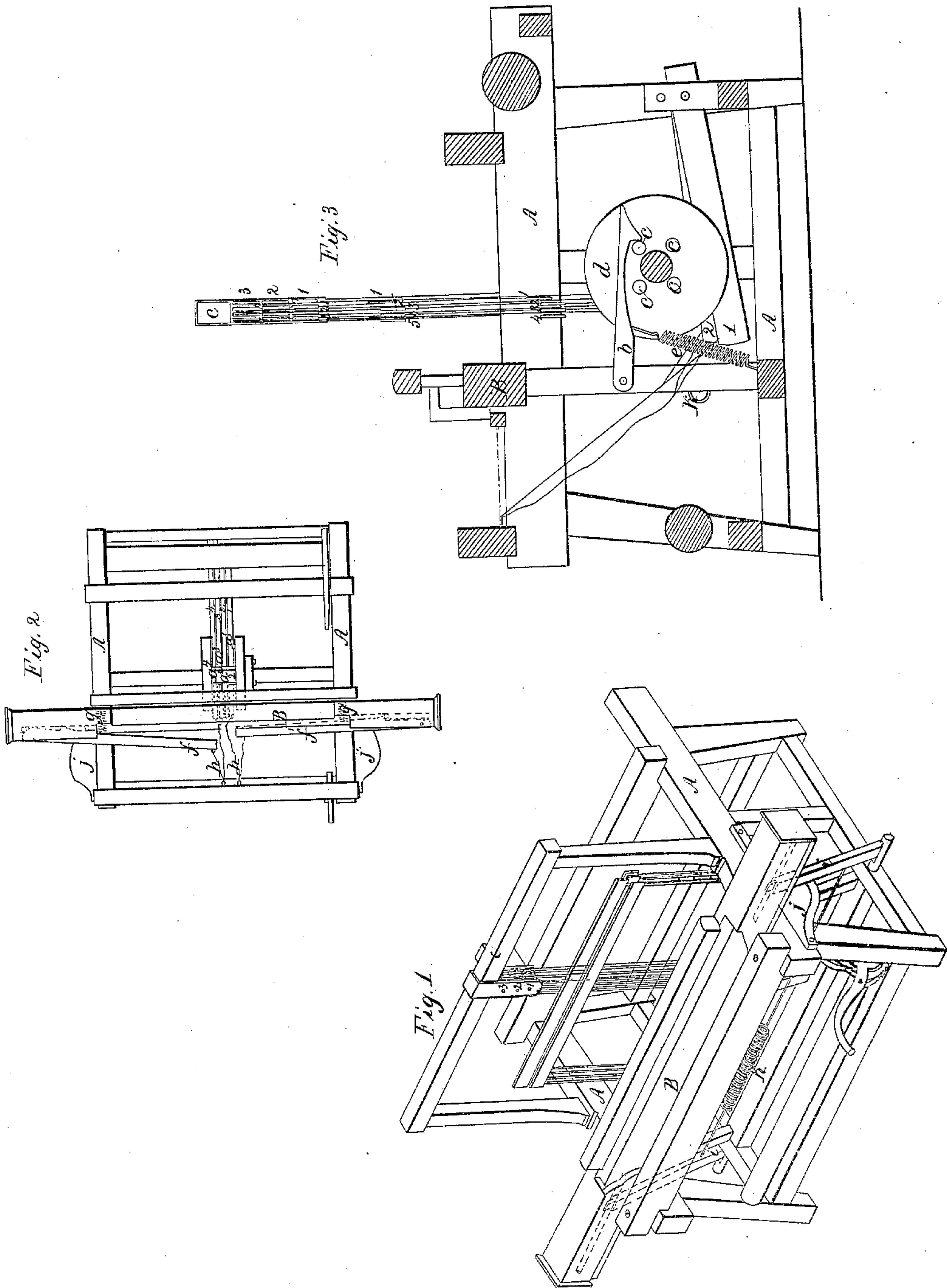


S. C. Mendenhall.

Bag Weaving.

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UNITED STATES PATENT OFFICE.

STEPHEN C. MENDENHALL, OF RICHMOND, INDIANA.

MODE OF THROWING SHUTTLES IN LOOMS.

Specification of Letters Patent No. 9,387, dated November 9, 1852.

To all whom it may concern:

Be it known that I, STEPHEN C. MENDENHALL, of Richmond, in the county of Wayne and State of Indiana, have invented certain
5 new and useful Improvements in Looms for Weaving Seamless Bags which are Applicable to Either Hand or Power Looms; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, and letters marked thereon, forming a
10 part of this specification.

My invention relates to improvements in looms for weaving two cloths united at the
15 selvages, that is, for weaving a continuous cloth, the weft instead of being passed back and forth by the shuttle, passes completely around or forms a continuous circuit without a selvage.

20 The mechanism for throwing the shuttle is regulated in its action, at every pick by the treadles, which prevent it from flying, until the lay has arrived at its farthest extent of back action and thereby is fully shed.

25 The accompanying drawing, Figures 1, 2, and 3, represent my "Columbia bagging loom" which can be used either for weaving plain, single or double cloths, without changing the harness or treadles.

30 In each of these figures where like parts are shown they are designated by the same letters of reference.

35 A, A, the main frame B, the lay, and C, the harness tie, constructed in the usual manner.

The cams a^1 a^2 a^3 a^4 are attached to a horizontal shaft, similar to those of ordinary looms and are designed to be operated in regular order as usual for weaving four leaved
40 twills, commencing with the first treadle and ending with the fourth, which order is repeated whether it be for weaving the double part of the bag or the single part for closing up the end.

45 A combination of cords and pulleys are operated by the treadles for producing the necessary reversed order in the sheds of the warp as follows: 1, 2, 3, 4 are four heddles their upper and lower shafts designated by
50 1 2 3 4, dividing the warp into four divisions, the first and third divisions making the upper side of the bag and the second and fourth the lower side. In order to produce these changes in the warp I have three sets
55 of pulleys 1, 2, 3, which are suspended from the tie c above the harness. The first shed

is produced by securing the second third and fourth lower treadle shafts by means of short cords to the first treadle which in its downward action takes $\frac{3}{4}$ of the warp down, 60 being all that forms the lower part of the bag and also $\frac{1}{2}$ that forms the upper part of the bag, but in order to make a wider shed so as to give the shuttle a free action in passing through the warp, I attach a cord to the
65 first treadle, passing it through the warp and over the first pulley of the first set and securing it to the first upper heddle shaft. When the lay is moved forward it causes the cam shaft to revolve which causes the first
70 cam to act on the first treadle—moving it downward, and the 2nd, 3rd and 4th shafts being secured to it as above described, are taken down, while the 1st moves up producing a full shed; the shuttle then passes
75 through carrying a weft thread through the upper side of the bag. The second is produced by securing the 2nd lower heddle shaft by means of a short cord to the second treadle which in its downward motion takes
80 $\frac{1}{4}$ of the warp down and in order to take all the warp up that forms the upper side of the bag and $\frac{1}{2}$ that of which forms the lower side, so as to pass the weft thread back through the underside of the bag, I secure
85 three long cords to the same treadle (second) passing them through the warp over the middle set of pulleys and secure their ends to 1st, 3rd and 4th upper heddle shafts. By this arrangement when the second treadle
90 moves down by the action of the second cam a^2 the short cord attached to the second lower heddle shaft takes it down, while the long cords arranged as above described takes the remaining three up. This completes the con-
95 tinuation of our weft thread around the bag. Now in order to cross the leaves on the weft thread on both sides of the bag two more sheds are necessary. In producing the third shed I secure the first second and fourth
100 lower heddle shafts by three short cords to the third treadle and pass a 4th cord from the same treadle through the warp over the third pulley of the first set and secure it to the third upper heddle shaft. In the opera-
105 tion of the third cam on the third treadle the 1st, 2d, and 4th divisions of the warp are taken down and the 3rd put up. This crosses the two upper divisions of the warp on the first weft thread and makes a third
110 shed or opening for the shuttle to pass a third weft thread through. To produce the

fourth thread I attach a cord to the fourth lower heddle shaft from the 4th treadle and from the same treadle I pass three other cords through the warp over the third set of pulleys and secure their ends to the 1st 2nd and third upper heddle shafts. When the 4th treadle is moved down by the action of the 4th cam, the 4th division of the warp is taken down and the remaining $\frac{3}{4}$ taken up. This closes the lower two divisions of the warp on the second weft thread and makes a 4th shed or opening for a shuttle to pass a 4th weft thread through. The next motion of the lay on the cam shaft brings it back to its first position as above described. This completes my simple and effective process of uniting two pieces of cloth at their selvages by one continuous weft thread. This combination of cords and pulleys is not confined to this loom, but may be used in other looms, hand or power.

The mode of operating the cam shaft, consists in providing a hook (*b*) hinged to a brace, extending from the center of the lay to the lay shaft and providing a series of pins or notches (*c c c c*) on one of the treadle guides (*d*) against which said hook impinges, on the forward motion of the lay, and moves the shaft operating the treadles; and on the backward motion of the lay, the hook is drawn down close to the pins by a spring (*e*). Thus the treadles are operated by means of the cams in the order above described. Cams ($a^1 a^2 a^3 a^4$) are arranged two on the treadle shaft and two on each of the treadle guides (*d d*) and the treadles 1 2 3 4 are hinged at the back of the frame in the usual manner.

The mode of operating the shuttle, which constitutes the main feature of my invention, consists in making the throwing of the shuttle dependent upon the action of the treadles and lay, so that it cannot fly until the lay is at its farthest backward motion, and the shed completely produced; consequently it will always have a wide opening through the warp in which to fly, and cannot by any awkward management of the lay, when the loom is operated by hand, cause the shuttle to hang or catch in the warp. The throwing of the shuttle is dependent upon the treadles by means of two spring triggers (*f f'*) hinged to the underside of the lay beam, provided with spiral springs (*g g'*) these are connected with the treadles by the cords (*h h*) attached to the breast-beam, which cords branch off before they reach the treadles into four cords which are attached to each alternate treadle, that is, the two ends of the cord leading from the trigger (*f'*) are attached to the first and third treadles, and those leading from the

trigger (*f*) are attached to the 2nd and fourth treadles. These triggers are provided with notches, seen in dotted lines, which catch and set the staves (*i i*) alternately at each forward motion of the lay, by the action of the inclined cams (*j j*), secured to the side of the frame.

When the lay is at its full backward motion as in Fig. 2, one set of cords attached to said triggers and treadles, are drawn tight by the action of the cams on the treadles, which releases one of the staves *i i* which by the action of the spiral spring (*h*) causes said stave to actuate the shuttle block and throw the shuttle. Thus the staves are alternately set, by the inclined cams (*j j*) at each forward motion of the lay, and alternately released at each backward motion of the lay, by the action of the treadles upon the triggers through the medium of the cords (*h h*) as described.

After weaving a sufficient distance for the length of the bag I close the end by changing the order in which the divisions of the warp are taken up and down, simply, by loosening the long cord which passes from the 4th treadle through the warp over the 3rd pulley of third set and securing it to the third upper heddle shaft; then I connect the third lower heddle shaft by means of an extra short cord to the 4th treadle. With this arrangement when the 4th treadle is taken down the first and second divisions of the warp passes up, and the 3rd and fourth down, perfectly interlocking the two ends of the cloths to form the end of the bag. I weave in this way far enough to close the ends of two bags; then I change back to the double arrangement and weave far enough for the length of the two bags. In this way I weave two ends and two mouths together alternately throughout the length of the warp.

Having thus fully described the construction and operation of my "Columbia bagging loom" what I claim and desire to secure by Letters Patent is—

The combination and arrangement of the spring triggers *f f*, cords *h h*, and treadles 1, 2, 3, &c., so that the depression of any one of these treadles shall release the triggers on the forward movement of the lay and allow the picker staff to actuate the shuttle substantially as set forth.

In testimony whereof I have hereunto signed my name before two subscribing witnesses.

S. C. MENDENHALL.

Witnesses:

GEORGE H. WEEKS,
GEO. R. WEST.