

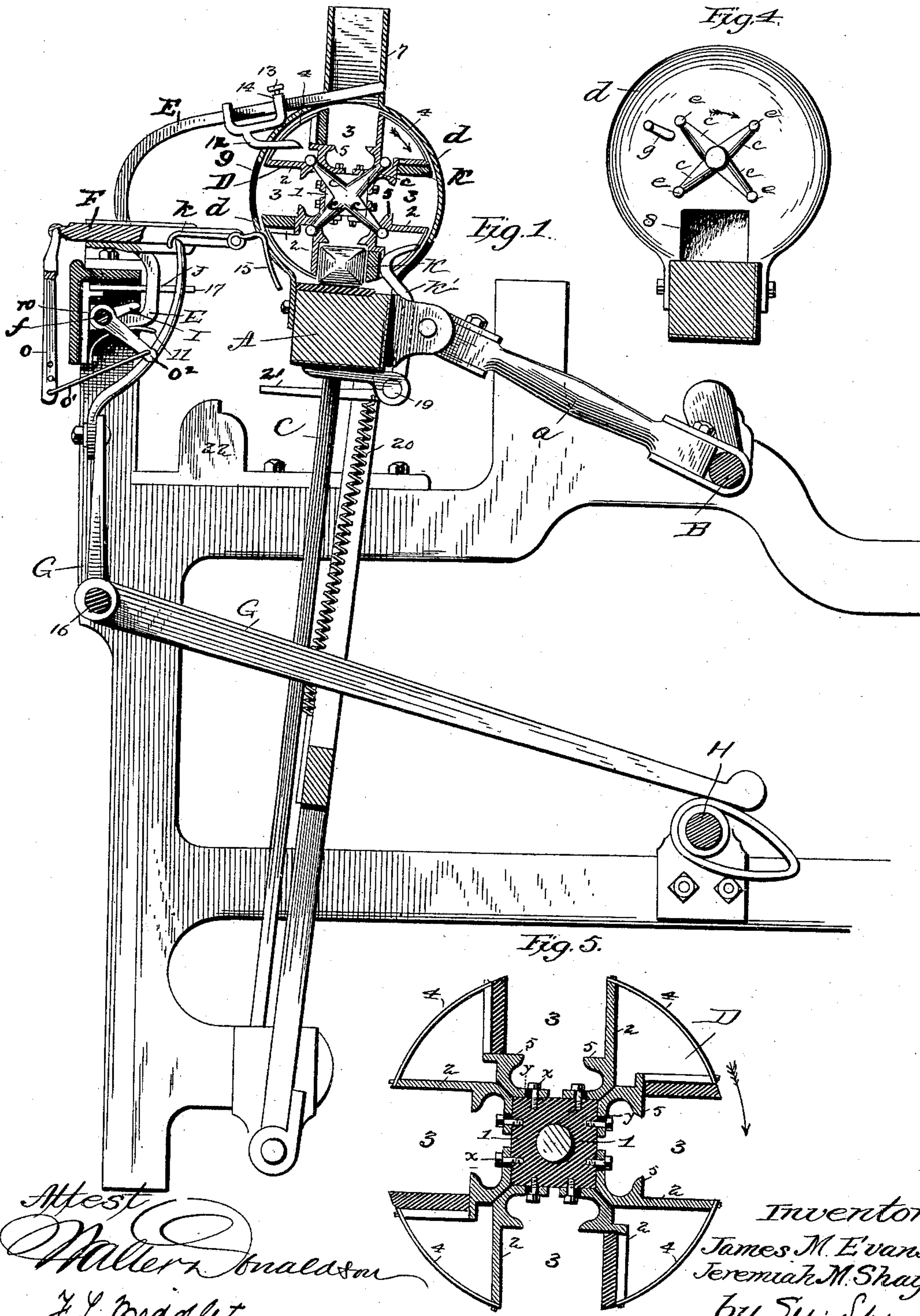
(No Model.)

2 Sheets—Sheet 1.

J. M. EVANS & J. M. SHAY.  
SHUTTLE SUPPLYING MECHANISM FOR LOOMS.

No. 409,282.

Patented Aug. 20, 1889.



Attest  
*Walter A. Baldwin*  
J. L. Middleton

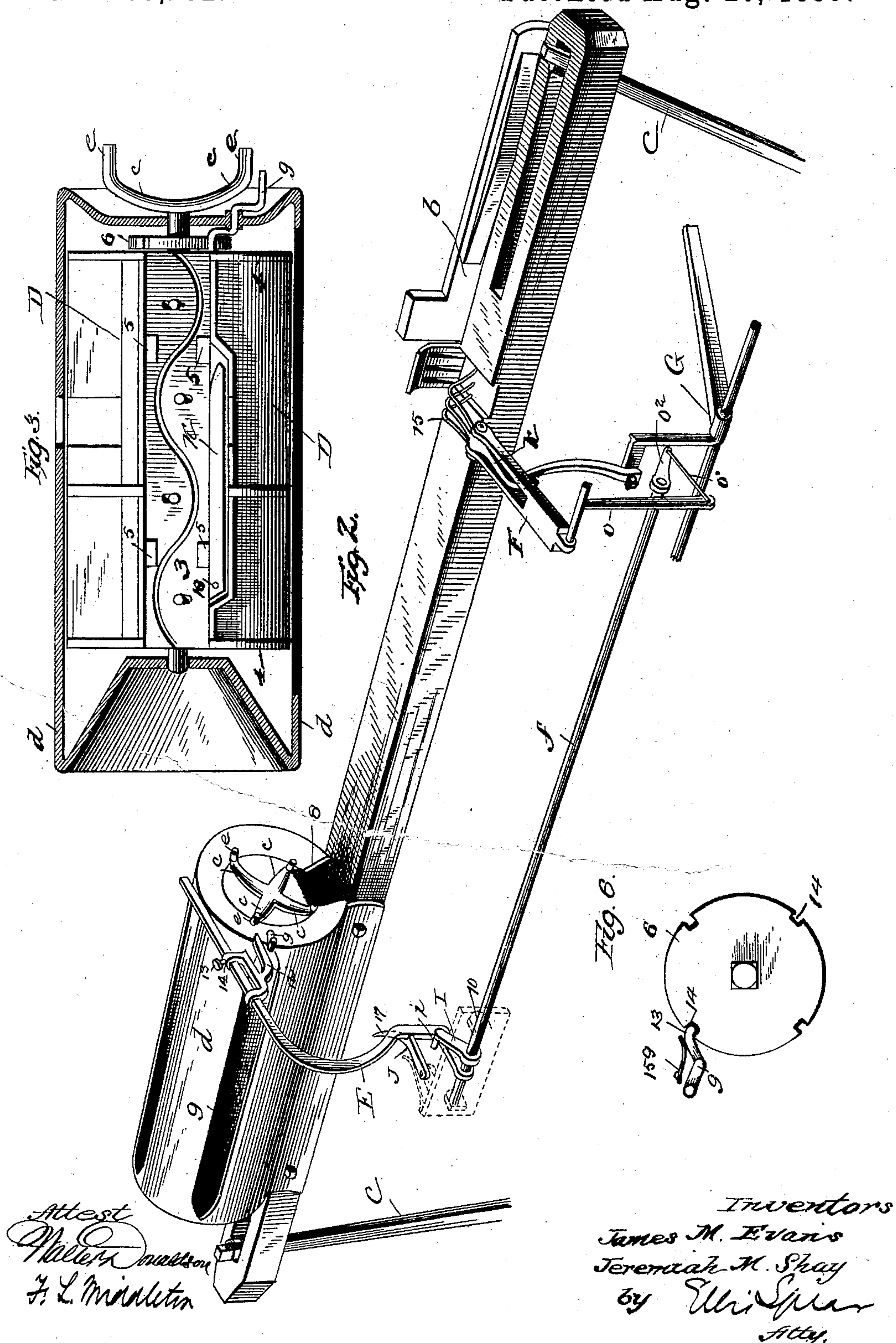
Inventors  
James M. Evans  
Jeremiah M. Shay  
by *Wm. Spear*  
Atty.



2 Sheets—Sheet 2.

No. 409,282.

Patented Aug. 20, 1889.





# UNITED STATES PATENT OFFICE.

JAMES M. EVANS, OF PROVIDENCE, RHODE ISLAND, AND JEREMIAH M. SHAY,  
OF FALL RIVER, MASSACHUSETTS.

## SHUTTLE-SUPPLYING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 409,282, dated August 20, 1889.

Application filed March 29, 1888. Serial No. 268,795. (No model.)

*To all whom it may concern:*

Be it known that we, JAMES M. EVANS, of the city and county of Providence, State of Rhode Island, and JEREMIAH M. SHAY, of Fall River, in the county of Bristol and State of Massachusetts, have invented a new and useful Improvement in Shuttle-Supplying Mechanism for Looms; and we do hereby declare that the following is a full, clear, and exact description of the same.

In the art of weaving as carried out with looms as now constructed the objection has been experienced that when the weft breaks or the cop of the shuttle becomes exhausted the warp will be drawn without the filling being thrown in unless the loom is closely attended and a fresh shuttle supplied at the proper moment by the hand of the operator.

Automatic operating devices have heretofore been devised for stopping the loom when the weft-thread breaks or becomes exhausted from the cop; but this only partially remedies the difficulty, as time is lost by this stoppage and the fresh shuttle has to be placed by the operator, who must closely attend the loom.

The object of the present invention is the provision of means capable of perfect automatic operation for the purpose of placing in proper position a fresh shuttle when the weft breaks or runs out, the said means being also operated and adapted to permit the discharge of the empty shuttle when the fresh one is being supplied to the shuttle-box.

It consists in the peculiar construction and arrangement of the receptacle by which the empty shuttle is discharged.

It further consists of a revoluble cylinder carried by the end of the lay, having compartments for receiving and containing the shuttles as they are fed thereto, and operating devices for moving said cylinder rotarily step by step, said devices being actuated automatically when the weft-thread breaks or becomes exhausted to partially rotate the cylinder for supplying a fresh shuttle to the box at the end of the lay.

The invention also includes holding devices for retaining the movable receptacle in the position to which it has been moved.

The details of construction relating to the movable receptacle, the various operating de-

vices, and their construction and arrangement also constitute a material part of this invention as enabling us to accomplish the desired end in a simple and practical manner.

In the drawings, Figure 1 is a vertical sectional view of a portion of a loom with the improvement in place. Fig. 2 is a perspective view of the lay-beam and some of its connected parts. Fig. 3 is a plan view of the cylindrical receptacle, the casing being in section. Fig. 4 is an end view of the cylinder-casing. Fig. 5 is a sectional view of the cylindrical receptacle. Fig. 6 is a detail view of a catch for holding the movable shuttle-box and the notched disk with which it engages.

In the drawings, A is the lay, B the crank-shaft, and *a* the pitman. The lay is of ordinary form, being provided with the ordinary race for the shuttle and being provided in the usual manner with picker-sticks C C for throwing the shuttle from side to side over the race and through the shed of the warp. At one end of the lay is an ordinary shuttle-box *b*, and at the other end and in place of the shuttle-box a rotating receiver or holder D for the shuttles is journaled in a casing *d*, the latter being securely fixed to the lay and surrounding the receiving and holding cylinder D. This receiver is composed of a central portion 1, the angular partition-strips 2, secured thereto by screws, as shown, to leave compartments 3, for receiving and holding the shuttles, and the strips 4, extending from edge to edge of these angular strips and secured to them.

The partition-strips 2 are provided with lugs or ledges 5, upon which the shuttles rest when in place, and these partition-strips are adjustable toward and from each other to provide compartments for larger or smaller sized shuttles. To permit this adjustment, the partitions are held by screws *x*, passing through slots *y*, Fig. 5. In the present instance four compartments are shown. At the end of the cylinder a head 6 is provided, which completes the detail construction of the cylinder. The casing *d*, which incloses the revolving cylinder, is provided with an opening in the top of about the same size as one of the compartments, and above this open-



ing a box 7 is placed, which contains the fresh shuttles and answers the purpose of a feed-box for the cylinder, and when the latter is in normal position one of its compartments will  
 5 be directly beneath the opening in the casing, and thus a shuttle may freely fall into position in the compartment, which is of such depth that only one shuttle can be contained therein at one time, the one above being sus-  
 10 tained so as not to interfere with the free rotary movement of the cylinder. While the cylinder is rotating the strips extending from one partition to the other keep the full shuttles in position within the box 7 until another  
 15 compartment registers with the opening in the top of the casing. The casing is secured by its lower edges to the sides of the lay-beam, and the lower portion of its end at 8 is cut out to form an opening for the passage of the  
 20 shuttle when the same is thrown by the picker-stick in the ordinary manner. Each movement of the cylinder is equal to a quarter-turn, and each time this is effected a compartment, with its shuttle, is brought directly  
 25 over the upper surface of the lay or race and in direct line with the picker-stick. At the same time that a fresh shuttle is presented in the box for the action of the picker-stick the empty shuttle, or the one with the broken  
 30 thread, as the case might be, is carried around a quarter-turn and presented to the slot 9 in the front of the casing for being discharged, as hereinafter described. The movement of  
 35 the receptacle to bring a full shuttle on the race is only necessary when the weft-thread breaks or becomes exhausted, and it is designed by the devices now to be described that this partial movement of the receptacle  
 40 shall be automatically performed by the movement of the machine at the proper moment to supply a new shuttle, and thus keep the loom running continuously without loss of  
 45 time, without the need of constant vigilance on the part of the operator, and without the liability of spoiling work.

On the end of the receptacle-journal is fixed a disk provided with four radial arms *c c*, the latter having at their outer ends projecting studs *e*. The studs are at equal distances  
 50 apart, and equidistant also from the axial line of the cylindrical receptacle.

Mounted in suitable bearings, as 10, under the breast-beam, is a rock-shaft *f*, and upon this is mounted loosely an arm *E*, which extends upwardly and to the rear above the path  
 55 described by the studs on the radial arms *c c* as the lay moves back and forth. This arm is held normally upward by means of a spring 11, secured to the breast-beam.

Upon the rearward extension of the arm *E* a projecting finger 12 is adjustably secured by the set-screws 13, passing through one of the loops 14. This finger projects to the rear  
 60 in approximately a horizontal plane, and when the arm *E* is in its normal or upward position the finger is above the path which is described by the pins on the radial arms *c*

when the lay moves. The pins are therefore not engaged or moved by the finger as the lay beats forward. At this time the filling or weft  
 70 thread is being properly thrown in and the cylinder remains stationary. When, however, the thread breaks or becomes exhausted, the arm is thrown down automatically by connections to the moving parts of the loom, as  
 75 will now be described, and the finger is brought into line with the pin on the first radial arm, and by its engagement therewith turns the cylinder in the direction of the arrow as the  
 80 lay beats forward sufficient to cause a quarter-turn of said cylinder and consequently the removal of the exhausted shuttle and the placing of the full shuttle in the shuttle-box at the end of the race. This movement of  
 85 the receptacle, which in the present case equals a quarter-turn, is accomplished as the lay completes its forward beat, and the fresh shuttle is then in position to be struck by the picker-stick. The same movement presents  
 90 the empty shuttle to the opening in the side, and the inertia of the shuttle causes its discharge when the lay changes its direction of movement. At the same time also the empty compartment of the receptacle is brought directly beneath the box 7 and a fresh shuttle  
 95 drops into place.

The movable receptacle is retained in exact position by means of a catch *g* provided in the casing, and extending inwardly  
 100 so that its end 13 may engage with notches 14 in the edge of the disk or head 6 of the cylinder, being held therein by means of any suitable spring 159. The notches are situated a quarter-turn distant from each  
 105 other, and they are positioned in relation to the compartments, so that when either is engaged by the end of the catch the compartments will be in position to place, discharge, and receive shuttles. The outer end of the  
 110 catch is provided with a pin projecting in line with the movable arm *E*, so that when the arm is depressed the first effect will be the release of the cylinder from the catch by the movable arm depressing the outer end  
 115 and lifting the inner end from the notches. The cylinder will then be given a quarter-turn as the lay continues its forward beat by the pin on the radial arm engaging with the finger.

The means for operating the arm *E* automatically at the proper moment may be of any desired form and arrangement; but we have shown herein a simple and effective  
 120 way for accomplishing the purpose. At one side of the breast-beam a plate *F* is supported so as to be allowed sliding movement. It is in connection, by means of the arm *o*, rod *o'*, and arm *o''*, with the rock-shaft. The rear end of said plate *F* pivotally supports weft-fingers 15, which depend into range with the  
 125 weft-thread at a point outside the line of the warp-threads. These weft-fingers are provided with an extension *k*, the hooked end of which when in normal position is in range  
 130



with the upper end of a bell-crank lever G, pivoted at 16, which is operated by a cam H, Fig. 1. When a full shuttle is in the loom and the thread extends across the race, no movement of the rock-shaft will take place as the thread strikes against the depending weft-fingers 15 as the lay beats forward, and by tilting said fingers on their pivots causes the hooked extension to be raised out of the path of the constantly-operating bell-crank lever G, which moves forward without effect. When, however, the weft-thread is absent from the race by reason of breakage or the shuttle becoming exhausted, the extension of the fingers will remain in normal position and the bell-crank lever will engage therewith, slide the plate F forward, drawing upon the connections and partially rotating the shaft. On this shaft, beside the arm E, is fixed an arm I, having a extension i, which, when the shaft is turned, engages with the arm E and moves it against the force of its holding-spring 11 until the finger carried thereby is brought into range with the radial arms on the cylinder, in which position it is held by a spring-actuated catch J, which snaps into action at this time. The finger 12 on the arm E now performs its functions of first releasing the cylinder and then turning it. The lay, as it completes its final beat forward, strikes against the extension 17 of the catch J and releases the arm E, which is free to rise to its normal position when the finger becomes disengaged from the radial arm as the lay moves rearwardly. It will be understood that these operating-connections from the cylinder to the operating parts of the loom may be varied as mechanical skill may dictate; but the spirit of this invention will not be departed from by such changes. For instance, we may employ a pinion instead of the radial arms on the cylinder, and provide the arm E with ratchet-teeth. Each compartment of the cylinder is provided with a binder K, pivoted at 18. A lever K' is arranged to press these levers inwardly in the usual manner, and the cylinder-casing is formed with an opening to admit the end of said lever. The action of this lever does not differ from that well known to those skilled in the art. It is mounted on a rock-shaft at 19, under tension of spring 20, and provided with horizontal arm 21. When a shuttle is on the compartment, the pivoted binder-arm is pressed outwardly and the upper end of the lever is forced and held back, so that the horizontal arm 21 will be elevated against the spring force and thus be out of line with the sliding plate 22, which may have any well-known connections to the belt-shifting mechanism. (Not shown herein.) Should the compartment be empty for any reason, however, there will be no resistance to the spring, which will now draw down the horizontal arm 21 into line with the shifting-plate, and as the lay beats forward the plate will be moved, shifting the belt through any well-known

connections (not shown) and thus stopping the loom. A box may be provided on the breast-beam for receiving the discharged shuttles.

We claim as our invention—

1. In combination, a movable receptacle for holding the shuttles carried by the lay, a movable operating-arm at the breast-beam, weft-fingers, operating devices for acting upon the weft-fingers, connections from said weft-fingers to the movable arm for changing the position of the same when the weft-thread breaks, and an operating device in connection with the movable receptacle, whereby, when the position of the movable arm is changed, a part of said operating device will be in line therewith and will be moved to operate the shuttle-box by contact with the movable arm at the breast-beam.

2. In combination, a movable receptacle for holding the shuttles carried by the lay, a movable operating-arm at the breast-beam, weft-fingers, operating devices for acting upon the weft-fingers, connections from said weft-fingers to the movable arm for changing the position of the same when the weft-thread breaks, and an operating device in connection with the movable receptacle, whereby, when the position of the movable arm is changed, a part of said operating device will be in line therewith and will be moved to operate the shuttle-box by contact with the movable arm at the breast-beam, and a catch for holding the receptacle in its moved position, said catch being positively operated when the movable arm is thrown into operative position.

3. In combination, a movable receptacle for holding the shuttles carried by the lay, an operating-arm E at the breast-beam for moving the receptacle, the weft-fingers, operating devices for acting upon the weft-fingers, and connections between said weft-fingers and the operating-arm, whereby the receptacle will be moved as the lay beats forward when the weft-thread breaks, substantially as described.

4. In combination with the lay, a cylindrical receptacle for holding the shuttles carried by said lay, an operating-arm on the breast-beam for moving the receptacle, weft-fingers, connections between said fingers and arm operated automatically for causing the arm to rotate said receptacle when the weft-thread breaks, and operating devices for the weft-fingers, substantially as described.

5. In combination with the lay, a movable receptacle for the shuttles, the arm E, and a catch for holding the receptacle in its moved position, said catch being in position to be struck by the arm when it operates, substantially as described.

6. In combination, the lay, the cylindrical receptacle provided with compartments, and the casing extending around said receptacle for completely inclosing the same, said cylindrical receptacle being provided with an



opening at the top and bottom, substantially as described.

7. In combination, the lay, the movable receptacle having the radial arms, the arm E  
5 on the breast-beam provided with the finger, the weft-fork, operating devices therefor, and the automatically-operating connections between the arm E and the fork, substantially as described.

10 8. In combination, the lay, the movable receptacle, the operating device c, the rock-shaft, the arm E, loosely mounted on the rock-shaft, the spring, the arm on the rock-shaft adapted to engage with the arm E, the catch,  
15 and the weft-fingers and connections for moving the rock-shaft.

9. In combination, the revoluble cylinder

having a series of compartments for the shuttles, each compartment having a binder-arm, the casing inclosing the cylinder and having  
20 openings in its top, front, bottom, and rear, and a lever having its end extending through the opening in the rear and bearing upon the binder-arms in succession, substantially as  
25 described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JAMES M. EVANS.  
JEREMIAH M. SHAY.

Witnesses:

EDWARD McDONALD,  
AMOS J. DAWLEY, Jr.