

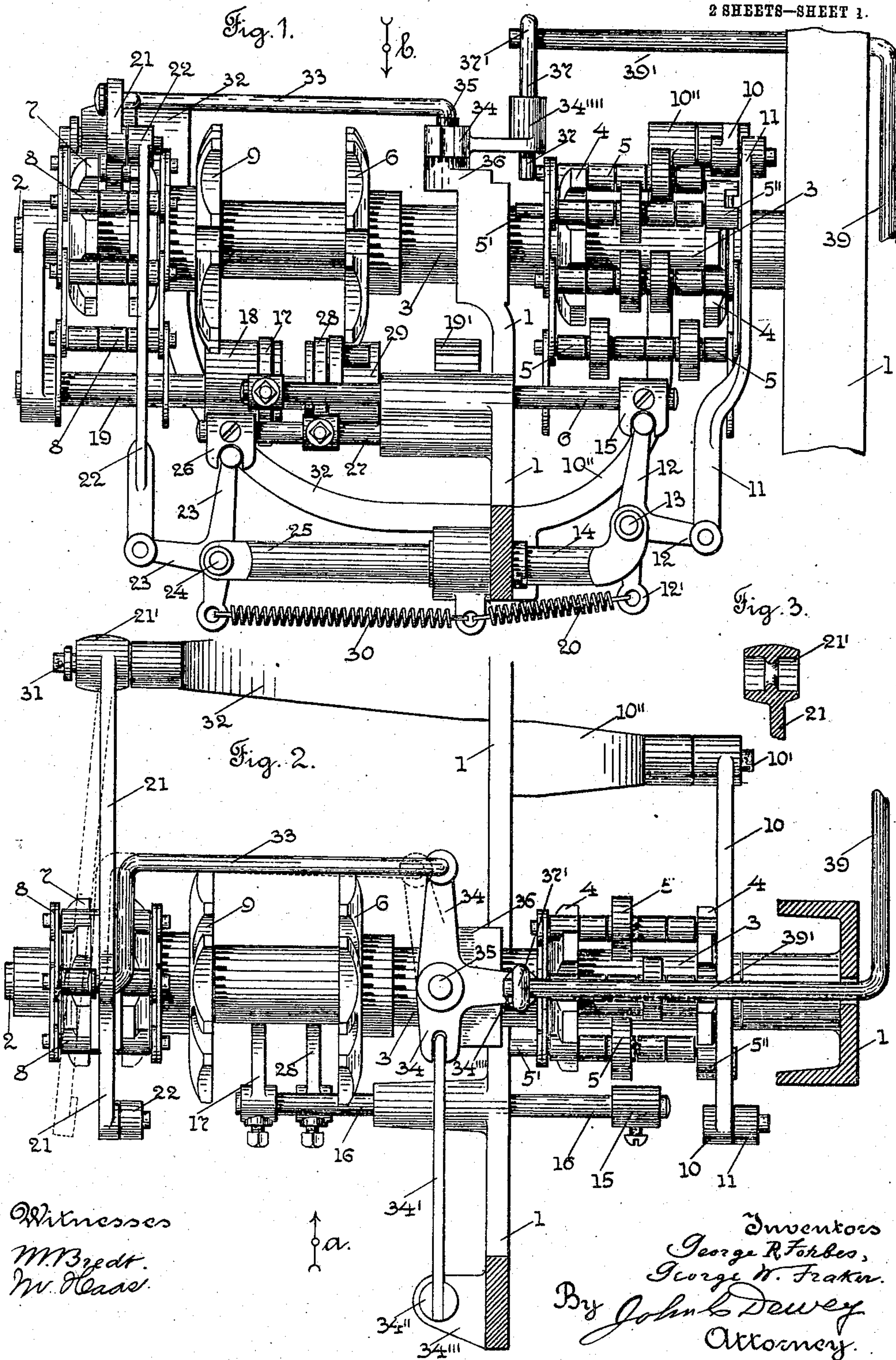
No. 855,102.

PATENTED MAY 28, 1907.

G. R. FORBES & G. W. FRAKER.  
MULTIPLIER MECHANISM FOR BOX LOOMS.

APPLICATION FILED MAR. 28, 1906.

2 SHEETS—SHEET 1.



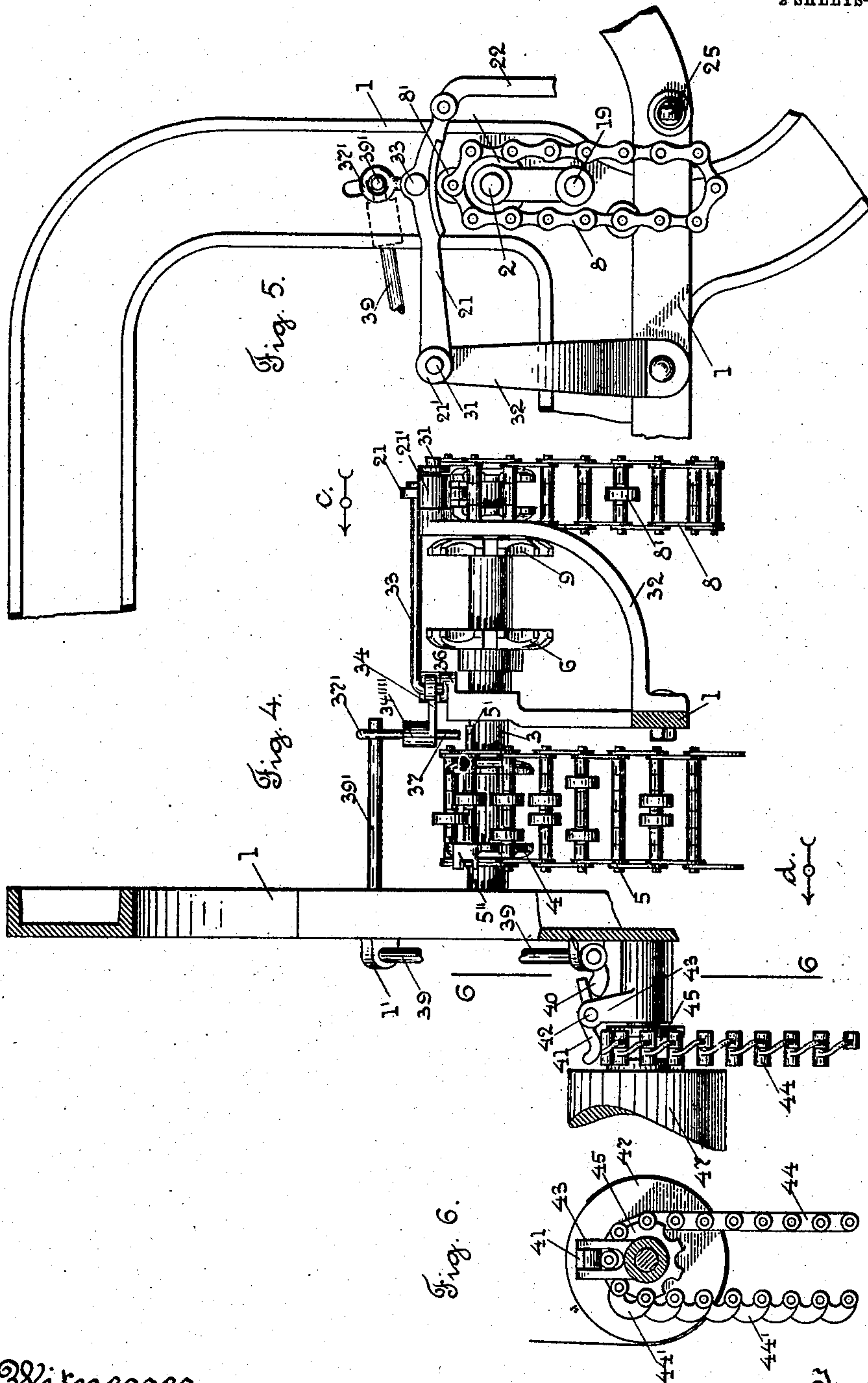
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# UNITED STATES PATENT OFFICE.

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## MULTIPLIER MECHANISM FOR BOX-LOOMS.

No. 855,102.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed March 28, 1905. Serial No. 252,600.

*To all whom it may concern:*

Be it known that we, GEORGE R. FORBES and GEORGE W. FRAKER, citizens of the United States, residing at Spray, in the county of Rockingham and State of North Carolina, have invented certain new and useful Improvements in Multiplier Mechanism for Box-Looms, of which the following is a specification.

Our invention relates to looms, and particularly to that class of looms for weaving blankets, or similar fabrics, which have plain bodies, and borders on their ends. In this class of looms an auxiliary or multiplier pattern chain mechanism is provided, by means of which certain bars of the box pattern chain may be repeated in weaving the plain body of the goods without constructing successive similar bars.

The object of our invention is to provide means, combined with any ordinary multiplier pattern chain mechanism, to automatically move the indicator lever of the multiplier pattern chain out of the path of said chain, into an inoperative position, to remain there for a predetermined length of time, according to the length of the plain body to be woven, and then returning said lever into its operative position in the path of the multiplier pattern chain.

In our improvements, we preferably control the lateral movement of the indicator lever of the multiplier pattern chain, through connections to a pattern chain mounted upon or connected with the take-up roll over which the woven fabric passes.

We have shown in the drawings parts of a box pattern chain and multiplier pattern chain mechanism of well known construction and operation, with our improvements combined therewith, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:—Figure 1 is a side view of a box pattern chain and a multiplier pattern chain mechanism, with our improvements combined therewith, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a plan view of the parts shown in Fig. 1, looking in the direction of arrow *b*, same figure; some of the parts shown in Fig. 1, are left off in Fig. 2. Fig. 3 is a sectional detail of the hub end of the laterally movable indicator

lever of the multiplier pattern chain. Fig. 4 shows the box pattern chain and the multiplier pattern chain on a smaller scale, and also shows the end of the take-up roll, the indicating chain thereon, and connections intermediate said chain and the laterally moving indicating lever of the multiplier pattern chain. Fig. 5 is an end view of the multiplier pattern chain and the indicator lever therefor, and the connections from said lever, shown in Fig. 4, looking in the direction of arrow *c*, same figure. Fig. 6 is a section, on line 6, 6, Fig. 4, looking in the direction of arrow *d*, same figure.

In the drawings is shown a box pattern chain, and a multiplier pattern chain mechanism of well known construction and operation, and which is particularly shown and described in U. S. Letters Patents, No. 413,369, and No. 617,290; the latter patent shows the location and arrangement of some parts, which correspond more closely with the location and arrangement of the parts shown in our drawings.

In the accompanying drawings, 1 is a detached portion of the frame for supporting the several parts of the pattern mechanism at the lower part of the loom, 2 is a shaft, on the inner end of which is loosely mounted a sleeve 3 carrying the shuttle box pattern chain cylinder 4, having the box pattern chain 5 thereon, made up of links, bars, rolls, and tubes, in the ordinary way. On the outer end of the sleeve 3 is fast a star wheel 6.

On the outer end of the shaft 2 is loosely mounted the pattern chain cylinder 7, carrying the auxiliary multiplier pattern chain 8, made up of links, bars, rolls, and tubes, in the ordinary way. Connected with the multiplier pattern chain barrel 7 is a star wheel 9.

Extending over the box pattern chain 5 is an indicator lever 10, which is pivoted on a stud 10' on an arm 10'', and connected, through connector 11, angle lever 12, pivoted at 13 on a stationary arm 14, with a collar 15 on a longitudinally sliding rod 16. The other end of the sliding rod 16 has a yoke shaped arm 17 fast thereon, which engages with a pin wheel 18 splined on a rotary driven shaft 19, having a pinion 19' thereon. Said pin wheel 18 is adapted to be moved into and out of engagement with the star



wheel 9 of the auxiliary pattern chain cylinder 7. A spring 20 secured to an extension 12' on the angle lever 12 and to a stationary part of the frame, acts to move the angle lever 12 and the rod 16, and carry the pin wheel 18 out of engagement with its star wheel 9.

An indicator lever 21 extends over the multiplier pattern chain 8, and is connected, through a connector 22, and an angle lever 23, pivoted at 24 on a stationary arm 25, with a collar 26 fast on the longitudinally sliding rod 27. The sliding rod 27 has a yoked shaped arm 28 fast thereon, which engages with a pin wheel 29 splined on the driven shaft 19. Said pin wheel 29 is adapted to move into and out of engagement with the star wheel 6 of the box pattern chain cylinder 4. A spring 30 attached to the angle lever 23 and to a stationary part of the frame, acts to move the angle lever 23 and rod 27, and carry the pin wheel 29 out of engagement with its star wheel 6.

All of the above parts may be of the usual and well known construction and operation, and are fully described in Patents, No. 413,369, and No. 617,290, above referred to.

We will now describe our improvements, which as above stated, consists of means for automatically moving the indicator lever 21 of the multiplier pattern chain, out of the path of the pattern indicators thereon, into an inoperative position, and returning the same into an operative position over the pattern chain, at predetermined times.

The indicator lever 21 has a hub 21' thereon, pivotally mounted on a stationary stud 31, which is secured in the upper end of a stand 32 secured to the frame, see Fig. 5. The hub 21' is recessed on its inner surface to allow of the swinging or lateral motion of the lever 21 on its pivot stud 31, as shown by full and broken lines in Fig. 2.

The lever 21 is loosely connected, through a connector or link 33, with one arm of an angle or bell crank lever 34, pivotally mounted on a stud 35 secured in the upper end of a stand 36. A flat leaf spring 34', secured at one end in a boss 34'' on a lug 34''', see Fig. 2, has its free end extending into an open end slot in an extension on the angle or bell crank lever 34, and acts to return said lever to its normal position, and yieldingly hold it in its normal position. The other arm of the angle lever 34 has a hub 34'''' thereon, into which loosely extends the lower end of a pin 37, which is adapted in this instance to extend into the path of an extended bar 5' on the box pattern chain 5, see Figs. 1 and 4. The upper end of the pin 37 has an eye 37' thereon into which loosely extends the end of a rod or arm 39', extending at an angle to and forming a part of a rock shaft 39, which is mounted to rock in lugs 1' on the frame 1, see Fig. 4. The other end of the rock shaft

39 has fast thereon an arm 40, which extends under and engages one end of the pattern indicator 41, which is centrally mounted on a stud 42 on a stationary stand 43. The other end of the pattern indicator 41, extends over and is adapted to be engaged by the pattern chain 44, mounted in this instance on a cylinder or barrel 45, fast on the journal 46 of the take-up roll 47.

From the above description in connection with the drawings, the operation of our improvements will be readily understood by those skilled in the art. Supposing the parts of the several mechanisms to be in the position shown in the drawings, and the driven shaft 19 in operation. The roll 8' on the multiplier pattern chain 8, under the indicator lever 21, see Fig. 5, has raised said lever, and through connector 22, angle lever 25, and rod 27, has moved the pin wheel 29 into position to engage with and turn the star wheel 6, and the box pattern chain cylinder 4 and box pattern chain 5, in the usual way. The multiplier pattern chain cylinder 7 and chain 8 are stationary, the pin wheel 18 having been moved out of engagement with the star wheel 9, by the spring 20, on the lowering of the lever 10 of the box pattern chain 5, by a tube passing thereunder, in the usual way. One partial revolution of the box pattern chain 5 brings the long bar 5' in engagement with the lowered pin 37, and at the same time brings a pattern indicating surface 5'' under the lever 10. The pin 37 is in its lowered position, because the lower part of the indicating chain 44 is under the indicator lever 41, see Fig. 4. The engagement of the long bar 5' with the pin 37, moves said pin and with it the bell crank lever 34, and through the connector 33 moves the indicator lever 21 laterally, into an inoperative position, see broken lines, Fig. 2. The lateral movement of the lever 21 from off the roll 8', allows the lever 21 to drop down and the spring 30 to act to move the pin wheel 29 out of engagement with its star wheel 6, and leave the box pattern chain 5 at rest. The passage of the pattern indicating surface 5'' under the lever 10, simultaneously with the movement of the bell crank lever 34, will raise said lever 10, and through connections to the pin wheel 18, will move said pin wheel into engagement with the star wheel 9, to rotate the multiplier pattern chain cylinder 7, and chain 8, in the usual way.

After a predetermined length of the fabric being woven has passed over the take-up roll 47, according to the pattern being woven or the length of the plain body, the controlling chain 44, which revolves with said roll, and is of a length corresponding to the full length of the pattern to be woven, brings the elevated portion 44' of said chain under the indicator lever 41, and raises the engaging end of said lever, and depresses its opposite end, and



causes the shaft 39 to rock, and through arm 39' the pin 37, is raised out of the path of the long bar 5', thus freeing the bell crank lever 34, and allowing the spring 34' to act to re-  
 5 turn said lever, and through connector 33, the indicator lever 21 to its normal position over the moving multiplier pattern chain 8. The indications of the moving multiplier pattern chain 8 are then communicated to the  
 10 pin wheel 29 of the star wheel 6 of the box pattern chain 5, in the usual way; and the indications of the box pattern chain 5 are communicated to the pin wheel 18 of the multiplier pattern chain 8, in the usual way, dur-  
 15 ing the weaving of the border or stripes.

When in the continued revolution of the take-up roll 47 and the movement of the controlling chain 44, the lower part of said chain comes under the indicating lever 41, then  
 20 through intermediate mechanism, the pin 37 is released and drops down into the path of the long bar 5', to be engaged thereby and cause the lateral movement of the indicating lever 21 to its inoperative position, as above  
 25 described.

It will be understood that by means of our improvements, a predetermined length or pattern of fabric is woven, with the box pattern chain stationary and out of operative  
 30 connection with the multiplier pattern chain, which is in operation, and that the operative connection of the multiplier pattern chain with the box pattern chain, is controlled by a chain on the take-up roll of the loom.

It will be understood that the details of construction of our improvements may be varied if desired. We have used the words "pat-  
 35 tern chain," and it will be understood that said words are intended to include any loom pattern surface, as cams, peg chains, etc. We have shown and described the third pattern chain 44, mounted on a cylinder on the journal of the take-up roll, but we do not  
 40 limit ourselves to this position of said chain, as it may be mounted on some other driven part of the take-up mechanism.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

50 1. In a loom, the combination with a box pattern chain, a multiplier pattern chain, and a chain connected with the take-up mechanism, and said take-up mechanism, of the indicator lever for the multiplier pattern chain, and connections intermediate said indicator  
 55 lever and the pattern chain connected with the take-up mechanism, and means for operating said connections to move said indicator lever to an inoperative position.

60 2. In a loom, the combination with a box pattern chain, a multiplier pattern chain, and a pin wheel and star wheel operating mech-

anism for said chains, of a third pattern chain connected with the take-up mechanism, to control the operation of said pin wheel and  
 65 star wheel mechanism and said take-up mechanism.

3. In a loom, the combination with a box pattern chain, a multiplier pattern chain, and a chain connected with the take-up roll, and  
 70 said take-up roll, of the indicator lever for the multiplier pattern chain, and connections intermediate said indicator lever and the pattern chain connected with the take-up roll, to positively move said indicator lever to an  
 75 inoperative position through the revolution of the box pattern chain, and to allow said pattern indicator to be returned to its operative position.

4. In a loom, the combination with a box  
 80 pattern chain, a multiplier pattern chain, and a chain connected with the take-up roll and said take-up roll, of the indicator lever for the multiplier pattern chain, and connections intermediate said indicator lever and the pat-  
 85 tern chain connected with the take-up roll, to positively move said indicator lever to an inoperative position through the revolution of the box pattern chain, and to allow said pattern indicator to be returned to its operative  
 90 position, the movement of said connections being controlled by the pattern chain connected with the take-up roll.

5. In a loom, the combination with a box pattern chain, a multiplier pattern chain, and  
 95 a chain on the take-up roll and said take-up roll, of the indicator lever for the multiplier pattern chain, a connection from said lever to an angle or bell crank lever, a movable pin connecting said lever with the box pattern  
 100 chain, and a connection from said pin to a rock shaft, and said rock shaft, an arm on said rock shaft, an indicator lever engaged by said arm and extending in the path of and engaged by the pattern chain on the take-up  
 105 roll, and a spring connected with the said angle or bell crank lever.

6. In a loom, the combination with a box pattern chain, a multiplier pattern chain, and the indicator lever of the multiplier pat-  
 110 tern chain, and a pattern chain connected with the take-up roll and said take-up roll, of connections, intermediate said indicator lever and said pattern chain connected with the take-up roll, the operation of said connections  
 115 controlled by the pattern chain connected with the take-up roll.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGE R. FORBES.

GEORGE W. FRAKER.

Witnesses:

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