(No Model.) 3 Sheets—Sheet 1.

J. E. & E. ATWOOD & E. E. BRADLEY.

SHEDDING MECHANISM FOR LOOMS.

No. 346,574. Patented Aug. 3, 1886.

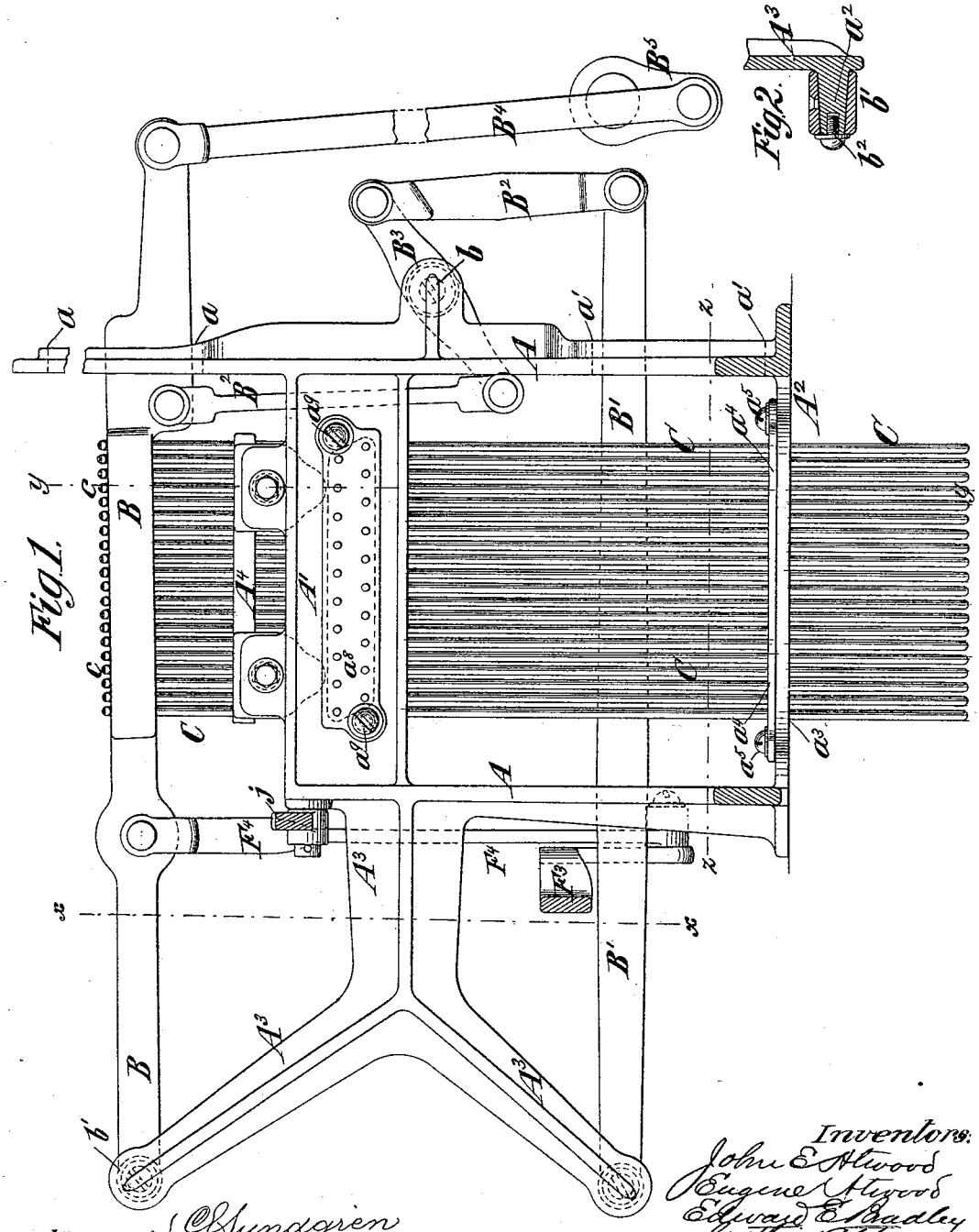

Fig. 1.

Fig. 2.

Witnesses:
C. L. Sundgren
Emil Kettes

Inventors:
John E. Atwood
Eugene Atwood
Edward E. Bradley
by their Attys
Brown & Seal

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J. E. & E. ATWOOD & E. E. BRADLEY.

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Fig. 3.

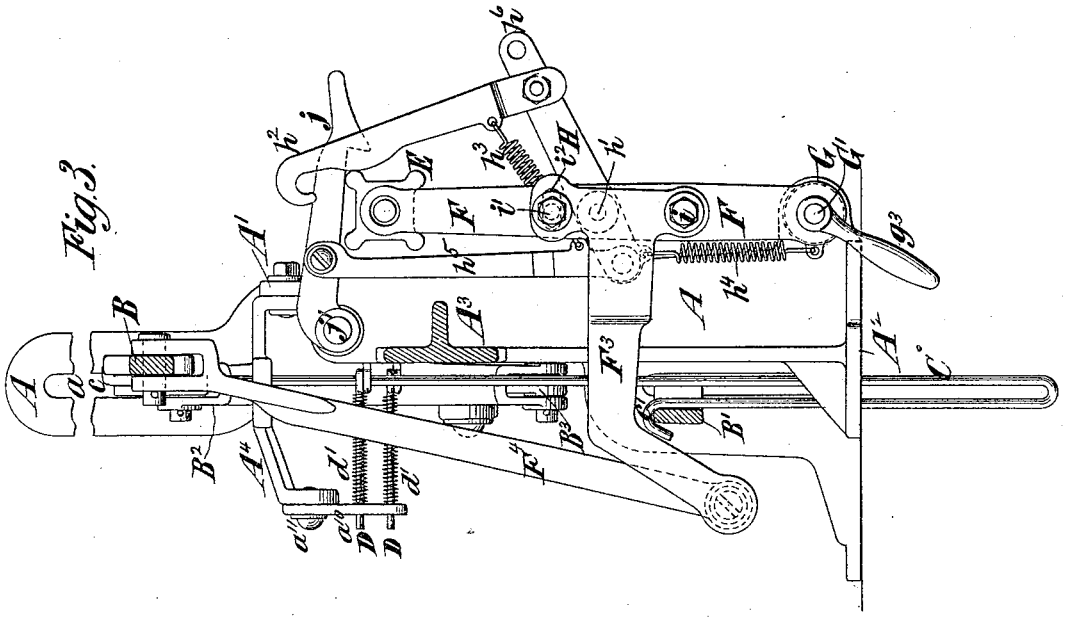
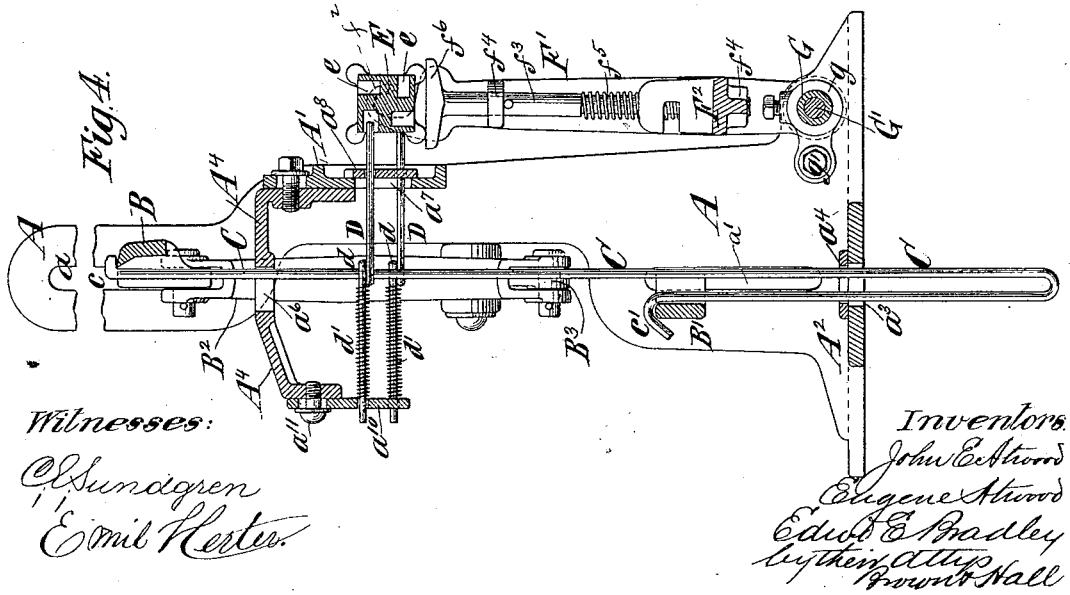


Fig. 4.



Witnesses:
C. L. Sundgren
Emil Herter.

Inventors.
John E. Atwood
Eugene Atwood
Edwd E. Bradley
by their attys
Brown & Hall

(No Model.) 3 Sheets—Sheet 3.

J. E. & E. ATWOOD & E. E. BRADLEY.

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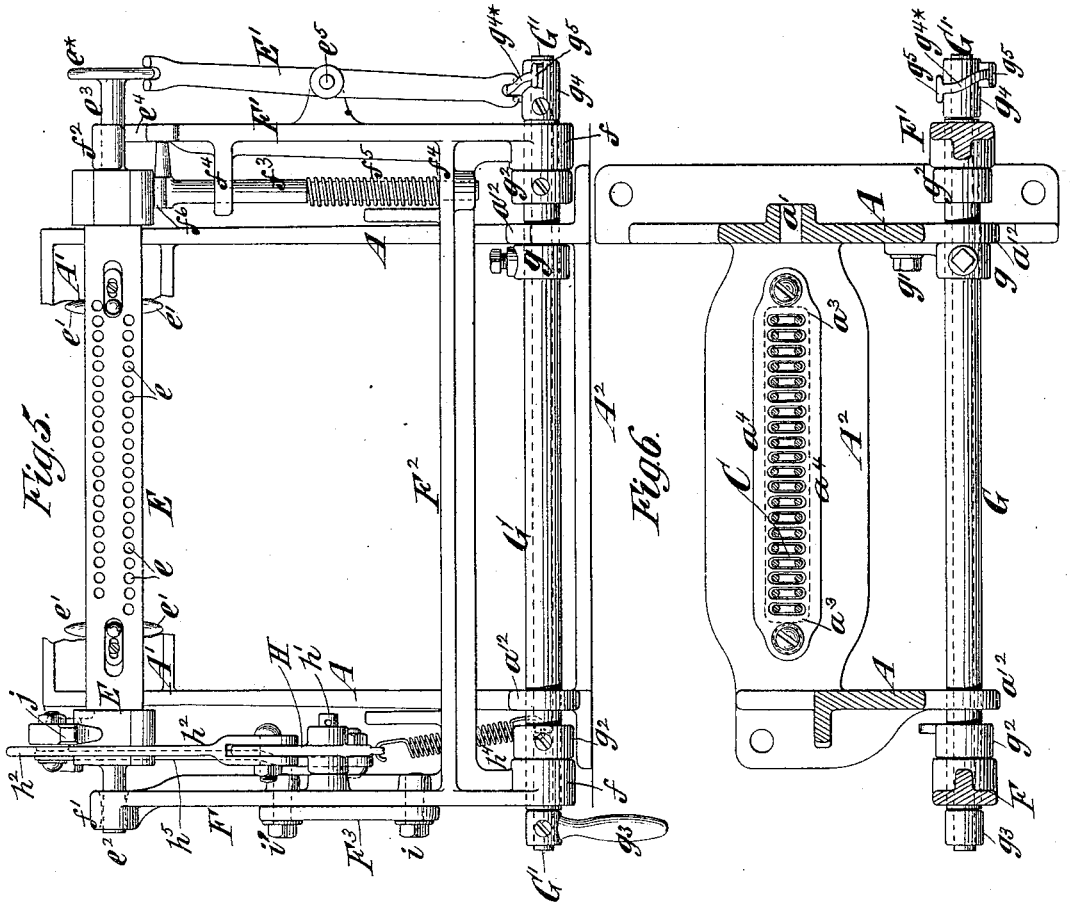

Fig. 5.

Fig. 6.

Witnesses:
C. L. Sundgren
Emil Hester.

Inventors:
John E. Atwood
Eugene Atwood
Edward E. Bradley
by their Attys
Brown & Hall

UNITED STATES PATENT OFFICE.

JOHN E. ATWOOD, EUGENE ATWOOD, AND EDWARD E. BRADLEY, OF STONINGTON, CONNECTICUT, ASSIGNORS TO THE ATWOOD MACHINE COMPANY, OF SAME PLACE.

SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 346,574, dated August 3, 1886.

Application filed September 10, 1885. Serial No. 176,652. (No model.)

To all whom it may concern:

Be it known that we, JOHN E. ATWOOD, EUGENE ATWOOD, and EDWARD E. BRADLEY, all of Stonington, in the county of New London and State of Connecticut, have invented a new and useful Improvement in Shedding Mechanisms for Looms, of which the following is a specification.

Our invention relates to the kind of shedding mechanism which is commonly known as a "dobby." In such mechanism the hooked lifting-wires from which the harness is suspended are raised and lowered by means of levers over which they hook, and the engagement of the levers with these wires is controlled by a series of horizontally-arranged and spring-actuated needles, which are operated upon by pattern-cards carried by a perforated cylinder in a swinging or oscillating frame.

Our invention consists in novel combinations of parts and details of construction, which are hereinafter described, and pointed out in the claims, and by which the construction of the dobby is simplified, and its cost greatly lessened.

In the accompanying drawings, Figure 1 is a side elevation of a dobby embodying our invention, the cylinder and its supporting-frame being removed in order to illustrate more clearly the other parts. Fig. 2 is a sectional view illustrating a portion of the main frame and one of the fulcrum-supports which the hook-levers have upon said frame. Fig. 3 is a vertical section upon the plane of the dotted line *x x*, Fig. 1, looking toward the right of Fig. 1. Fig. 4 is a similar section upon the plane of the dotted line *y y*, Fig. 1, also looking toward the right of Fig. 1. Fig. 5 is an elevation of the cylinder, cylinder-frame, and its operating mechanism, including those portions of the main frame which support the cylinder-frame; and Fig. 6 is a horizontal section upon the plane of the dotted line *z z*, Fig. 1.

Similar letters of reference designate corresponding parts in all the figures.

In this dobby the main frame is made, for the sake of simplicity and cheapness, in one integral cast structure. This structure comprises end standards or uprights, A A, upper and lower horizontal girts or stretchers, A' A^2, connecting the end standards, and a projecting portion, A^3, which extends horizontally from one of the end standards, and is bifurcated or forked to form two arms, as shown in Fig. 1, so as to form the supports for the upper and lower hook-levers, B B'. The end standards or uprights are arranged with their width transverse to the length of the hook-levers B B', and the upper lever, B, works in a suitable slot or guide, *a*, in one end standard or upright, while the lower hook-lever, B', works in a suitable slot, *a'*, in the same end standard or upright. The slots *a a'* form suitable guides to the levers in their rising and falling movements. The upper and lower levers, B B', are connected by rods or links B^2 with opposite ends of the lever B^3, fulcrumed at *b*, by which they are made to rise and fall simultaneously. One lever always descends as the other one is rising. The levers receive a regular reciprocating upward and downward movement by means of a rod, B^4, from the crank B^5, which is commonly secured on the main crank-shaft of the loom, such crank and rod being shown in Fig. 1.

In order to construct the fulcrum-support for the levers B B' in an inexpensive manner, we cast upon the arms A^3 integral laterally-projecting studs a^2, which taper from the arm outward, as shown in Fig. 2, and we construct on the end of each of the levers B B' a taper socket or eye, *b'*, which fits the said taper stud. A screw, b^2, inserted in the end of the taper stud, secures the socket or eye *b'* thereon, and such an arrangement constitutes a very simple fulcrum-support for the levers.

C designates the vertically-arranged hooked lifting-wires, which have hooks *c* engaging the upper lever, B, and the other hooks, *c'*, engaging the lower lever, B'. The harness of the loom is to be connected with these lifting-wires in the usual way.

In the lower stretcher or girt, A, is an opening, a^3, through which the lifting-wires pass clearly, and opposite this opening is a plate, a^4, which is provided with slots for the reception of the lifting-wires, as shown best in Fig. 6, and which is made separate from the frame, and secured thereto by screws a^5, or other means. The slotted plate a^4 holds the lifting-wires separate from each other at proper distances apart, and forms their lower guide.

To the upper girt or stretcher, A′, is secured a horizontally-extending bracket, A^4, which is slotted at a^6, for the passage of the lifting-wires C, and which forms the upper guide for said wires, and holds them separate from each other.

D designates the horizontal needles, each of which is formed with an eye, *d*, to receive a lifting-wire through it, and which are actuated by springs *d′* in a direction to carry the hooks *c* of the wires C within range of the rising and falling lever B.

In the upper girt or stretcher, A′, is formed a large opening, a^7, opposite which is a plate, a^8, secured in place by screws a^9, as shown best in Fig. 1, or otherwise, and forming a guide to the needles D. The opposite ends of the needles are guided in a plate, a^{10}, adjustably secured by screws a^{11}, or otherwise, to the overhanging side of the bracket A^4.

It will be understood that inasmuch as the main frame of the dobby is cast in one integral structure it will be difficult, if not impossible, to properly cast the slots for the passage of the lifting-wires and needles, and this difficulty we overcome by casting in the upper and lower stretchers or girts large openings a^7 a^3, which are of ample size for all the wires and needles, and we accurately guide the wires and needles by the plates a^4 a^8, adjustably secured opposite these openings.

The pattern-cards, which are not here shown, are carried and moved by an ordinary rectangular cylinder, E, having in it series of perforations *e*, for the reception of the needles D, and provided with lugs or spurs *e′*, which engage with the cards and move the chain of cards forward as the cylinder is rotated step by step. The cylinder is supported and carried by a cylinder-frame, which comprises vertical arms F F′ and a cross-bar or stretcher, F^2. The arms F F′ have at their lower ends eyes or sockets *f*, which turn freely upon a tubular shaft, G, supported in bearers a^{12} on the main frame.

g designates a collar, which is secured fast on the tubular shaft G by a set-screw, and which has an arm secured by a screw, *g′*, to the main frame, as best shown in Fig. 4, and by this collar and screws the tubular shaft G may be held securely in place, both against endwise movement and against turning.

Upon the shaft G are secured collars g^2, which are adjustable on the shaft, and are held in place after adjustment by set-screws, (shown in Fig. 5,) and which hold the cylinder-frame from shifting lengthwise of the shaft. The cylinder E has at one end a journal, e^2, which fits a cylindric bearing, *f′*, in the arm F, and has at the opposite end a journal, e^3, which fits an open or U-shaped bearing, f^2, in the arm F′ of the cylinder-frame. The arm F′ has a lateral opening, e^4, through which the journal e^3 may be brought under the bearing f^2, and the said bearing f^2 is open at the bottom, and will permit of the lateral insertion of the journal upward into it. The cylinder-frame carries a sliding rod, f^3, which is fitted to suitable guides, f^4, and which is encircled by a spring, f^5, tending to press it upward. The upper end of the rod f^3 has a broad horizontal surface, f^6, which bears against the end portion of the cylinder and tends to hold it squarely in position when it is swung against the needles D, as will soon be described. The cylinder is turned step by step, as is usual, and the sliding rod f^3 and its head f^6 constitute a spring-actuated keeper, which tends to limit the turning of the cylinder to a quarter-revolution, and which serves the additional purpose of keeping the journal e^3 in the U-shaped bearing f^2. The needles D are shown as arranged in two rows, one above another, as best seen in Fig. 1, with the needles of each row opposite the spaces between the needles of the other row, in the usual manner. The cylinder E has two rows of perforations or holes, *e*; but the perforations of each are placed only one-half as far apart as are the needles in the row, and therefore constitute two sets of holes, those in one set being alternated between those in the other set. It will therefore be seen that by shifting the cylinder endwise a distance equal to the distance from center to center from the holes *e* the other set of holes will be brought into use.

In order to act in conjunction with the adjustable cylinder, the cards must of course have two sets of perforations, one intermediate to the other in a direction lengthwise of the cylinder, and when so made it is obvious that they may be used to weave two patterns alternately by shifting the cylinder endwise, without the necessity of removing the cylinder and substituting another set of cards.

In order to provide for moving the cylinder endwise, we have represented the journal e^3 as provided with a head or flange, e^*, and a lever, E′, which is fulcrumed at e^5 to the cylinder-frame, and the upper end of which is bifurcated to engage with the head or flange e^*. Through the tubular shaft G extends an inner shaft or rod, G′, which has at one end a handle, g^3, whereby it may be turned, and which has at the other end a cam, g^4, having an oblique rib, g^{4*}, which engages with the lower end of the lever E′. At opposite ends of the oblique rib g^{4*} are shoulders or projections g^5, which constitute stops to limit the turning movement of the cam in both directions. By turning the inner shaft or rod G′ the lever E′ will be actuated and the cylinder shifted lengthwise a distance equal to the distance between the holes in each row. The cylinder-frame receives a vibrating or swinging movement which is synchronous with the movements of the levers B B′. As here represented, the cylinder-frame has secured to it an arm, F^3, which is best shown in Fig. 3, and which is connected by a rod, F^4, with the upper hook-lever, B.

In order to properly limit the termination of the cylinder movement, the arm F^3 is secured or pivoted to the cylinder-frame by a

bolt at i, and is also secured by a bolt or screw, i', which passes through a slot, i^2, in the arm, as best shown in Fig. 3. By adjusting the arm by means of the bolt and slot i' i^2 it may be set so as to definitely fix the limit of movement of the cylinder-frame.

The mechanism for rotating the cylinder step by step is of the usual form and arrangement. A hook or pawl, j, is pivoted at j' to the main frame of the machine, and rests upon the end portion of the cylinder. As the cylinder-frame is swung outward, this hook or pawl j engages with the end portion thereof and turns it one quarter-revolution. The usual means are provided to pull back the cylinder in case any mistake in the pattern is made. This means consists of a lever, H, which is fulcrumed at h' to the cylinder-frame, and which has connected with it a pawl or hook, h^2. This pawl or hook is connected to a spring, h^3, to hold its hooked end in engagement with the end portion of the cylinder, and the lever H, by a spring, h^4, is drawn up normally into the position shown in Fig. 3. The lever H is connected by a rod, h^5, with the pawl or hook j, and is to have a cord or connection attached to its outer end, h^6. By pulling downward on the cord or connection attached to the end h^6 of the lever H the attendant will bring the pawl or hook h^2 to act upon the cylinder, and may thereby turn it backward, the rod h^5 serving at the same time to lift the pawl or hook j entirely out of engagement with the cylinder.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination, with the hooked lifting-wires and hook-levers, the needles, the swinging cylinder-frame and cylinder, and mechanism, substantially as described, for operating said levers, the cylinder-frame, and cylinder, of a main frame consisting of end standards and upper and lower girts connecting them, all cast in one integral structure, the lower girt being formed with a single opening of a size to receive all the lifting-wires, and the upper girt being formed with an opening large enough to receive the needles, and guiding-plates, one for the lifting-wires and the other for the needles, made separate from and secured to said girts opposite the openings in them, substantially as herein set forth.

2. The combination, with the hooked lifting-wires, the levers, the needles, the swinging cylinder-frame and cylinder, and mechanism, substantially as described, for operating the levers, the cylinder-frame, and cylinder, of a main frame comprising end standards and upper and lower girts connecting them, all cast in one integral structure, said girts being provided with openings to receive the wires and needles, a plate secured to the lower girt opposite the opening therein and forming the lower guide for the wires, a bracket projecting from the upper girt and forming the upper guide for the wires, and plates secured to the upper girt and bracket and forming the needle-guides, substantially as herein set forth.

3. The combination, with the hooked lifting-wires, the needles, and the swinging cylinder-frame and cylinder, of a main frame provided with projecting arms having the taper studs a^2 rigidly projecting from their sides, hook-levers provided at their ends with taper holes or sockets fitting directly upon said taper studs, means, as screws b^2, for securing the hook-levers upon the studs, and by which the taper holes or sockets of the levers may be brought to a proper bearing on the taper studs, and mechanism, substantially as described, for operating the levers, the cylinder-frame, and cylinder, substantially as herein set forth.

4. The combination, with the hooked lifting-wires, the levers and needles, the swinging cylinder-frame composed of upright arms and a girt or stretcher rigidly connecting them, a cylinder, and mechanism, substantially as described, for operating the levers, the cylinder-frame, and cylinder, of a main frame and a horizontal shaft supported in the main frame, and upon which the upright arms of the cylinder-frame are fulcrumed, and means, substantially as described, whereby the horizontal shaft may be adjustably secured in different positions lengthwise in the main frame, and whereby the cylinder-frame may be adjustably secured in different positions lengthwise of said shaft, substantially as herein set forth.

5. The combination, with the hooked lifting-wires, the levers and needles, the swinging cylinder-frame and the cylinder having upon one journal a head or flange, and mechanism, substantially as described, for operating the levers, the cylinder-frame, and cylinder, of a lever fulcrumed at one side of the cylinder-frame and engaging at the upper end with the said head or flange on the cylinder-journal, and a shaft provided with a cam, with which the opposite end of the cylinder-shifting lever engages, and whereby the cylinder may be shifted lengthwise in its frame, substantially as herein set forth.

6. The combination, with the hooked lifting-wires, the levers and needles, the swinging cylinder-frame and its cylinder having on one of its journals a head or flange, and mechanism, substantially as described, for operating the levers, the cylinder-frame, and cylinder, of a tubular shaft on which the cylinder-frame is journaled, a lever fulcrumed on said frame and engaging at the upper end with a head or flange on the cylinder-journal, and a shaft arranged within said tubular shaft, and having upon it a cam engaging with the lower end of the cylinder-shifting lever, substantially as herein set forth.

JOHN E. ATWOOD.
EUGENE ATWOOD.
EDWARD E. BRADLEY.

Witnesses:
JOS. F. JOSEPH,
WM. A. GILBERT.