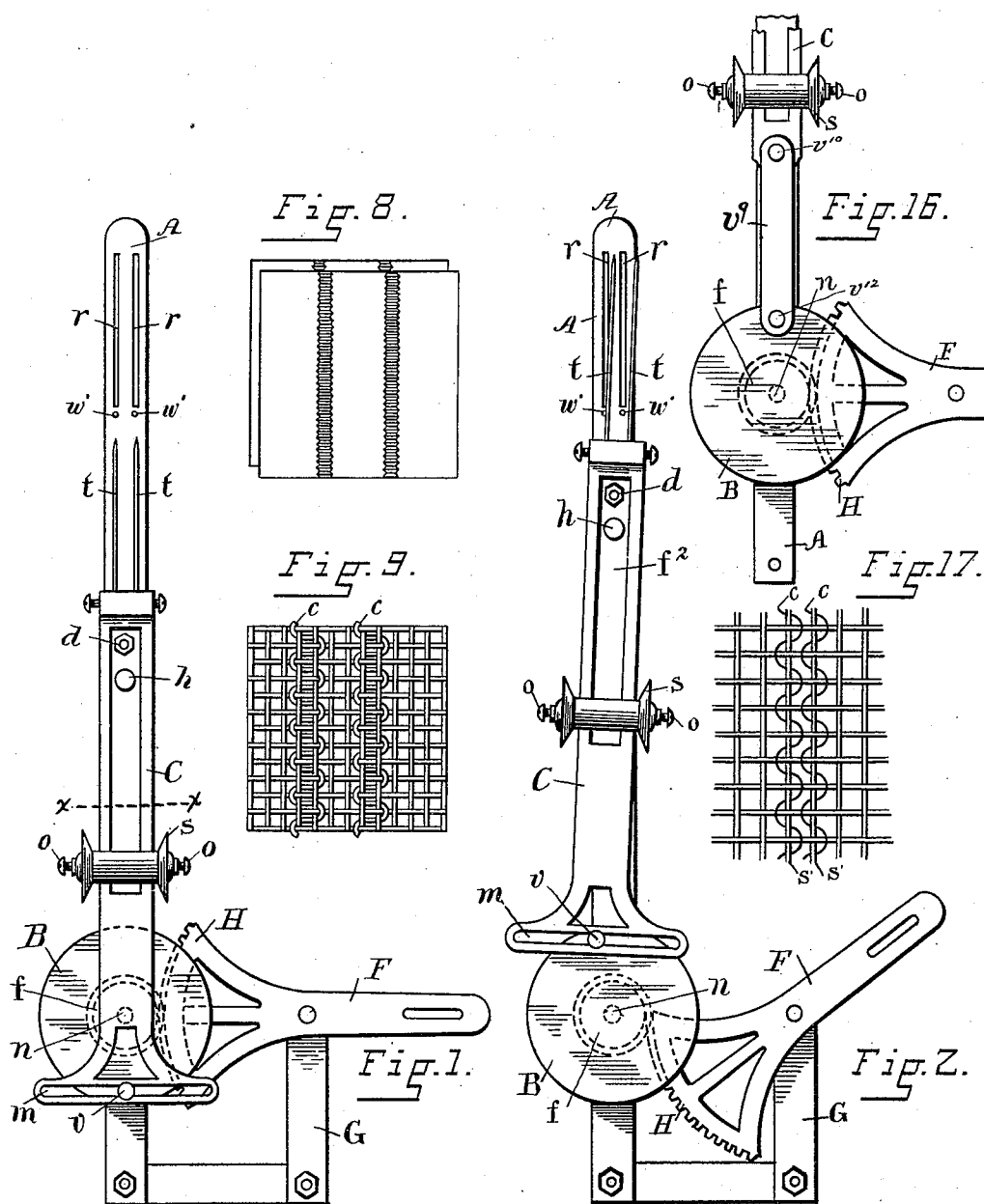


F. LACEY.
SELVAGE FORMING DEVICE FOR LOOMS.

No. 436,018.

Patented Sept. 9, 1890.



WITNESSES:

James E. Arnold
H. A. Shove

INVENTOR

Fred Lacey
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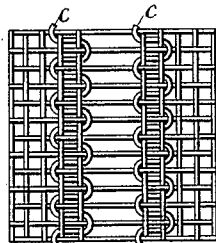
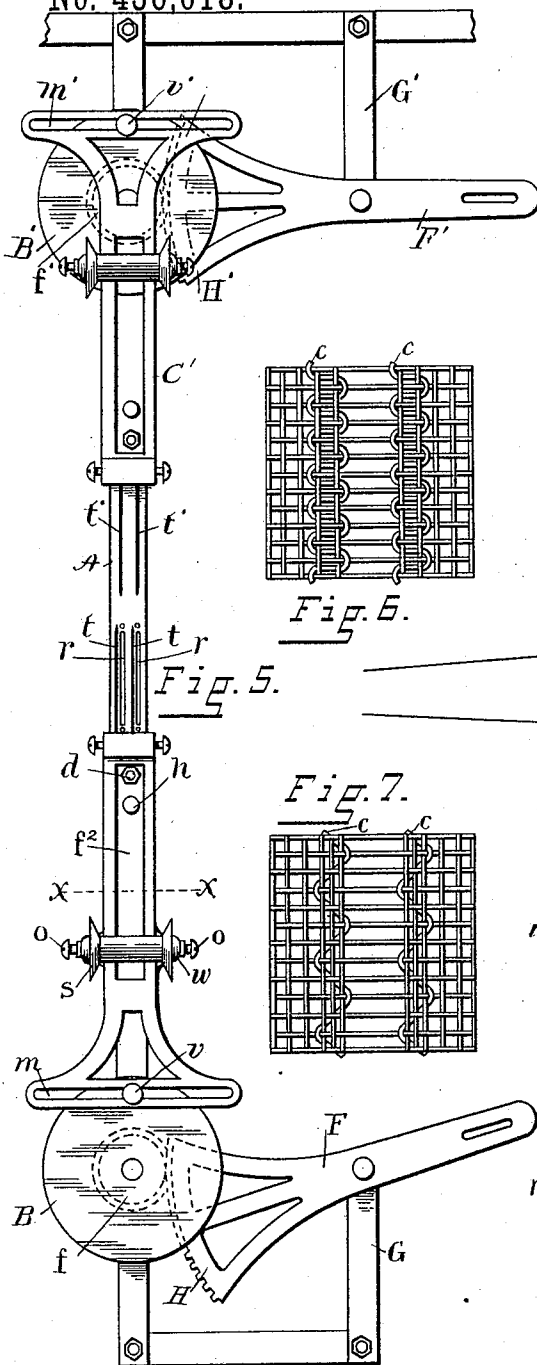


Fig. 5.

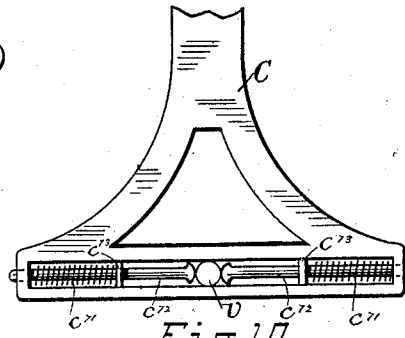


Fig. 10.

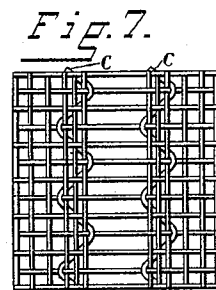


Fig. 7.

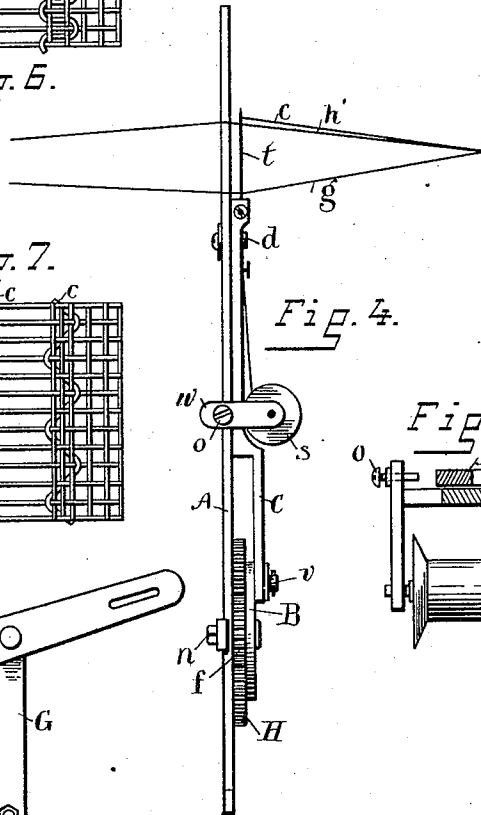


Fig. 4.

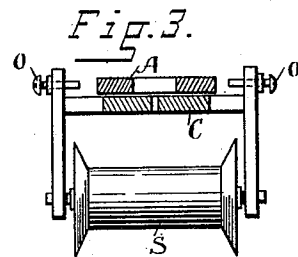


Fig. 3.

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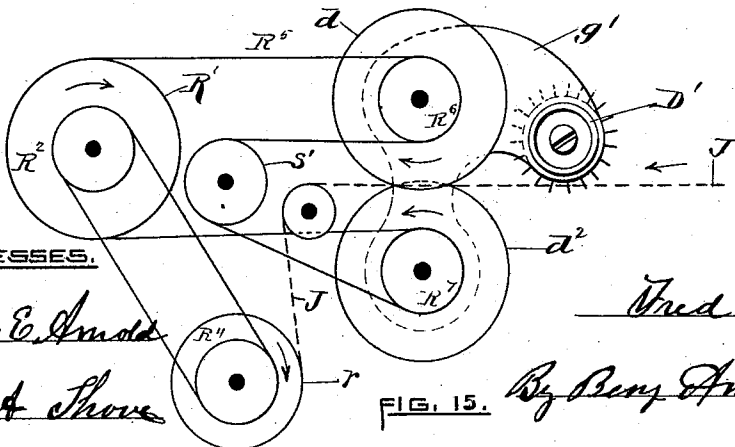
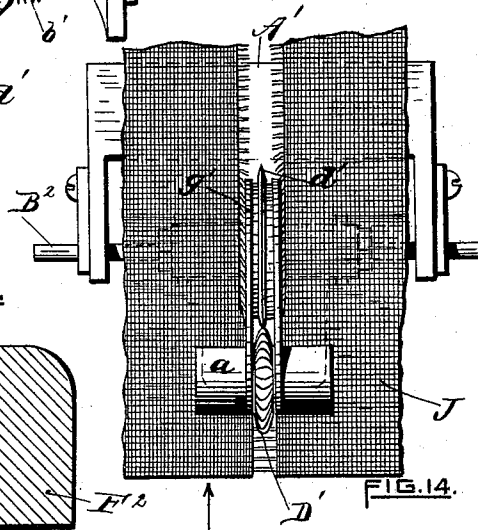
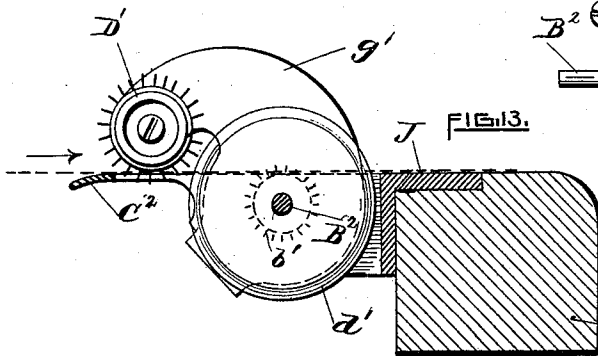
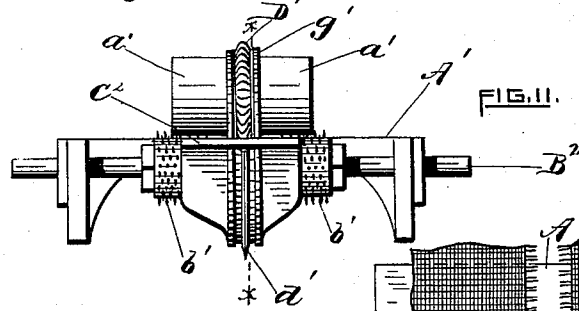
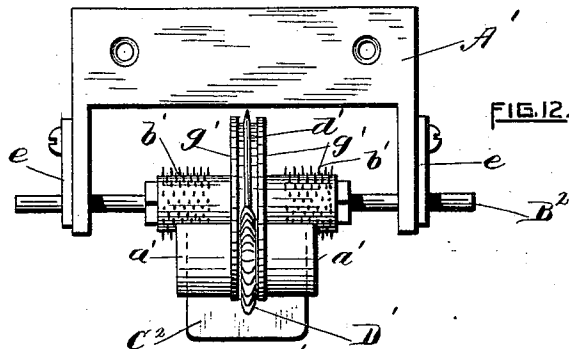
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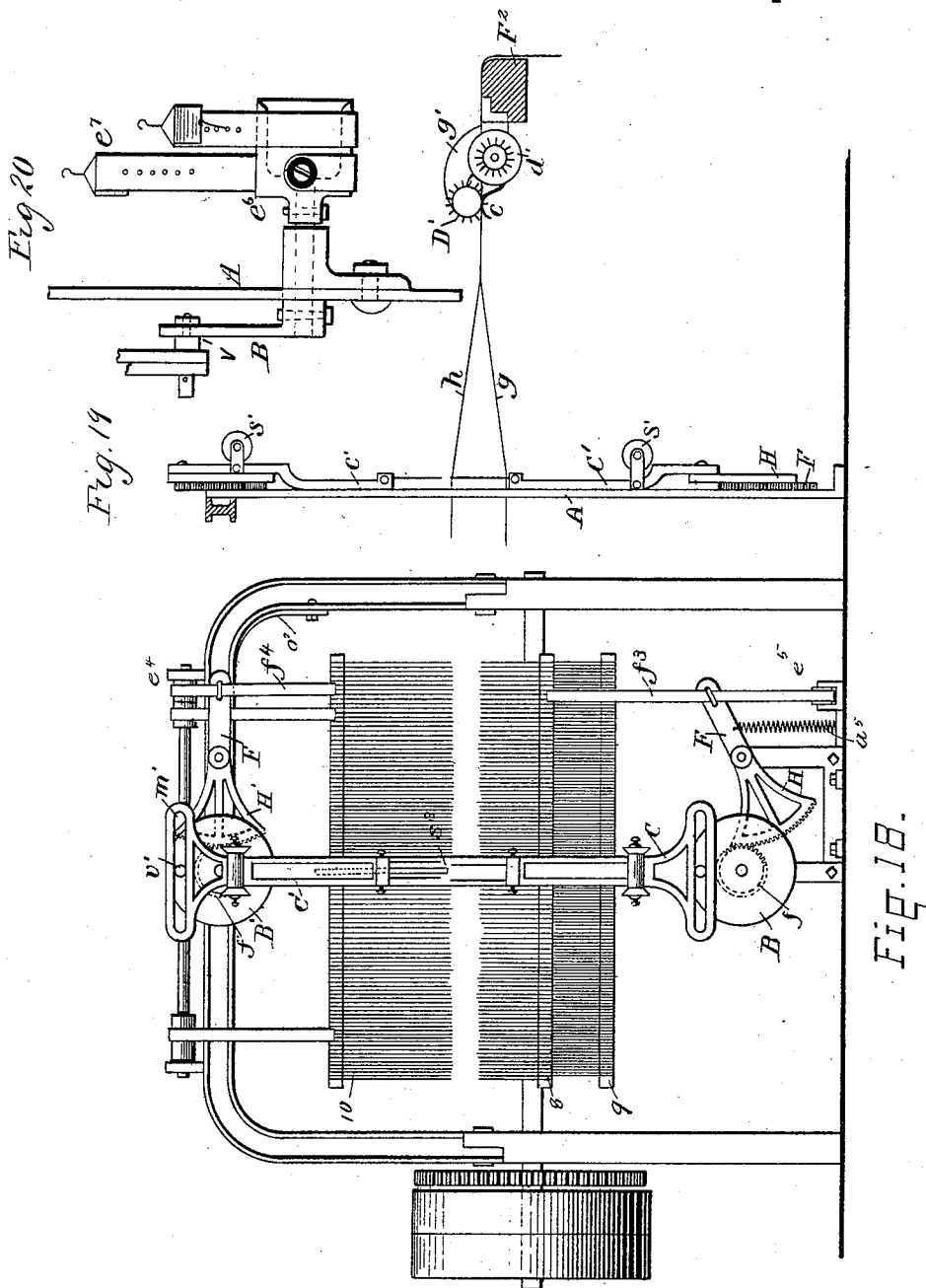
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UNITED STATES PATENT OFFICE.

FRED LACEY, OF ADAMS, MASSACHUSETTS.

SELVAGE-FORMING DEVICE FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 436,018, dated September 9, 1890.

Application filed October 9, 1889. Serial No. 326,424. (No model.)

To all whom it may concern:

Be it known that I, FRED LACEY, of Adams, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Selvage-Forming Devices for Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to that class of attachments to looms that are used in making central selvages where more than one width of fabric is woven in the loom at the same time, and is an improvement on my United States Patent No. 403,198, and also to that class of attachments to looms used in connection with the central selva ge attachment to separate the two webs so woven together by cutting the filling-threads between the selvages produced by the first attachment.

The invention consists in the construction and combinations of parts hereinafter fully explained, and specifically pointed out in the claims.

In the drawings, Figure 1 is a front elevation of my selvage attachment, the parts being shown as they are when the shed is closed. Fig. 2 is a similar view, except that the parts are shown as they are when the needle-slide has been tilted to the right and raised and the shed has been formed. Fig. 3 shows a horizontal cross-section taken on line *x x*, Fig. 1. Fig. 4 is a side elevation of the attachment as shown in Fig. 2, the needle-slide being up and the shed formed ready for the passage of the shuttle. Fig. 5 represents a front view of the attachment when arranged for use upon a loom weaving double fabrics of two or more widths. Fig. 6 shows a piece of fabric with central selvages binding two warp-threads. Fig. 7 shows the same as Fig. 6, except that three instead of two warp-threads are bound by the selvage-thread. Fig. 8 shows a piece of double fabric woven with central selvages in both parts by the attachment as shown in Fig. 5. Fig. 9 shows a piece of corded fabric produced by means of the attachment. Fig. 10 shows devices for insuring the tipping of the sliding bar by the

pin *v* in plate B when that plate is turned. Fig. 11 is a front elevation of the cutting mechanism for separating the two webs by cutting the weft-threads between the two selvages as the fabric is woven. Fig. 12 shows a top view of the cutting devices shown in Fig. 11. Fig. 13 is a vertical section taken through line *x x* in Fig. 11, showing the relative position of the guide and cutter. Fig. 14 is the same view as Fig. 12, with a portion of two webs woven together, being separated by cutting between the selvages. Fig. 15 is a diagram showing a modification of the cutting mechanism using two cutters and driven by belts from the cloth-roll. Fig. 16 shows a modification of the connection between the plate B and the plate C. Fig. 17 represents central selvages in which a dummy-thread is used. Fig. 18 is a vertical cross-section of a loom taken between the lathe and the harnesses, showing the application of the selvage devices to a loom weaving a double fabric. Fig. 19 is a vertical section from front to back of part of a warp and the selvage devices in combination with the cutting attachment, also shown in section. Fig. 20 shows a modification of the devices for operating the selvage devices.

In the drawings, A represents a stiff metallic plate that is arranged for rigid connection with the loom-frame, the plate being placed back of the loom-lay and in front of the harness, a supplemental casting being at times necessary in order to secure a proper adjustment of the plate. Two slots *rr* are made in the upper end of the plate A to receive the threads that are to be bound in the selvages.

When the attachment is used for single fabrics, or those of only one thickness, the plate A is intended to be attached to the loom-frame by its lower end only, being made as shown in Fig. 1; but when used for double fabrics it should be secured at its upper end, which is extended up (see Figs. 5 and 18) to the arch of the loom and at its lower end to the bottom girt or floor. About the middle of the plate A there is a long slot *s* (see Fig. 18) made through it, through which a bolt *d* passes, which bolt also enters a hole in the plate C, where it is held by a nut. To the upper end of the plate C there are secured

needles *t t*, which have eyes near their free ends, in like manner to needles used in sewing-machines.

The sliding plate C has ears *w* cast on each edge of it which extend out on the front to form supports for the thread-spools *s* and in on the back of the plate to receive set-screws *o o*, which are so set as to bring their inner ends against the plate A on either side when the sliding bar is moved sidewise. By means of the set-screws the amount of side motion allowed to the plate C is regulated, and the set-screws are prevented from slipping by check-nuts placed on them. (See Fig. 3).

The slide C carries a spool *s*, upon which there are wound two threads *c*, that are passed through the eyes of the needles *t t*, and in order that a proper and uniform tension may be at all times imparted to the threads I arrange a spring *f*² in such a position that it will bear upon the inner face of the thread wound upon the spool, the spring being provided with an adjusting-screw *h*, whereby its tension may be regulated.

By mounting the spring *f*² so that it will bear upon the thread instead of upon the spool proper I secure a uniform tension upon the thread *c*, inasmuch as the pressure of the spring decreases as the leverage of the thread decreases—that is, as the thread unwinds, so that as the face of the roll approaches the axis of the spool, the leverage necessarily decreases and the pressure exerted by the spring also decreases. The warp-threads upon the outside of the inner edges of the two pieces of cloth that are to be woven together are passed through the slots *r r* in the plate A.

The plate C is made with an offset just below the spool *s* (see Fig. 4) to make between it and the plate A room to receive the mechanism that raises the said plate C, which mechanism consists of a circular plate B and a gear-wheel *f*, which is attached to the plate B, and both are held on a stud *n*, made fast in the plate A by means of a nut on the back of that plate. A pin *v* is inserted in the face of the plate B, and a horizontal slot *m* is made in the lower end of the plate C, which is widened out for that purpose, to receive the pin *v*, which slides freely in it.

A lever F is pivoted near its middle to the upper end of a support G, extending out and up from the lower end of the plate A, and a segment-gear H, that engages with the gear-wheel *f*, is made on the inner end of the lever F, the outer end of the lever being connected to a harness-frame or harness-lever to give it motion.

The proportion between the gear *f* and the segment H is such that a motion of rather less than one-third of a circle at the outer end of the lever F will give the gear-wheel *f* about one revolution on its stud, so that one motion down or up of the lever F will lower and raise the plate C and needles *t t*, which will always be up when the shed is open in ordinary weaving.

The parts are shown in Fig. 2 as being in the position in which the harness-frame, to which the lever F is attached, and also the needles, are up and the shed open, as shown in Fig. 4. Now a downward motion of that same harness will carry down the outer end of the lever F and lower and raise the plate C and needles for the other harness and its shed—that is, the up and down motion of one harness-frame will operate the attachment for both sheds, so that only one connection is needed to work the attachment, and the motions may be positive, doing away with all springs.

The tipping of the plate C on its pivot *d* to give the proper direction to the needles to make them pass up alternately on the outer and inner sides of the slots *r r* is caused by the action of the pin *v* in the slot *m* as it passes its lowest point. When the outer end of the lever F goes down, the pin *v* passes to the right in the slot and carries the lower part of the plate C over that way, which tips the upper end of the plate over to the left, so that the needles pass up on the left of the slots *r r*; but when the outer end of the lever F goes up the pin *v* goes to the left in the slot *m*, carrying the lower part of the plate C over to the left, and the needles are carried over and pass up to the right of the slots.

The action of the pin *v* in the slot *m* in directing the needles, as before referred to, may be increased, if desired, by means of the modification shown in Fig. 10. In this modification open spiral springs *c*⁷¹ are placed in the slot in the plate C on each side of the pin *v* on pins *c*⁷², passing through partitions *c*⁷³ in the slot and the metal at the ends of the slot, the inner ends of the springs being secured to their pins, so that when the pins are pushed endwise by the pin *v* the springs will push the plate C that way, but will allow of sufficient compression for the pin *v* to move in the slot in going around the circle. The modification shown in Fig. 16 is made by taking the devices as shown in Fig. 1 and cutting off the plate C below the spool *s*, leaving enough of the plate to hold the stud *v*¹⁰ to receive the link *v*⁹, which has a hole in its upper end to receive the stud, which latter is screwed down tight enough on the link to carry the plate C over to one side when the crank-pin *v*¹² carries the lower end of the link over that way, and at the same time allow the link to swing so that the pin *v*¹² may go around the circle.

The form of the attachment for weaving double fabrics, as shown in Fig. 5, is made by taking a duplicate set of the operating parts, as shown in Fig. 1, comprising a plate *c*, with slot *m'*, gear-wheel *f'*, plate B', pin *v'*, and lever F', with segment H', reversing their position and putting them on the upper part of the plate A, which is extended up for that purpose and making the necessary connections of studs, bolts, &c., with that plate. This form operates in the same manner as that already described for Fig. 1, only that

one set of the devices is reversed in position with all that implies. Its object is to form the central selvages for the upper web as well as the lower web when double fabrics are woven in the loom, and the operation in connection with the upper web is the same exactly as that described for Fig. 1 upon the lower web and may perhaps be best understood by reversing the drawing Fig. 5 and applying the description for Fig. 1.

In making the selvages shown in Fig. 17 a thread s' is draw through each of the holes $w'w'$. (See Fig. 1.) These are called "dummy-threads," as they never rise with the harnesses, but have the threads c passed around them to form the selvages. In Fig. 18 the application of the selvage device to a loom weaving double fabrics is shown. In this figure the lower web-harnesses 8 9 are shown as being in operation for weaving and the upper web-harnesses 10 up out of action. The outer end of segment-arm F is made fast to a strap f^3 , that has one of its ends secured to the harness-frame 8, and the other end, after passing down around a pulley e^5 , fast to the floor, is carried up and made fast to the harness-frame 9, so that when either one of the lower web-harnesses is up the lower set of needles will be up; but when both of the lower web-harnesses are down—that is, when the upper web is weaving—the strap f^3 will be slack and allow the spring a^5 to hold the segment-arm level, and the pin v will be at the bottom of the plate B, holding the lower set of needles down. The attachment for operating the upper needles is the same, the pulley e^4 for the strap f^4 to pass over being held on an extension of the shaft of the harness-rolls on top the arch, and a flat spring o^2 , secured to the under side of the arch, being used to bring the segment-arm level when the upper web-harnesses are both up and the lower web is being woven, which is the position shown in Fig. 18. The circular plate B, with pin v , does not necessarily make a whole revolution for every rise and fall of the needles; but such part of a circle as any particular case may require can be obtained by varying the extent of motion given to the outer arm of the lever F. The number of warp-threads passed through the slots r is governed by the depth to which it is desired to bind the selvages; but whatever the number may be, they will be regularly woven like the others not in the slot, which is a great advantage.

That part of my invention used to separate the two webs as fast as they are woven in the loom consists of a horizontal plate A', which is intended to be let into the top of the breast-beam F² of the loom flush with the surface of the beam and on its inner corner. Two vertical ears project from the ends of the plate in toward the loom and have bearings made in them to receive a horizontal shaft B², which carries the cutter d' , which is a round steel plate made sharp on its periphery. The shaft

B² revolves and also slides freely endwise in its bearings in the supporting-ears.

The cutter d' is made fast on the middle of the shaft B², and two vertical plates $g'g'$ are placed one on each side of the cutter d' , and a short shaft is held in bearings made in the forward extensions of the plates g' , to which shaft the guide-wheel D' is attached, with the rolls $a'a'$, one on each end of the guide-roll shaft. The guide-roll D' is so placed that the lower side of it is about on a level with the tops of the rolls $b'b'$, fast on the cutter-shaft B², and also on a line with the top of the breast-beam F². (See Fig. 13.) The peripheral surfaces of the rolls $b'b'$ have small sharp points set in them, after the manner of rolls used in cloth-templates. A plate C² is carried out horizontally from the plates g' around close in front of the guide-roll D' and on a level with the lower side of that roll to serve as an apron to hold the web up to the guide-roll.

The guide-roll D' consists of a flat collar, the thickness of which mainly depends on the space left between the two selvages, with thin flat radial teeth set in its periphery. These teeth are made with oval tapering points to enable them to enter between the two selvages of the webs to be separated, but not sharp enough to catch and enter the cloth on either side of the selvages. The rolls $a'a'$ are intended, mainly, to prevent the guide-roll D' from dropping down between the webs after they are separated, if it should be necessary for any reason to slack back the two webs toward the lathe. The plates g' are made to turn freely on the shaft B² to allow the parts attached to rise or fall to keep level with the web.

The operation may be described as follows: The plate A' is so placed on the breast-beam of the loom as to bring its middle opposite the usual line between the two central selvages. Then the cloth enters on the line J (see Fig. 13) and passes between the top surface of the plate C² and the under sides of the rolls $a'a'$, and thence over the rolls $b'b'$; the points on those rolls entering the cloth as it passes and causing the movement of the cloth to give a rotary motion to the said rolls and the cutter d' on the same shaft. As the two connected webs pass, the teeth of the guide-wheel D' enter between the two selvages, the filling-threads between which enter between the teeth of the wheel and assist with the friction of the web on the rolls $a'a'$ to turn the guide-wheel and its rolls. The teeth in the guide-wheel D' are supposed to about fill the space between the two selvages, so that if the cloth swerves to the right or left the selvages will press against the sides of the teeth, and as the whole guiding and cutting mechanism is free to slide sidewise in the bearings of the shaft B² this pressure on the sides of the teeth before mentioned will carry the whole mechanism either way, as the case may be, and keep the teeth of the

guide-wheel in between the two selvages. The cutter d' being placed so as to stand behind the center of the guide-wheel and compelled to follow its sidewise motion, when it has any, will be obliged to cut the weft-threads exactly in the middle between the selvages.

Fig. 15 shows a modification of the invention, using two cutters working together as circular shears and a method of driving them by a band from the cloth-roll. The same guide-wheel and arrangement of parts, as before described, are used to allow motion sidewise of the guide-wheel and cutters. The pulley R' is driven by a belt R^3 on a small pulley R^2 attached to it, passing around a pulley R^4 on the cloth-roll r , and a belt R^5 , starting from the pulley R' , passes over a pulley R^6 on the shaft of the cutter d' , then back over an idle-pulley s' , thence over a pulley R^7 on the shaft of the cutter d^3 , and back to the pulley R' again, giving motion to the cutters d' d^3 . The pins in the rolls b b also assist in guiding the cutting attachment in passing through a fringe woven between two pieces—as in towels, for instance—as the pins enter between the warp-threads and prevent any improper side motion. The modification shown in Fig. 20 substitutes for the gear f and segment F a pulley e^6 , secured to the shaft of the plate B , which shaft is extended out back of the plate A . Straps e^7 pass around this pulley in opposite directions and are secured to it. One end of one strap is made fast to the bottom frame of one of the harnesses and the end of the other strap to the bottom of the frame of the other harness, supposing that there are but two harnesses in use. It will readily be seen that as either harness goes up the strap will turn the pulley e^6 and bring the needles up by means of the plate B and pin v in time for the passage of the shuttle.

Having thus described my improvements, what I claim as my invention is—

1. In a central selvage-weaving attachment for looms, the plate A , with the plate C attached thereto, substantially as described, said plate C being provided with needles at its upper end, in combination with gear-wheel f , plate B , pin v , and lever F , formed with the

segment-gear H , substantially as and for the purpose set forth.

2. In a central selvage-weaving attachment for looms, the plate A , with the plate C attached thereto, substantially as described, said plate C being provided with needles at its upper end, in combination with plate B and pin v and mechanism for operating the said plate, substantially as and for the purpose set forth.

3. In a central selvage attachment for looms, the plate A , with the plate C attached thereto, substantially as described, said plate C being provided with needles at its upper end, gear-wheel f , plate B , pin v , and lever F , formed with segment H , in combination with the plate C' , attached to the plate A , substantially as described, said plate C' provided with needles at its lower end, gear-wheel f' , plate B' , pin v' , and lever F' , formed with the segment-gear H' , substantially as and for the purpose set forth.

4. The guide-wheel D' , in combination with a cutting mechanism, all arranged to move sidewise freely, substantially as specified.

5. The combination of the guide-wheel D' , cutter d' , rolls $a' a'$, rolls $b' b'$, plate C^2 , plates g' , and shaft B^2 , arranged to slide freely in its bearings, substantially as and for the purpose specified.

6. The combination of the guide-wheel D' and rolls $b' b'$, provided with points, as described, with a cutting attachment, all being arranged to move freely sidewise, substantially as described.

7. The circular cutter d' , in combination with the rollers $b' b'$, provided with pins, and a guiding mechanism, all being arranged to move freely sidewise, substantially as and for the purpose set forth.

8. In a central selvage-weaving attachment for looms, the combination of the plate A , plate C , the plate B , pin v , and link v^9 , substantially as described, and for the purpose specified.

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Witnesses:

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BENJ. ARNOLD.