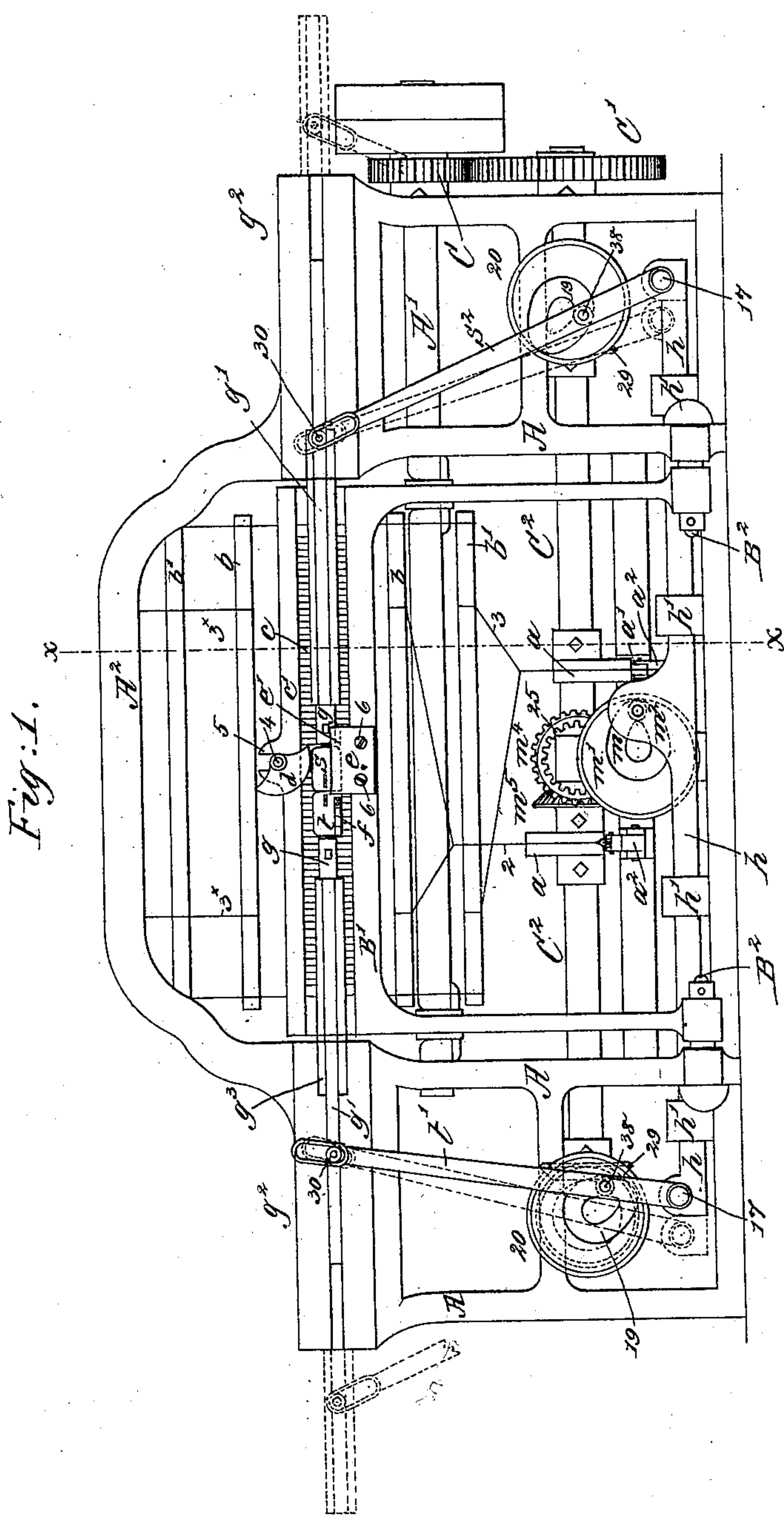
2 Sheets—Sheet 1.

B. SCARLES.

LOOM.

No. 364,860.

Patented June 14, 1887.



Witnesses.  
Fred L. Emery  
John F. C. Remondet

Inventor.  
Benjamin Scarles.  
By Crosby & Rogers attys

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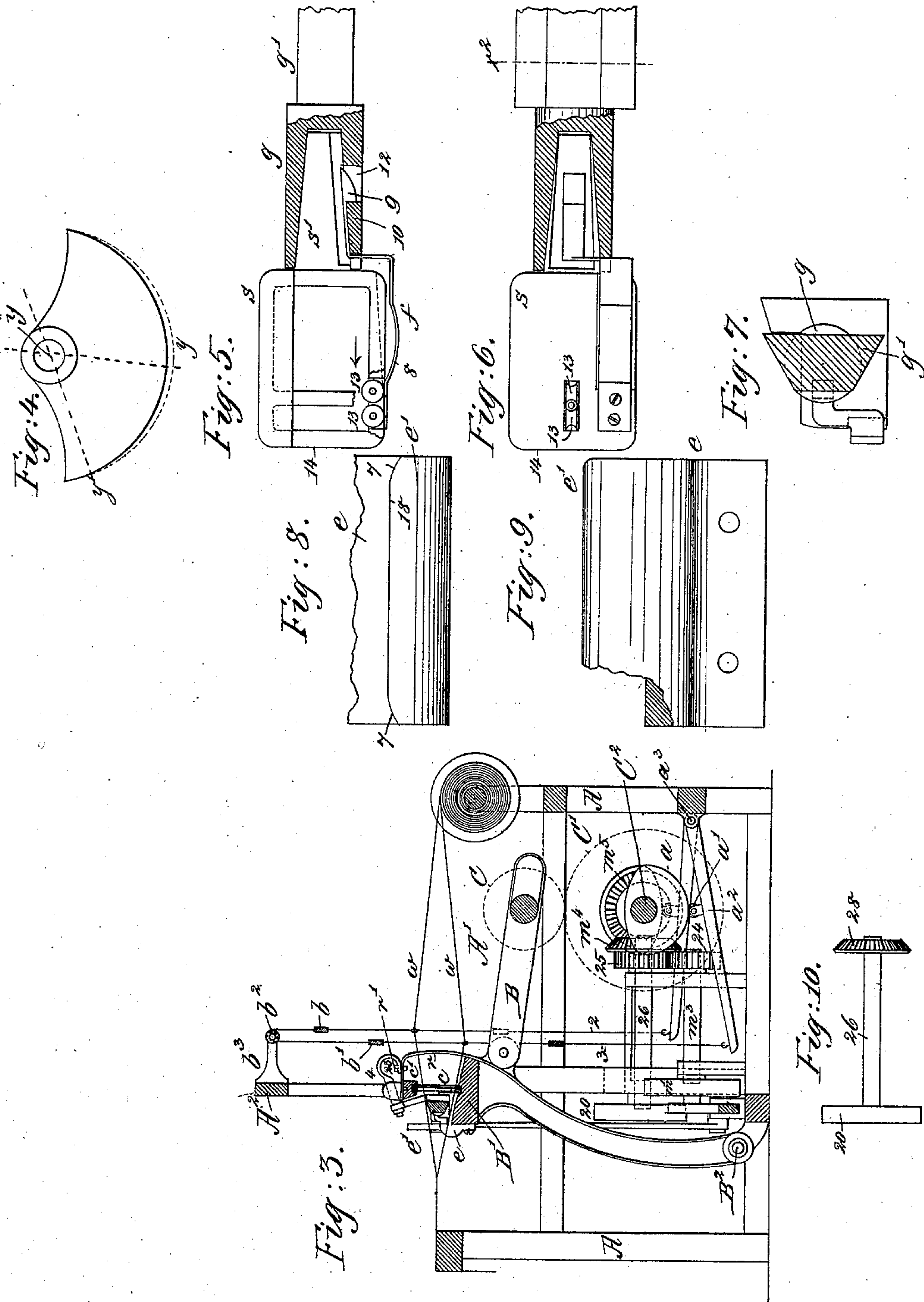
B. SCARLES.

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Witnesses.  
Fred L. Emery,  
John F. C. Brunsbach

Inventor.  
Benjamin Scarles.  
by Emily Gregory attys.



# UNITED STATES PATENT OFFICE.

BENJAMIN SCARLES, OF CLINTON, MASSACHUSETTS, ASSIGNOR TO THE  
CLINTON WIRE CLOTH COMPANY, OF SAME PLACE.

## LOOM.

SPECIFICATION forming part of Letters Patent No. 364,860, dated June 14, 1887.

Application filed August 30, 1886. Serial No. 212,186. (No model.)

*To all whom it may concern:*

Be it known that I, BENJAMIN SCARLES, of Clinton, county of Worcester, and State of Massachusetts, have invented an Improvement in Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

The loom made the subject of the invention to be herein described has a lay and each side of the frame-work a shuttle-box, two levers or picker-sticks—one at each side of the loom-frame—and operating-carriers, whereby two shuttles are actuated positively one at each side of the loom, the said shuttles being alternately inserted into and then withdrawn from a central shuttle-box located at or near the center of the length of the lay, provided the two pieces of cloth to be woven are to be of the same width, my invention being especially applicable for weaving wire-cloth. The application of a shuttle-box to the lay between the usual shuttle-boxes at its ends also enables me to utilize broad looms for weaving two narrow fabrics, each fabric having two well-finished selvages. A woven-wire fabric having a regular selvage at each edge is much more serviceable than a fabric with but one selvage, such as is commonly produced by weaving a fabric on a broad loom and then splitting it longitudinally into two fabrics. In accordance with my invention, as herein embodied, each shuttle as it is inserted into the central or intermediate shuttle-box acts to push the other shuttle then in it partially out, so as to be readily taken by its carrier, each carrier when inserting a shuttle into the intermediate box traveling a little farther than when about to take a shuttle from the intermediate box, the difference in the length of the stroke of the carrier for such purpose being made by shifting the fulcrum of the levers or picker-sticks which actuate the said carriers, as will be described.

The novel features above described, and forming the subject of my invention, will be hereinafter described more fully, and be specifically pointed out in the claims at the end of this specification.

Figure 1 in front elevation represents a loom embodying my invention, the breast-beam

and front part of the loom-frame being broken out; Fig. 2, a detail and partial elevation taken from the front of the loom chiefly to show part of the reed, the intermediate shuttle-box, a shuttle therein, the shuttle-holder, and the shuttle-boxes at the ends of the lay, and the carrier to move the shuttle, the carrier at the right hand of Fig. 1 having a shuttle. Fig. 3 is a section of Fig. 1 in the dotted line  $xx$ . Fig. 4 is an enlarged detail of the shuttle-holder, the dotted line therein indicating part of a true circle; Fig. 5, a top or plan view of one of the shuttles, partly broken out, together with a part of one of the carriers. Fig. 6 is a front elevation of the devices shown in Fig. 5. Fig. 7 is a sectional detail in the line  $x^2$  of Fig. 6, looking toward the left. Fig. 8 is a top or plan view of a portion of the intermediate shuttle-box, which is open at both ends; Fig. 9, a front elevation of the intermediate shuttle-box; and Fig. 10 is a detail of one of the cam-disks, its shaft, and attached gear for actuating one of the picker-sticks or levers.

The frame-work A, of suitable construction to support the working parts, has a lay or crank-shaft, A', upon which is mounted usual fast and loose pulleys, (see Fig. 1,) to receive a belt upon which to rotate the crank-shaft, and through the links B vibrate in usual manner the lay B', pivoted at B<sup>2</sup>. The crank-shaft has fast upon it a toothed gear, C, which engages a toothed gear, C', on the cam-shaft C<sup>2</sup>, provided with cams  $a$ , which act upon rolls  $a'$ , mounted upon levers  $a^2$ , pivoted at  $a^3$ , there being two such cams and levers, one lever being attached by usual cording, 2, to a harness-frame,  $b$ , while the other lever is attached by usual cording, 3, to a harness-frame,  $b'$ , the said harness-frames being joined by cording 3<sup>x</sup>, passing over suitable rolls,  $b^2$ , on brackets  $b^3$ , supported upon an arch, A<sup>2</sup>, at the top of the frame-work, the said harness-frames having usual heddles provided with eyes for the reception of the warp-threads  $w$ , the said harness-frames forming the shed in the warp-threads for the passage of the shuttle or shuttles, to be described, the two harness-frames herein shown being capable of manipulating the warps for what is known as "plain weav-



ing." The warp-threads come from one or more beams or spools, supported in usual manner at the rear side of the loom-frame.

The shed-forming mechanism, hereinbefore described, and the mechanism for moving the lay are not of my invention, and, instead of being made as shown, may be of any other usual or suitable construction, according to the class of material to be woven.

Herein I have shown my invention as applied to the weaving of wire-cloth, a class of cloth for which my invention is especially applicable; but I desire it to be understood that my invention might be employed in weaving fabrics of other material than wire. The lay B' has a reed, *c*, held therein in usual manner. Near the center of the lay I have erected an arm, *r*, which is extended over the top of the reed and rests upon or is secured to its cap *c'*. The arm *r* has secured to it by a screw, *r'*, a spring-arm, 4, upon the front end of which is loosely pivoted the shuttle-holder or check *d*, consisting of a cam shaped plate, (see Figs. 1, 2, 3, and 4,) the periphery of which is normally kept pressed toward the race of the lay by means of the said spring 4, lateral movement of the spring being prevented by the projections 5 rising from the reed cap *c'*. This holder is so mounted upon the spring-arm 4 that when permitted to do so it will gravitate into the position shown in Fig. 4—that is, it will hang with its points in the same horizontal plane. Viewing Fig. 4, it will be noticed that the holder is of shorter radius in the line *yy* than in the line *yy'*, so that as the said holder is turned by contact against it of a shuttle, the periphery of the holder of greater radius will come gradually into contact with the shuttle and act as a brake to stop the shuttle at a certain spot in the said box.

To the lay, and, as herein shown, near its center, I have attached by screws 6 an intermediate shuttle-box, *e*, it being made as a plate to embrace the front edge of the race of the lay, and when desired the said plate may be shaped to extend partially over the race of the lay. A portion of the said plate is extended upward, as at *e'*, to constitute a wall or flange, against which the front of the shuttle may bear, to prevent the same flying off the front side of the race of the lay, the rear side of the shuttle acting against the front side of the reed. The intermediate shuttle-box, *e*, referred to, is open at both its ends, and is located directly below the holder *d*. The wall or flange *e'* of the intermediate shuttle-box is beveled, as at 7, to act upon the curved part 8 of the spring-latch *f*, as the shuttle *s* enters one end of the said intermediate box, thus pushing in or backward the said latch, (shown as out or forward in Fig. 5,) until the hooked part 9 of the latch is pushed in far enough to be disengaged from the shoulder 10 of the socket-head *g* of the carrier, the said shoulder being formed by cutting a recess, 12, in the said socketed head. The carrier is composed of a socketed head, *g*, and a rod, *g'*, the socketed head being pref-

erably cylindrical externally, whereas the rod is of dovetailed shape in cross-section, as best shown in Fig. 7, the rod entering a correspondingly-shaped guide in a guide-plate, *g''*, provided at its end next the lay with a recess or chamber, as *g'''*, which constitutes a shuttle-box or receiver for the shuttle when the carrier is thrown outwardly, as represented by dotted lines in Fig. 1, the shuttle at such time being drawn into the said recess outside of and beyond the ends of the lay. The shuttle *s*, herein shown, has usual delivery-rolls, 13, at its front side, between which passes the wire or other material contained upon a suitable cop or ball of usual construction, supported in usual manner within the frame of the shuttle, the said cop or ball being omitted because not of my invention. The shuttle *s* has at but one of its ends a projecting arm, *s'*, preferably of conical shape, as shown in Figs. 5 and 6, the said arm entering a conical hole in the socketed head *g* of the carrier, one side of the said arm being grooved in the direction of its length to permit the latch *f* to be pushed back into it when it is desired to release the latch from the socketed head *g* of the carrier.

Prior to my invention carriers such as described and shuttles, substantially such as described, but provided at both ends with an arm or projection, *s'*, and a latch to be engaged by the carrier, have been used, one carrier, however, taking the shuttle directly from another carrier at or near the center of the lay in the shed. Herein it will be noticed that the inner end of each shuttle *s* is left to present a flat end or wall, 14, which may be abutted against the corresponding inner end of another shuttle, *t*, held in the intermediate shuttle-box, *e*, by the holder *d*.

Referring to Fig. 1, it will be understood that the shuttle *s* is held by the holder *d* in the intermediate shuttle-box, and that the shuttle *t* has just struck against the shuttle *s*, the carrier *g'*, attached to the lever or stick *t'*, not yet having reached the full extent of its stroke. The farther movement of the stick *t'* to the right, with its attached carrier, will cause the shuttle *t* to push against and move the shuttle *s* to the right and force its projection or arm *s'* into the socketed head *g* of the carrier to receive it at the right of the loom, the movement of the shuttle *s*, by the blow against it of the shuttle *t*, being sufficient to carry the bulged part 8 of the spring-latch *f* beyond the straight inner edge, 18, of the intermediate shuttle-box far enough to permit the hooked part 9 of the spring-latch to move outward and engage the shoulder 10 of the socketed head placed there to receive the said arm *s'*, and thereafter the lever or picker-stick *s''* is moved to the right, viewing Fig. 1, taking with it the carrier *g'*, the socketed head thereof holding the arm *s'* and taking the shuttle *s* from the intermediate shuttle-box outward. The shuttle *t* will be moved to the right far enough to carry the spring-latch *f* past the round corner 7 and against the straight



edge 18 of the intermediate shuttle-box, *e*, which will cause the said latch to be pushed in, as described of the latch *f*, attached to the shuttle *s*, thus withdrawing the hooked latch 5 from its engagement with the socketed head *g* of the carrier *g'*, operating the said shuttle *t*. A shuttle having been disengaged from the socketed head carrying it into the intermediate shuttle-box, the carrier will be withdrawn as 10 the picker-stick is next moved outward or away from the loom-frame, but the shuttle will be left in the intermediate shuttle-box until pushed partially out of the said shuttle-box by a second shuttle. A new shed will be 15 formed after the outward movement of each picker stick or lever, after which the carrier will be again moved, so that the latter will pass through the new shed toward the intermediate shuttle-box to take a shuttle therefrom and 20 bring it back through the shed last formed. The picker-sticks *t'* and *s'* have their fulcrum upon a slide-bar, *h*, in the bearings *h'* at the bottom of the loom-frame, the said picker-sticks being pivoted upon the said slide-rod, 25 as at 17. Each picker-stick has at one side a roller or stud, 38, which enters a cam-groove, 19, in a plate or disk, 20, the cam-groove being of such shape (see Fig. 1) as to cause the said picker-sticks to be moved at their upper 30 ends for a distance sufficient to actuate the carriers and pass the shuttle through the shed in the warp and into the intermediate shuttle-box, as described, and back again.

From the foregoing description it will be 35 noticed that the carrier having a shuttle attached to it and passing from the outer end of the lay toward the intermediate shuttle-box has to have a movement sufficient not only to knock the shuttle from the intermediate box, 40 but also to carry the shuttle far enough into the intermediate box to enable the wall 18 of the latter to push inward the spring-latch and disengage the shuttle so being entered into the intermediate box from the carrier which 45 placed it there, so that the carrier could return without it. The carrier approaching the intermediate box to take a shuttle therefrom is not moved as far as when it approaches the intermediate box to leave a shuttle. This dif- 50 ference in the alternate throws of the carrier is provided for by sliding the bar *h* laterally in one and then in the other direction after each movement of the carrier, thus placing the fulcrum of the carriers in different positions 55 at different strokes, as indicated by the dotted lines in Fig. 1. The slide-bar *h* derives its movement from a cam-groove, *m*, in a disk, *m'*, the said cam-groove receiving a roller or other stud, *m''*, attached to the slide-bar. The 60 cam-disk *m'* is attached to a shaft, *m'''*, mounted in suitable bearing of the frame-work. The shaft *m'''* has fast to it a gear, 24, which is engaged and rotated by a gear, 25, secured to a bevel-gear, *m''''*, loose on a stud, (not shown,) the 65 said bevel-gear being engaged and rotated by a bevel-gear, *m''''''*, fast on the shaft *C*<sup>2</sup>. Each of the cam-disks 20 is secured to the front end of

a shaft, 26, one of which is shown in Fig. 3, each of the said shafts having at its inner end a bevel-gear, as 28, (see Fig. 10,) which is en- 70 gaged by a bevel-gear, 29, on the shaft *C*<sup>2</sup>. Each carrier *g'* at its rear end has a roller-stud, 30, which is embraced by the slotted upper end of the lever or picker-stick *t'* or *s'*.

In Fig. 1 the holder *d* is shown as acting 75 upon the shuttle *s*; but in Fig. 2 the holder is acting to hold the shuttle *t*.

In accordance with my invention the broad reed has the spaces between its dents filled with warp from the outer ends of the reed to 80 a point near the intermediate shuttle-box, *e*, and the two carriers are moved in the same direction and in substantially the same time, the length of the backward and forward stroke of each carrier being the same; but by shifting 85 the fulcrum 17 of the picker-sticks or levers *t'* *s'*, as described, their starting and stopping points are shifted without altering their length of stroke. As the two carriers approach the in- 90 termediate shuttle box, one carrier is without a shuttle; but the carrier having the shuttle to be left in the said intermediate box abuts against and knocks out of the said box the shuttle then in it far enough to permit 95 its spring-latch to fly out and engage the socket of the carrier that approached the intermediate shuttle-box empty to receive a shuttle. As the carriers move outwardly from the intermediate shuttle-box, one carrier 100 takes with it a shuttle, the other carrier comes away empty, the carrier to come away empty being the one that last delivered its shuttle to the intermediate box. A shed is made in the warp at each side of the shuttle- 105 box between each complete inward and outward stroke of each carrier.

In factories for weaving wire-cloth it frequently happens that orders are given for wire-cloth narrower than can be made on the 110 regular looms, the looms being usually made for wide widths of wire fabric. In such cases the wide widths are cut longitudinally, leaving one selvage and one raw edge. This latter edge is objectionable to many, for the wire 115 left at the raw edge has to be brought over to keep the woven wire in place. By my invention these wide looms may be altered at but little expense to weave narrow goods. To make this alteration, I have but to supply the 120 proper shuttles, place the intermediate shuttle-box at or near the center of the lay, and change what would be called the "picking" mechanism for moving the carriers, in order that they may be reciprocated different dis- 125 tances at alternate throws, to manipulate the shuttles, substantially as herein described, the holder being added to retain the shuttles in the intermediate boxes.

I have herein shown the holder as consist- 130 ing of a block somewhat segmental in shape, I having found a holder of the shape shown suitable for the purposes intended; but I do not desire to limit this my invention to a holder of the precise shape shown, for instead I may



employ any other equivalent device capable of holding the shuttle in like manner, it being understood that the chief object and purpose of the holder is to produce friction upon the shuttle and retain it in the intermediate shuttle-box at a point where it may be left by its carrier until the said shuttle is to be removed from the said intermediate shuttle-box.

I have herein shown and described mechanism for actuating carriers; but I desire it to be understood that instead of the mechanism so shown I may employ any other usual mechanism common to so-called "positive looms" to actuate the carrier or device for positively moving the shuttle into and from the shed.

I am aware that a patent describes a loom provided with a central shuttle-box containing a double-ended picker which is actuated by a centrally-located picker-stick; but the loom referred to does not contain carriers to move the shuttles positively, nor does it contain a holder to retain the shuttle in the box until it is again to be taken from the central shuttle-box.

I claim—

1. The lay and its intermediate shuttle-box open at both ends, a holder, and two shuttles, combined with two carriers, and means to actuate them, substantially as described, whereby each carrier at one movement is made to place a shuttle in the intermediate shuttle-box and to take it from the said shuttle-box at its next movement, substantially as described.

2. The lay and an attached intermediate shuttle-box and a holder to act upon the shut-

tle in the said box, the said shuttle-box having a curved surface, as at 7, and a shuttle having a spring-latch and a projection at one end, combined with a carrier having a socketed head to embrace the said projection and to be engaged by the said spring-latch.

3. The lay, two shuttles, an intermediate shuttle-box attached to the lay and open at both ends, and a shuttle-holder to retain the shuttles therein in the position where they may be left by the carriers, combined with two carriers, and with means to move them, whereby the shuttles attached to the carriers may be made to abut, the one against and drive the other partially from the intermediate box, substantially as described.

4. The lay, its attached intermediate shuttle-box, two shuttles, and carriers to move the shuttles, as described, combined with the levers or picker-sticks, the sliding rod upon which they have their fulera, and with means to move the said rod and to actuate the said levers or picker-sticks upon their fulera, substantially as described, whereby the stroke of each carrier is alternately varied as to its starting and stopping point, for the purposes set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

BENJAMIN SCARLES.

Witnesses:

H. G. CARTER,

WM. MERRIAM.