(No Model.) 3 Sheets—Sheet 1.

F. LEAKE.

TERRY LOOM.

No. 454,367. Patented June 16, 1891.

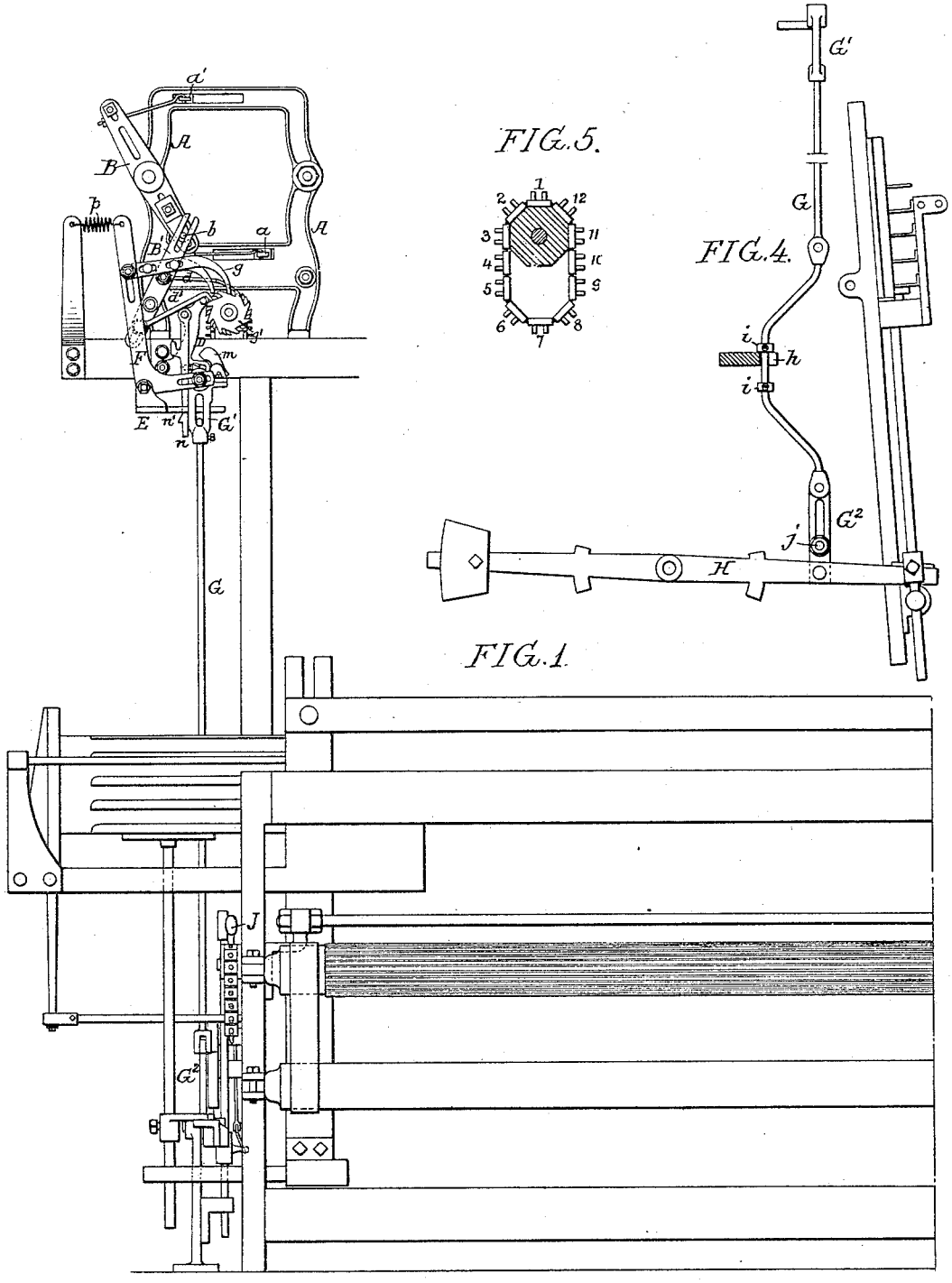

FIG. 1.

FIG. 5.

FIG. 4.

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by his Attorneys
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(No Model.) 3 Sheets—Sheet 2.

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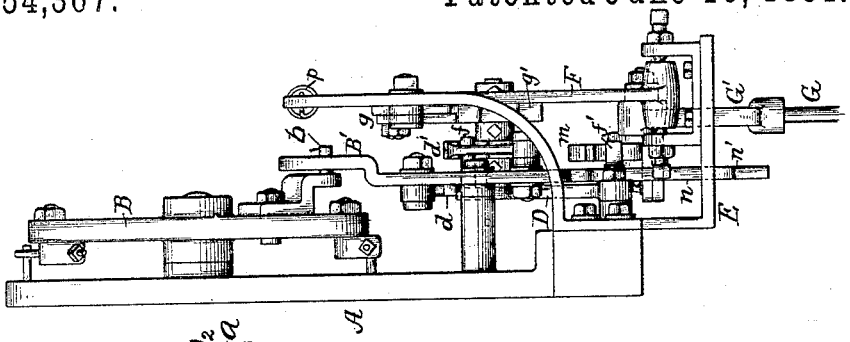

FIG. 3.

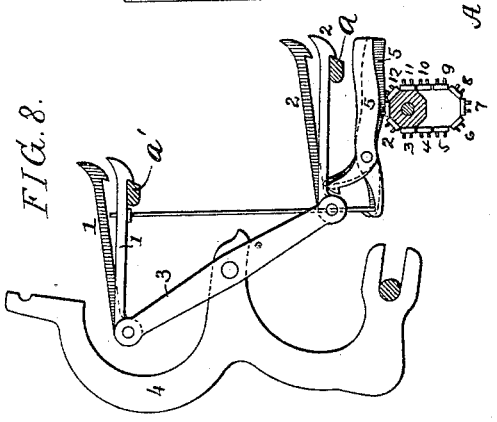

FIG. 8.

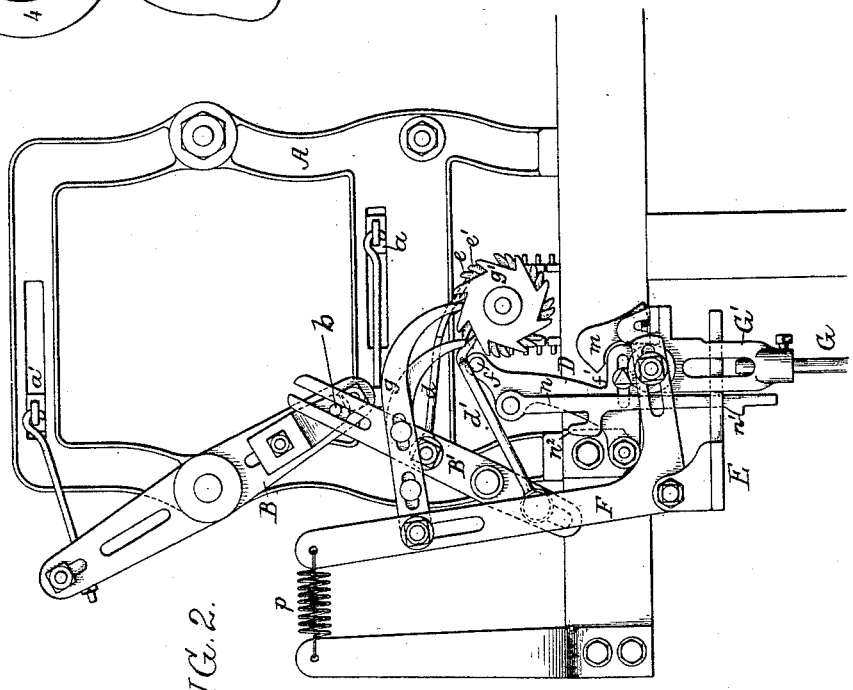

FIG. 2.

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(No Model.) 3 Sheets—Sheet 3.

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FIG. 6.

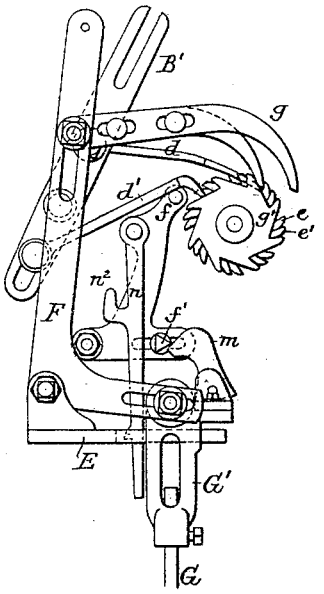
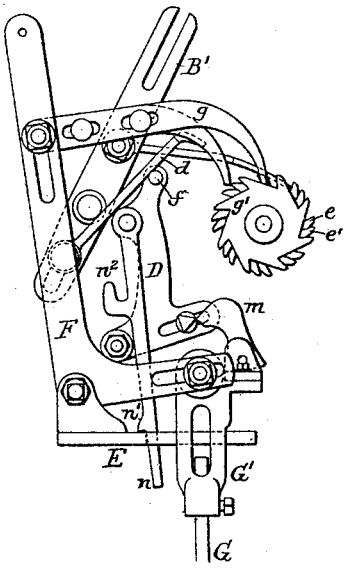


FIG. 7.



Witnesses:
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Alex. Barkoff

Inventor:
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UNITED STATES PATENT OFFICE.

FRANK LEAKE, OF PHILADELPHIA, PENNSYLVANIA.

TERRY-LOOM.

SPECIFICATION forming part of Letters Patent No. 454,367, dated June 16, 1891.

Application filed September 5, 1890. Serial No. 364,001. (No model.)

To all whom it may concern:

Be it known that I, FRANK LEAKE, a citizen of the United States, residing at Philadelphia, Pennsylvania, have invented certain Improvements in Terry-Looms, of which the following is a specification.

My invention consists of certain improvements in that class of looms which are employed for weaving Turkish towels or like terry goods and in what may be termed "duplex harness mechanism" is employed, so that there may be one shedding of warp-threads while the terry portion of the fabric is being woven and another and different shedding of warp-threads while a fancy patterned border or stripe is being woven, the change in the character of the shedding being due to a change in the operation of the pattern-chain of the heddle mechanism in respect to the movement of the other parts of the same.

The object of my invention is to effect this change automatically instead of by hand, as usual. This object I attain in the manner hereinafter set forth, reference being had to the accompanying drawings, in which—

Figure 1 is a front view of sufficient of the loom to illustrate my invention. Fig. 2 is an enlarged front view of that part of the heddle-operating mechanism to which my invention relates. Fig. 3 is an view of the same. Fig. 4 is a view on a smaller scale of part of the mechanism constituting the subject of my invention. Fig. 5 is a view of the pattern-chain. Figs. 6 and 7 are views in different positions of part of the mechanism shown in Fig. 2, and Fig. 8 is a diagram showing those parts of the heddle-operating mechanism which are not illustrated in Figs. 1 and 2.

In looms of the class to which my invention relates the harness or heddle frames are operated by what is known as a "witch motion" or "dobby," having upper and lower reciprocating bars a' a, acting, respectively, on hooked arms 1 and 2, connected to levers 3, which carry the levers 4 for operating the heddle-frames, and in connection with such heddle mechanism what may be termed a "duplex pattern-chain" is used, said chain having a series of bars or lags with double rows of pins for acting upon levers 5, controlling the hooked arms 1 and 2, which are under the influence of the reciprocating bars a' a of the heddle mechanism. (See Fig. 8.)

The bars a a' act alternately—that is to say, when one bar is moving forward or acting the other bar is moving backward, and the character of the shedding is dependent upon the timing of the movements of the pattern-chain in respect to the movements of these reciprocating bars—that is to say, the pins upon the bars are so arranged that if the pins of the bars 1 3 5 7, &c., of the chain are acting during the forward movement of the upper bar and the pins of the bars 2 6 8, &c., during the forward movement of the lower bar the operation of the heddles will be such as is required for the plain shedding of the warp for the production of the terry portion of the fabric, while if, on the contrary, the timing of the movements of the pattern-chain is altered so that the pins of the bars 2 4 6, &c., are operative when the upper reciprocating bar is acting and the pins of the bars 1 3 5 7, &c., when the lower bar is acting the shedding will be changed to that required for the patterned border or stripe, or the reverse may be the case. Heretofore this change in the timing of the movement of the pattern-chain has been effected by turning the chain backward or forward to the extent of one tooth of its operating-ratchet when about to begin weaving the stripe or border and turning it forward or back to the extent of a tooth when the weaving of the stripe or border was completed, both of these operations being performed by hand.

In carrying out my invention I effect the change in the movement of the pattern-chain automatically through the medium of the drop-box mechanism in a manner which I will now describe.

In Fig. 1, A represents the frame of the harness motion, and a a' respectively the lower and upper reciprocating bars of the same, these bars being actuated by rods connected to levers B at opposite ends of the frame A. One of these levers has a pin b, adapted to a slot in a lever B', the opposite arms of which carry pawls d d' for acting upon the teeth of ratchet-wheels e e' on the shaft of the pattern-chain drum, so that there will be a movement of said drum to the extent of two

teeth for each backward and forward vibration of the lever B. Upon one of the side frames of the loom is pivoted a lever D, (hereinafter in some cases referred to as a "lifter-lever,") which has a pin *f* projecting beneath the lower pawl *d'*, and also has a projecting stud *f'*. (Shown in Figs. 2 and 3.)

Hung to a bracket E on the side frame of the loom is a lever F, one arm of which carries a double-toothed pawl *g* for acting on a ratchet-wheel *g'* on the shaft of the pattern-chain drum, the other arm of this lever being connected to the head G' of a rod G, which, as shown in Fig. 4, passes through a slotted lug *h* on the frame of the loom, and has above and below said lug a collar *i*, the lower end of the rod having a slotted head G^2 for the reception of a pin *j*, projecting from a stud on the drop-box lever H. Hung to a flange on the head G' of the rod G is a dog *m*, and to the lifter-lever D is hung a catch or detent-arm *n*, passing through a slot in the bracket E, and having a shoulder *n'* for engaging with said bracket, said arm also having a finger n^2 for a purpose described hereinafter.

When the loom is weaving the terry portion of the fabric, the top box of the set is in line with the shuttle-race and the head G^2 of the rod G has been acted upon by the pin *j*, so as to pull said rod downward to its full extent, the rod remaining in this position as long as the top box is in action. When the rod is down, the dog *m* on the head G' of the rod occupies a position beneath the stud *f'* of the lifter-lever D, as shown in Fig. 6.

During the time the terry fabric is being woven the drop-box chain is out of action; but when the time arrives for weaving a stripe or border the drop-box chain is thrown into action by an automatic device—such, for instance, as that shown in Hebden's patents, Nos. 399,613 and 401,702. As soon as the drop-box commences to rise the downward strain is removed from the rod G, and the latter is permitted to rise under the action of a spring *p*, which is connected to the upper end of the lever F, the extent of this rise of the rod being limited by the lower collar *i* coming in contact with the lug *h* on the frame of the loom. As the rod rises the stud *f'* of the lever D is acted upon by the dog *m* and said lever is swung upward, so that its pin *f* lifts the pawl *d'* out of engagement with the ratchet-wheel *e'*, the shoulder *n'* of the catch or detent-arm *n* engaging with the bracket E to retain the lever in the elevated position, as shown in Fig. 7. The lever remains in this position, however, only during one vibration of the lever B', for as the lower arm of the latter swings forward it strikes the finger n^2 of the catch or detent-arm *n* and pushes the latter forward, so that its shoulder is released from engagement with the bracket E, and the lever D is permitted to fall to its normal position. Hence the pawl *d'* is only held out of action for one stroke, and consequently misses but one tooth in the movement imparted to the ratchet-wheel *e'*, this being sufficient to change the order of presentation of the pins on the bars of the pattern-chain, in the manner and for the purpose before described.

The operation of the lever F, which caused the rise of the rod G, drew back the double-pointed pawl-bar *g* into position for acting upon the teeth of the ratchet-wheel *g'*, and when the weaving of the stripe or border has been completed and the drop-boxes again fall, so as to bring the top box into line with the shuttle-race, the rod G will be again pulled downward and the lever F will be caused to swing so as to carry its pawl *g* forward and impart movement to the ratchet-wheel *g'* to the extent of a tooth, this movement being, in addition to the normal movement of the pattern-chain drum, due to the action of the pawls *d d'* upon the ratchet-wheels *e e'*. It will thus be seen that at the beginning of the operation of weaving a stripe or border the movement of the pattern-chain drum is retarded to the extent of a tooth, while when the weaving of the stripe or border is completed the movement of said pattern-chain drum is accelerated to the extent of a tooth, so that the desired change in the order of presentation of the bars or lags of the pattern-chain is effected both at the beginning and the end of the operation of weaving said stripe or border.

The object of furnishing the pawl *g* with two teeth or points is to insure the proper extent of movement of the ratchet-wheel *g'*, for, as said pawl is rigidly secured to the lever F, the tooth upon which the forward point acts swings down beyond the path of said point before the movement is completed, the second or following point of the pawl then acting upon the succeeding tooth, however, to insure the completion of the movement.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination, in a loom, of the devices for operating the pattern-chain drum of the heddle mechanism, with the drop-box mechanism and with a connection between the two, whereby the movement of the pattern-chain drum is changed from its normal movement when the box carrying the terry-weft is moved out of or brought into line with the shuttle-race, substantially as specified.

2. The combination of the ratchet-wheels on the pattern-chain drum, a lever carrying pawls for operating said wheels, a lifter for one of said pawls, a lever forming part of the drop-box mechanism, and a rod through the medium of which the movement of said drop-box lever is imparted to the pawl-lifter, and the pawl acted on by the latter thus temporarily rendered inoperative, substantially as specified.

3. The combination of the pattern-chain drum, a ratchet-wheel thereon, a lever hav-

ing a pawl for acting on said ratchet-wheel, a lever forming part of the drop-box mechanism, and a rod connecting said levers, whereby a certain movement of the drop-box lever effects a movement of the pattern-chain drum independent of that due to its regular operating devices, substantially as specified.

4. The combination of the pattern-chain drum and its ratchet-wheels, a pawl engaging with one of said wheels, a lever acting on said pawl, a lever forming part of the drop-box mechanism, a rod connecting the drop-box lever and pawl-controlling lever, said rod having a slotted connection with the drop-box lever, a spring for effecting the upward movement of the rod, and a stop for limiting said upward movement, substantially as specified.

5. The combination of the pattern-chain drum and its ratchet-wheels, a lever having pawls for engaging with certain of said wheels, a lifter-lever for one of said pawls, a supplementary lever having a pawl for engaging with another of said ratchet-wheels, a lever of the drop-box mechanism, a rod connecting said supplementary lever to said drop-box lever, and a dog, whereby on the movement of said supplementary lever the lifter-lever is raised and the pawl acted on thereby rendered inoperative, substantially as specified.

6. The combination of the pattern-chain drum, ratchet-wheels connected thereto, a lever having pawls for engaging said ratchet-wheels, a lever for lifting one of said pawls out of operative position, a catch or detent for said lifter-lever, a lever of the drop-box mechanism, and a connection between said lifter-lever and drop-box lever, said catch or detent being so located in respect to the pawl-carrying lever that it will be struck and released by the latter on the first forward movement of the same after it lifts the pawl, substantially as specified.

7. The combination of the pattern-chain drum and its ratchet-wheels, a lever having a double-pointed pawl for acting on one of said ratchet-wheels, a lever forming part of the drop-box mechanism, and a rod connecting said levers, substantially as specified.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FRANK LEAKE.

Witnesses:
H. F. REARDON,
JNO. E. PARKER.