(No Model.) 3 Sheets—Sheet 1.

M. ARMITAGE & C. TOPHAM.

DROP BOX MECHANISM FOR LOOMS.

No. 422,279. Patented Feb. 25, 1890.

FIG. 1.

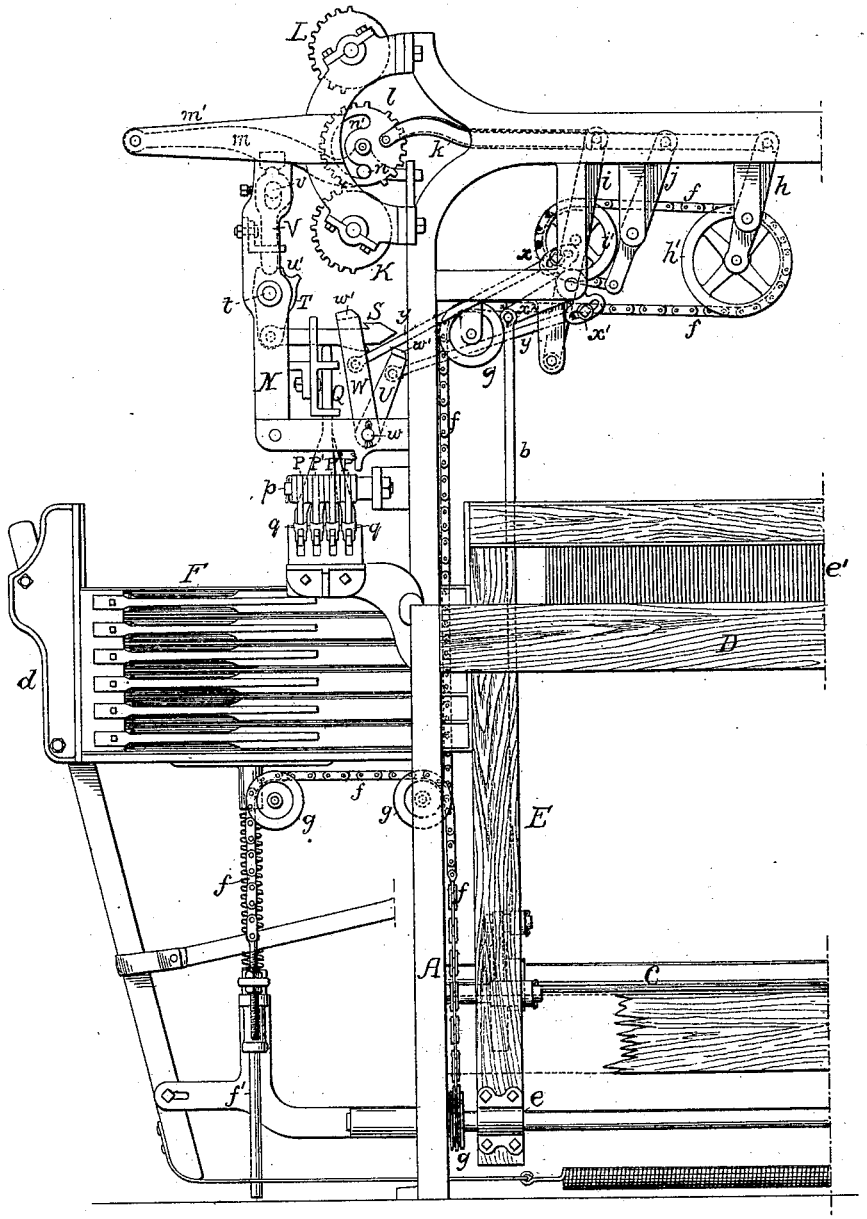

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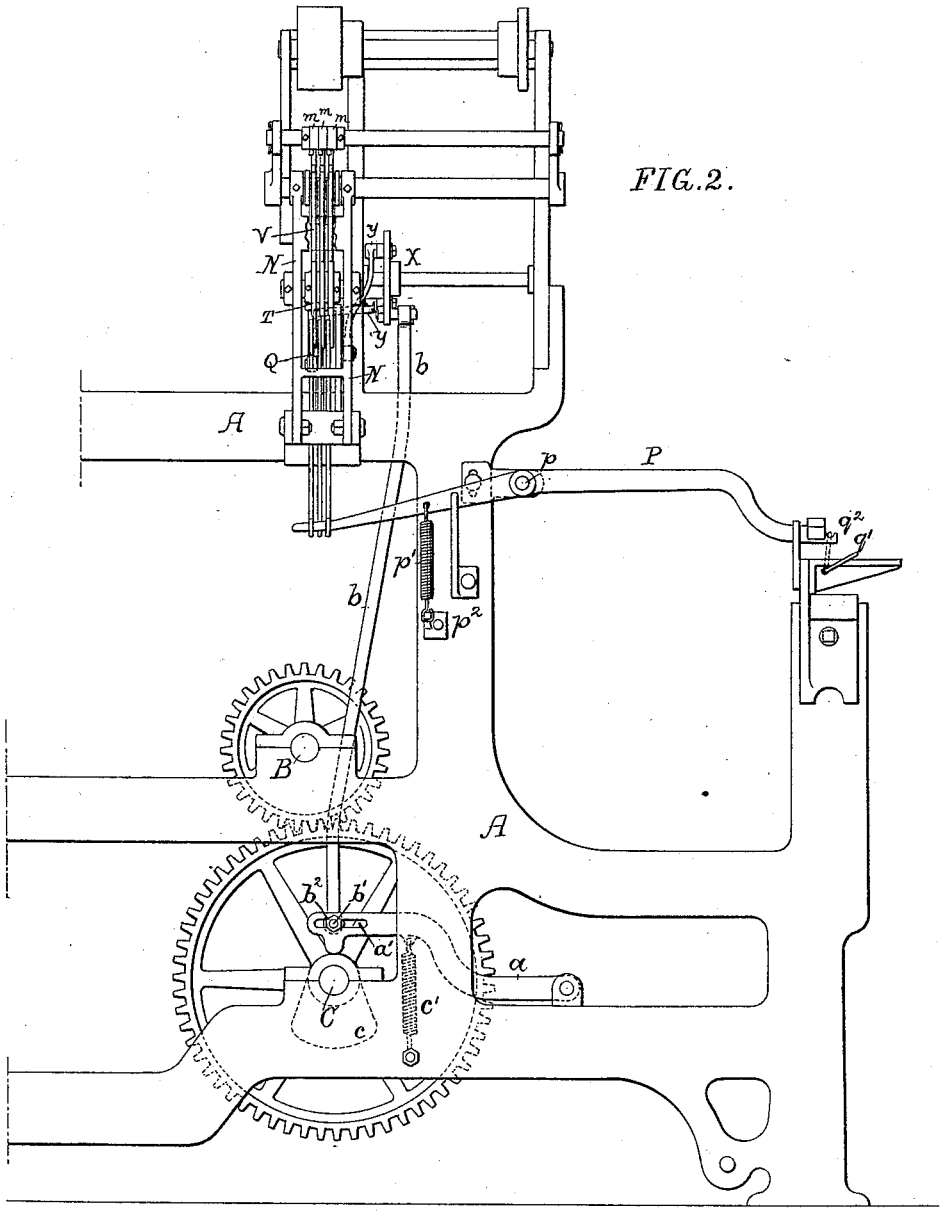
FIG. 2.



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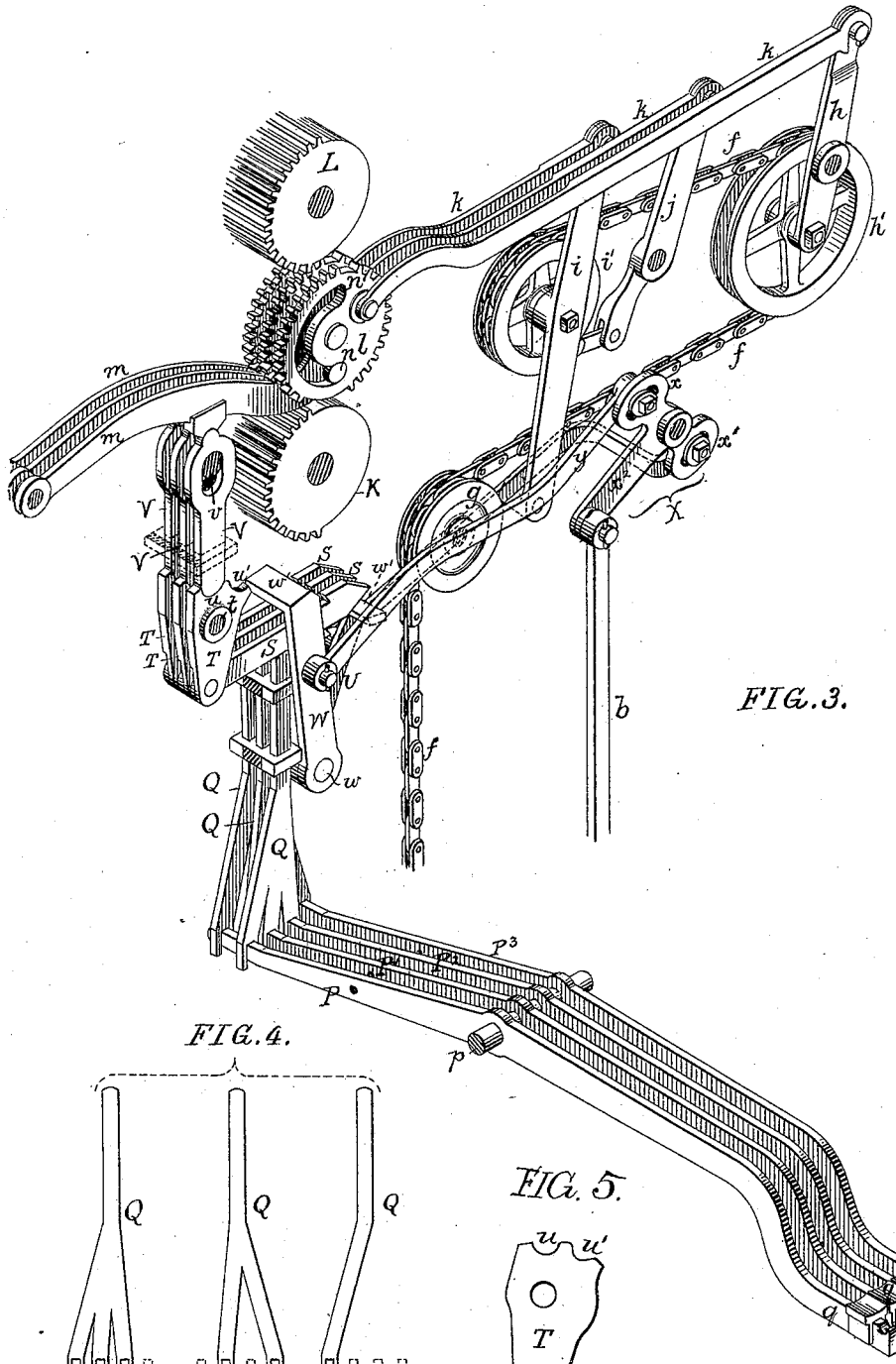
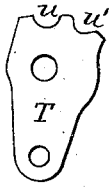


FIG. 3.

FIG. 4.

FIG. 5.



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UNITED STATES PATENT OFFICE.

MARRIOTT ARMITAGE, OF LONG ISLAND CITY, NEW YORK, AND CHARLES TOPHAM, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNORS TO JOSEPH WILD AND JOHN CARTLEDGE, BOTH OF BROOKLYN, NEW YORK.

DROP-BOX MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 422,279, dated February 25, 1890.

Application filed August 17, 1888. Serial No. 282,998. (No model.)

To all whom it may concern:

Be it known that we, MARRIOTT ARMITAGE and CHARLES TOPHAM, both citizens of the United States, and the said ARMITAGE residing in Astoria, Long Island City, New York, and the said TOPHAM residing in Philadelphia, Pennsylvania, have invented certain Improvements in Drop-Box Mechanism for Looms, of which the following is a specification.

Our invention relates to looms for weaving leno fabrics, such as those which are afterward severed between the lines of warp to form chenille strips; and the object of our invention is to facilitate the weaving of such fabrics. This object we attain by providing the loom with drop-boxes and dictating the proper operation of said drop-boxes through the medium of a key-board, as fully described hereinafter.

In the accompanying drawings, Figure 1 is a front view of sufficient of a loom to illustrate our invention. Fig. 2 is a side view of part of the loom, showing only that part of the drop-box-operating mechanism to which our invention particularly relates and omitting the shuttle-boxes, lathe, &c. Fig. 3 is a detached perspective view of the drop-box-operating mechanism with our attachment, and Figs. 4 and 5 are views of detached parts of said mechanism.

We have omitted from the drawings the warp carrying and shedding mechanism in order to illustrate more clearly the points of our invention. We may say, however, that the shedding mechanism which we prefer to use in connection with our improved box-motion is fully illustrated and described in the Letters Patent granted to H. and C. Topham on the 29th day of May, 1888, No. 383,838.

The ordinary method of weaving a leno fabric which is intended to be subsequently cut between the lines of warp to form strips of chenille for use in weaving rugs, lambrequins, carpets, and other fabrics is a slow one, as a hand-loom with single shuttle-box is generally used, and the loom is stopped and the shuttle changed whenever a change of color in the weft becomes necessary. Such changes are frequent, as a dozen or more colors are frequently employed and the same color may be used for but a few picks at a time. We overcome this objection by using drop-boxes raised and lowered by power and timed with the shedding mechanism of the loom, the power mechanism being governed by the manipulation of the keys carried by levers conveniently arranged for operation by the weaver.

Referring to the drawings, A is part of the frame of the loom, B the usual driving or crank shaft, and C the cam-shaft, geared together as shown.

D is the breast-beam of the loom, and E is the lathe, pivoted at *e* and carrying the shuttle race and reed *e'*, and also the guides *d* for the shuttle-boxes F, all of which parts may be of the ordinary construction, as they form no part of our invention.

We have shown in the drawings six shuttle-boxes and mechanism for operating this number; but it will be understood that any number of boxes and any desired style of box-operating mechanism may be used without departing from our invention, the mechanism shown in the drawings being that of the well-known "Knowles" loom. (See Patent No. 134,992, dated January 21, 1873.)

The boxes are raised and lowered by means of a chain *f*, which is secured to a vertical shaft *f'*, attached to the lower portion of the box-frame and adapted to suitable guideways in the fixed frame, as usual, the chain passing over pulleys *g*, thence over a wheel *h'*, hung to a lever *h*, thence over a wheel *i'*, hung to a lever *i*, and thence to one arm of a lever *j*, all these levers being pivoted to the frame of the loom. Each of these levers is connected to a segment-pinion *l* through the medium of a connecting-bar *k*, and said segment-pinions are hung to levers *m*, pivoted to an arm *m'* on the frame of the loom. The connecting-rods *k* are hung to crank-pins on the pinions *l*, as shown, and the pinions can have a limited rotating movement dependent upon the stop-pins *n*, projecting from the levers *m* and adapted to slots *n'* in said segment-pinions.

Directly above and below the segment-pin-

ions are power-driven toothed segment-gears L and K, and in practice the upper gear is rotated in one direction and the lower gear in the opposite direction, so that it will be seen that by throwing either of the segment-pinions in gear with the gear L it will be moved in one direction and by throwing it in gear with the gear K it will be moved in the other direction, the lever *h*, *i*, or *j* being likewise moved, so as to take up or let out a certain length of chain *f* to raise or lower the boxes to the desired extent.

The levers *m*, carrying the segment-pinions, are ordinarily moved to throw the pinions into and out of gear with the power-driven gears L and K by means of pattern chains or cards; but in weaving fabric for chenille the use of such devices is impracticable, on account of the necessarily elaborate character of the same, and because in most cases but one piece of fabric of any particular pattern is required; hence the chain or set of cards after the weaving of that one piece would be useless. By the mechanism which we have devised, however, the weaver has the drop-boxes completely under control and can bring any one of the shuttles into line with the race, as desired.

Pivoted to a stud *p* on the frame of the machine are levers P, P′, P², and P³, one arm of each lever being provided with a key *q*, while the other arm is adapted to engage with one or more of a series of vertical adjusting-bars Q, each of which is adapted to a guide in a frame N, projecting from the side of the loom, and is peculiarly constructed at its lower end—that is to say, it is forked or branched, one of the bars being so constructed that it is acted upon by the lever P, another bar being acted upon by the levers P′ P³, and the third being acted upon by the levers P, P′, and P², as shown in the diagram, Fig. 4.

Above each of the bars Q is a jack S, pivoted to one arm of a lever T, hung to a stud *t* on the frame N, each lever having a short arm with pockets *u u′*, in one or other of which rests the lower end of a slide V, adapted to a guide on the frame of the loom, and guided also by a pin *v*, passing through a slot in the slide, as shown in Fig. 3, the slide being lowered when it rests in the pocket *u* and raised when it rests in the pocket *u′* of the lever T.

Pivoted to a stud *w* on the frame of the machine are two levers W and U, each having a projecting bar *w′*, that of the lever W being above the jacks S, while that of the lever U is beneath the jacks. Each jack is notched above and below for engagement with the bars *w′*, so that when a jack is raised by the adjusting-bar it will be thrown into engagement with the bar *w′* of the lever W, and if allowed to fall the bar *w′* of the lever U will engage with it.

The levers W and U are connected by rods *y* to oppositely-projecting arms *x x′* of a three-armed lever X, pivoted to the frame of the loom and adjustably connected by a rod *b* to a lever *a*, which is acted upon by a cam *c*, (shown by dotted lines in Fig. 2,) and is held in contact with this cam by a spring *c′*, so that a vibrating motion is imparted to the lever X and thence to the levers W and U. The lever *a* has a slot *a′*, and the bolt *b′* at the lower end of the rod *b* can be moved to and fro in this slot and secured in position after adjustment by a nut *b²*.

The keys *q* of the levers P P′ P² P³ are held in the raised position by means of springs *p′*, acting on the levers and secured to a bracket *p²* on the frame of the loom.

When it is required to hold one or other of the levers in operative position for a considerable time, a link *q′* is passed over the hooked end *q²* of the lever, this plan being preferably adopted where a number of shots of the same color have to be made, thus avoiding the necessity of holding down the key by hand.

A pull upon the lever *j* effects the lifting of the boxes to the extent of one box. A pull upon the lever *h* lifts to the extent of two boxes, and a pull upon the levers *j* and *h* lifts to the extent of three boxes. A pull upon the levers *i* and *h* lifts to the extent of four boxes, and a pull upon all the levers *h*, *i*, and *j* lifts to the extent of five boxes, thus placing the sixth box in position.

The rear adjusting-bar Q is under control of the lever P. The intermediate bar is controlled by the levers P′ and P³, and the front bar by the levers P, P′, and P². By this means a lift to the extent of one, two, three, or four boxes may be effected by depressing but one key at a time, or a lift to the extent of five boxes by depressing all of the keys simultaneously. Thus by depressing the key P³ the intermediate bar Q will be lifted and the operating devices for the lever *j* will be thrown into action, so as to lift one box. By depressing the key P² the front bar Q will be lifted and the operating devices for the lever *h* thrown into action, so as to lift two boxes, while by depressing the key P′ the front and intermediate bars Q will be lifted, thus effecting the operation of the levers *h* and *j* and a lift of three boxes, and by depressing the key P the front and rear bars Q will be elevated, so as to effect the operation of the levers *h* and *i* and a lift of four boxes, the depression of all of the keys effecting the elevation of all of the bars Q and the operation of all of the levers *h*, *i*, and *j*, so as to lift five boxes. If each bar Q were controlled by but one key-lever, the depression of two of these levers simultaneously would be required to lift the box-rod to the extent of three or four boxes, whereas this is rendered unnecessary by the construction shown.

It will be understood that the levers P P′ P² P³, instead of being hand-levers, may be in position to be operated by the foot, or may be connected with suitable treadle mechanism, without departing from our invention; and it will also be understood that a greater or less number of levers may be used, depending

upon the quality of the work and the number of boxes employed.

We have shown in the drawings the key-levers acting upon the jacks S to throw them into engagement with the power-actuated levers W and U; but it should be understood that the adjusting-bars Q may act directly upon the levers *m*, if desired. In this case, however, not only will more power have to be exercised, but the levers will have to be held down while the boxes are being moved, whereas in the construction shown the levers are merely held down a sufficient length of time to allow the lever W or U to catch the jack, after which said lever W or U completes the movement and the key-lever can be released. The series of levers *m* are therefore to be viewed simply as the primary elements of the power-actuated shuttle-box mechanism, our invention consisting, mainly, in the use of a series of key-levers and adjusting-bars for acting upon these primary elements of the power mechanism either directly or through the medium of the intervening mechanism shown, in place of the pattern-chain usually employed for the purpose, with the view of dispensing with the impracticably long pattern-chain which would be required if each pick from the beginning to the end of the piece of fabric to be woven had to be represented by a separate link of pattern-chain, as it would have to be where, as in weaving chenille, there is no repetition in the pattern.

We therefore claim as our invention—

1. The combination of the series of primary elements of the power-actuated shuttle-box mechanism with controlling mechanism therefor, embracing a series of key-levers, whereby said mechanism constitutes a substitute for the ordinary pattern-chain, substantially as specified.

2. The combination of the series of primary elements of the power-actuated shuttle-box mechanism with controlling mechanism therefor, comprising a series of slides, levers acting thereon, jacks hung to said levers, vibrated bars engaging the jacks, a series of adjusting-bars for the jacks, and a series of key-levers acting on said adjusting-bars, substantially as specified.

3. The combination of the series of primary elements of the power-actuated shuttle-box mechanism with controlling mechanism therefor, comprising a series of adjusting-bars and a series of key-levers acting upon said bars, each lever operating one of the bars and some of the levers operating more than one of the bars, substantially as specified.

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

MARRIOTT ARMITAGE.
CHARLES TOPHAM.

Witnesses:
HUBERT HOWSON,
GEO. A. CRANE.