(No Model.) 4 Sheets—Sheet 1.

G. F. HUTCHINS.

LOOM.

No. 544,356. Patented Aug. 13, 1895.

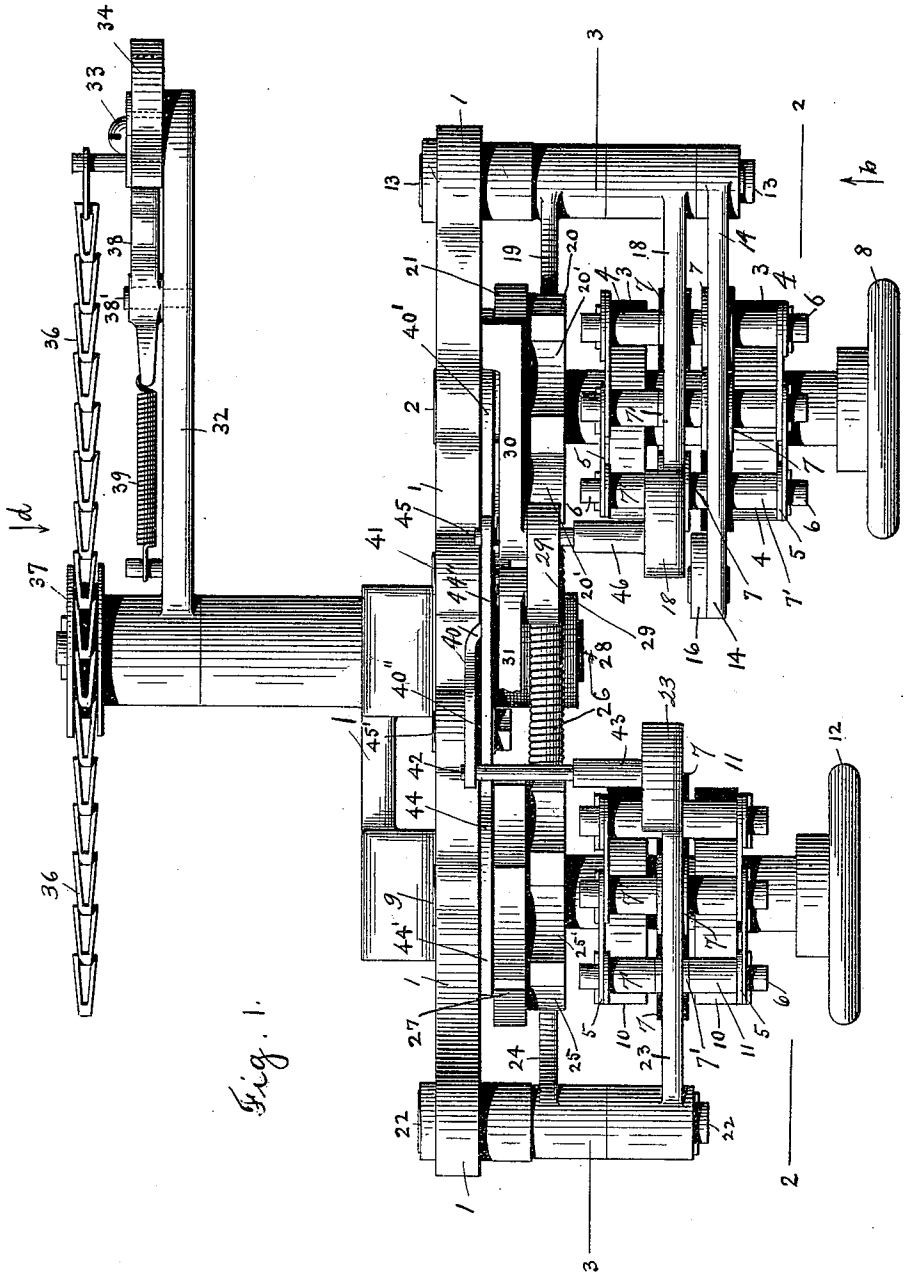

Fig. 1.

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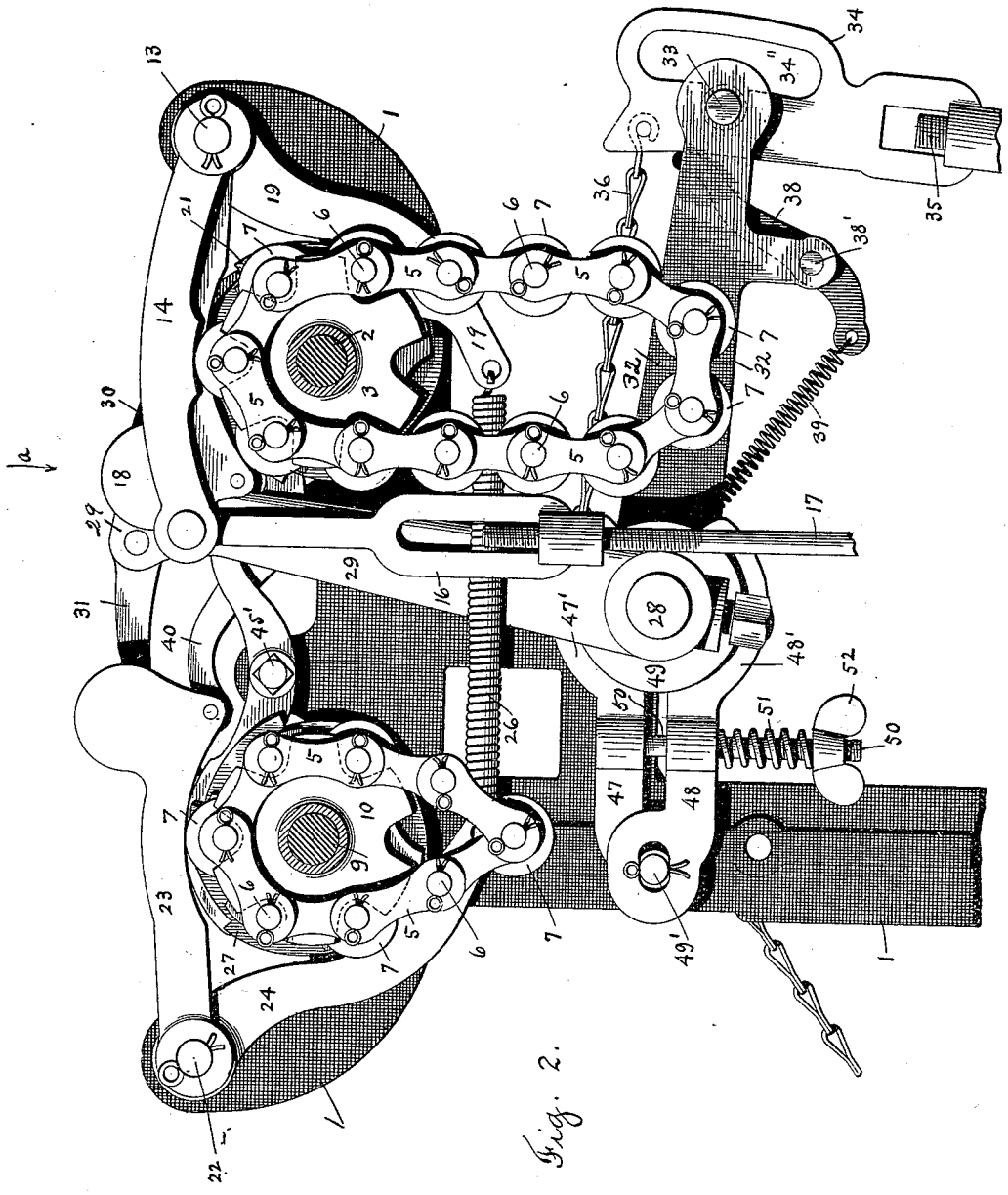

Fig. 2.

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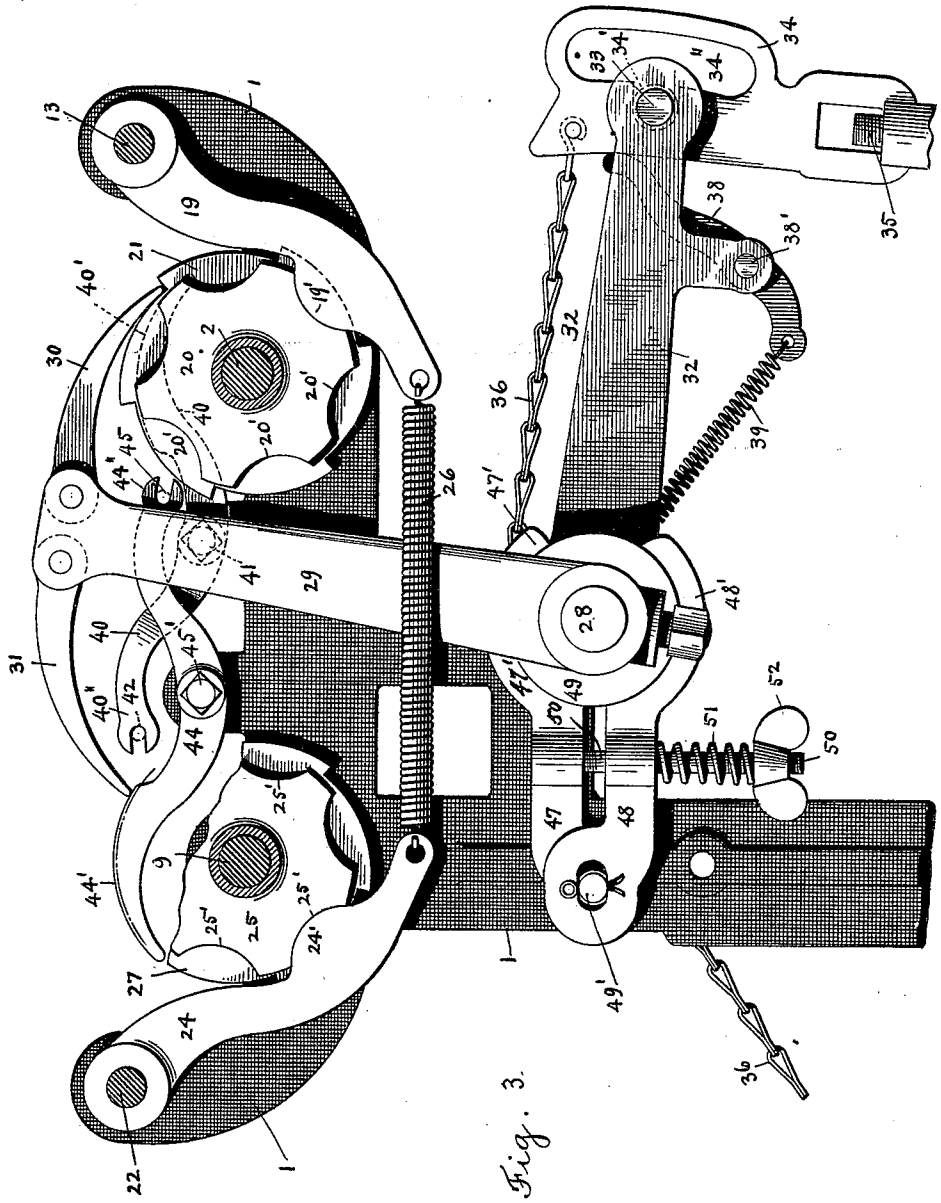

Fig. 3.

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LOOM.

No. 544,356. Patented Aug. 13, 1895.

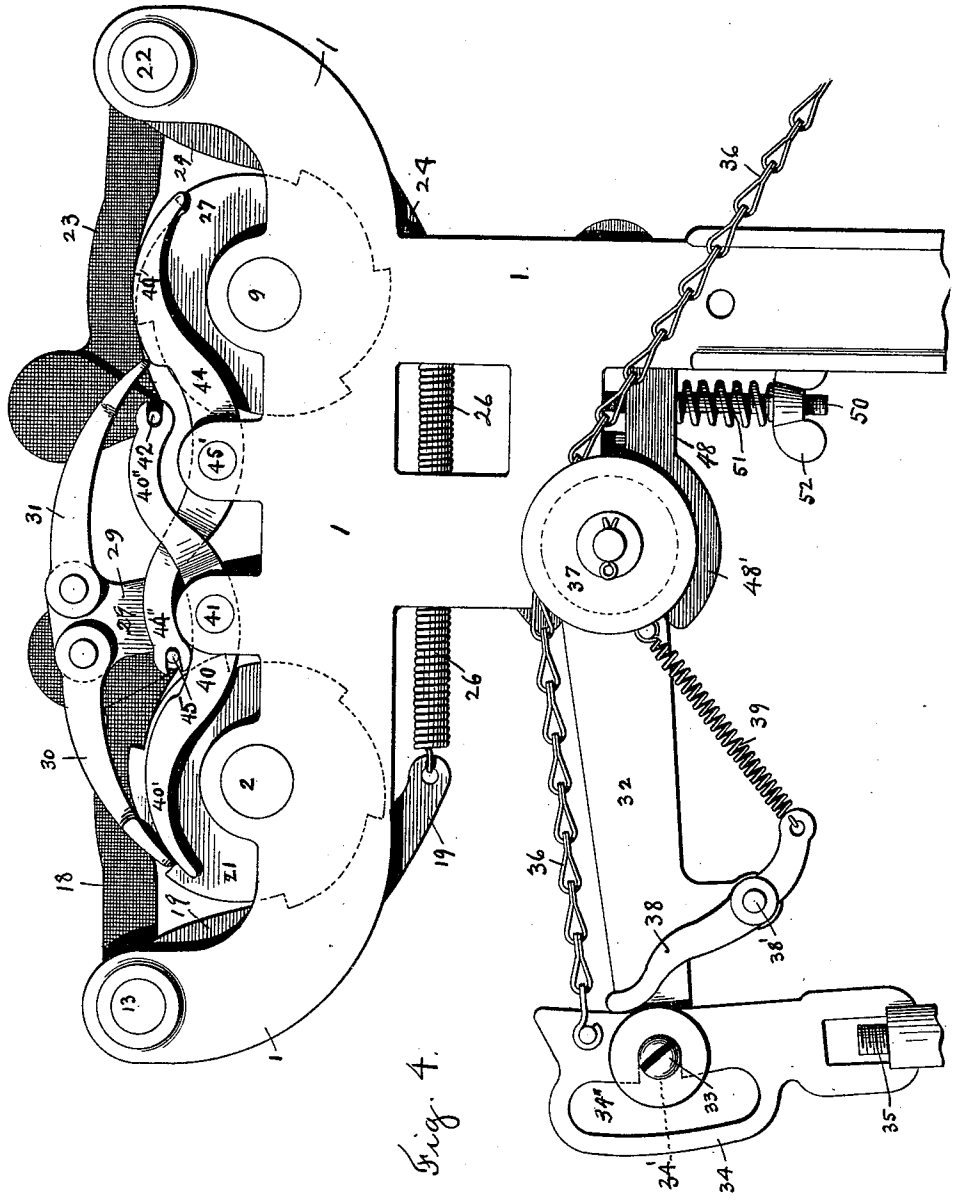

Fig. 4.

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UNITED STATES PATENT OFFICE.

GEORGE F. HUTCHINS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE KNOWLES LOOM WORKS, OF SAME PLACE.

LOOM.

SPECIFICATION forming part of Letters Patent No. 544,356, dated August 13, 1895.

Application filed March 22, 1895. Serial No. 542,825. (No model.)

To all whom it may concern:

Be it known that I, GEORGE F. HUTCHINS, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Looms, of which the following is a specification.

My invention relates to looms provided with an auxiliary or multiplier pattern-chain in addition to the main pattern-chain, as set out in United States Letters Patent No. 396,057 of January 8, 1889, and No. 413,369 of October 22, 1889, to which reference is hereby made.

It will be understood that by means of the auxiliary or multiplier pattern-chain certain bars of the main pattern-chain of the drop-box-indicating mechanism may be repeated without constructing successive similar bars in said main pattern-chain.

My present invention relates more particularly to the mechanism for operating or driving the main pattern-chain and the auxiliary or multiplier pattern-chain at the proper time according to the indications of the pattern-surface, and also to disconnecting mechanism to immediately stop the movement of the pattern-cylinders on the giving out of the filling and the operation of the filling stop-motion shaft.

The object of my invention is to provide improved mechanisms for the purposes above stated; and my invention consists in certain novel features of construction and operation of said mechanisms, as will be hereinafter fully described.

I have shown in the drawings a drop-box pattern-indicating mechanism of my improved construction for a two-by-one-box loom—that is, a loom having two movable shuttle-boxes at one end of the lay and one stationary shuttle-box at the other end—but it will be understood that the same may be used on a four-by-one-box loom by adding another indicator-lever on the main pattern-chain, and by adding two indicator-levers the same may be used on a six-by-one-box loom.

Referring to the drawings, Figure 1 is a plan view of a two-box pattern-indicating mechanism of the description referred to embodying my improvements, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a front view taken on line 2 2, Fig. 1, looking in the direction of arrow *b*, same figure. Fig. 3 is a vertical section taken on line 3 3, Fig. 1, looking in the direction of arrow *b*, same figure; and Fig. 4 is a rear view looking in the direction of arrow *d*, Fig. 1.

In the accompanying drawings, 1 is a stand or frame, which is bolted at its lower end to the loom-frame, preferably at the top of the loom. Upon the frame 1 are supported the several parts of the pattern-indicating mechanism. Upon a stud 2, secured in the upper part of the frame 1 and extending out therefrom, is mounted the main pattern-chain cylinder 3, carrying the pattern-chain 4, made up of links 5, which connect bars 6, on which are mounted rolls 7 and tubes 7′ in the ordinary way. The pattern-chain cylinder 3 is provided with a hand-wheel 8 in the ordinary way, by which said cylinder is turned as desired. Upon another stud 9, fast in the upper part of the frame 1 and extending out therefrom, is loosely mounted the auxiliary or multiplier pattern-chain cylinder 10, carrying the auxiliary or multiplier pattern-chain 11, made of links 5′, bars 6′, rolls 7, and tubes 7′, similar to the main pattern-chain 4. The multiplier chain-cylinder 10 is provided with a hand-wheel 12 to turn the same as desired.

Secured in the upper end of the frame 1 on the outside of the stud 2 is a stud 13, on the outer end of which is pivoted one end of the shuttle-box indicator-lever 14, which is operated by the main pattern-chain 4, and to the outer ends of said indicator-lever 14 is pivoted the upper ends of the link 16 of the connector-rod 17 leading to the vibrator-lever of the box-motion, (not shown,) which may be of any ordinary construction and operation and arranged at the lower part of the loom. Upon the stud 13 is also pivoted one end of the weighted indicator-lever 18 and one end of the lock-lever 19, which is provided with a convex portion 19′ adapted to extend into concave portions 20′ in the stop-wheel 20, fast to the pattern-chain cylinder 3. (See Fig. 3.) On the stud 2 and next to the frame 1 is loosely mounted a ratchet-wheel 21, which is

secured to the pattern-chain cylinder 3, and through said ratchet-wheel said pattern-chain cylinder is operated.

On a stud 22, fast in the opposite end of the frame 1 from the stud 13, is pivoted one end of a weighted indicator-lever 23, which is acted on by the auxiliary or multiplier pattern-chain 11. On the stud 22 is also pivoted one end of the lock-lever 24, provided with a convex portion 24′, adapted to extend into concave portions 25′ in the stop-wheel 25, loose on the stud 9 and secured to the auxiliary pattern-chain cylinder 10. The lower end of the lock-lever 24 is secured to the lower end of the lock-lever 19 by a spring 26, (see Fig. 3,) which acts to move said levers toward each other and hold them in engagement with their respective stop-wheels 20 and 25. A ratchet-wheel 27 is mounted loosely on the stud 9, and is attached to the auxiliary pattern chain cylinder 10, and through said ratchet-wheel 27 motion is communicated to the auxiliary pattern-chain cylinder 10. The lock-levers 19 and 24, in connection with the stop-wheels 20 and 25, serve to hold the pattern-cylinders after each partial rotation thereof.

I will now describe the mechanism for operating the ratchet-wheel 21 to communicate motion to the main pattern-chain 4, and for operating the ratchet-wheel 27 to communicate motion to the auxiliary pattern-chain 11.

In the lower part of the frame 1 is loosely mounted in a suitable bearing a rock-shaft 28, having secured thereon at one end thereof the lower end of the pawl-arm 29, which carries at its upper end two oppositely-extending paws 30 and 31 pivoted thereon. The pawl 30 is adapted to engage the teeth of the ratchet-wheel 21 of the main pattern-chain cylinder 3, and the pawl 31 is adapted to engage the teeth of the ratchet-wheel 27 of the auxiliary pattern-chain cylinder 10. On the other end of the rock-shaft 28 is fast the inner end of the arm 32. I provide a lock connection intermediate the arm 32 and the driven part of the loom from which said arm is operated, and provide means, preferably connected with the stop-motion shaft, to automatically operate said lock connection to disconnect the arm 32 and immediately stop the movement of the pattern-surfaces in case the filling gives out, and the filling stop-motion shaft acts to stop the loom. In this instance the outer end of the arm 32 is provided with a pin 33, which is adapted to engage a notch 34′ in the slotted head 34 of the connector-rod 35. The lower end of said rod 35 is connected with a cam on the bottom shaft or with some other driven part of the loom from which a continuous up-and-down motion is communicated to said rod 35, and through the arm 32 motion is communicated to the rock-shaft 28 and the pawl-arm 29.

From the head 34 of the connector-rod 35 a chain 36 leads over a pulley 37, loose on the shaft 28, to an arm fast on the stop-motion shaft of the loom, (not shown,) so that when the loom is stopped by the stop-motion shaft of ordinary construction, in case the filling gives out the chain 36 will be pulled and cause the pin 33 on the arm 32 to move out of the notch 34′ and into the longitudinal slot 34″ in the head 34, to allow the head 34 and connector-rod 35 to move up and down without moving the arm 32, so that the pattern-chain will be instantly stopped, though the loom may continue to run. A pawl 38, pivoted at 38′ on the arm 32 and bearing at one end against the inner edge of the head 34 and attached at its other end to one end of a spring 39, acts to hold the pin 33 in the notch 34′ in the head 34 to form a lock-connection between the connector-rod 35 and the arm 32.

I may provide the rock-shaft 28 with a friction device to prevent the arm 32 dropping down and carrying the pin 33 into the bottom of the slot 34″ in the head 34 when the pin 33 is drawn into said slot. Said friction device consists, in this instance, of two clamping-arms 47 and 48, pivoted on a pin 49 and provided with circular portions 47′ and 48′, adapted to encircle a pulley or hub 49, fast on the shaft 28. Said clamping-arms 47 and 48 are held together to clamp said pulley or hub 49 by a pin 50, fast at its upper end in the arm 47 and extending loosely through the arm 48 and encircled by a spring 51, the action of which is regulated by the thumb-nut 52 on the end of said pin 50.

In order to regulate the operation of the ratchet-wheels 21 and 27 of the main pattern-chain cylinder 3 and the auxiliary pattern-chain cylinder 10 by the pawls 30 and 31, I provide a pawl guard or shield for each pawl to keep the same out of engagement with its ratchet-wheel, when desired. For the pawl 30, which operates the ratchet-wheel 21 of the main pattern-chain cylinder 3, I provide a pawl guard or shield 40, pivoted at about its central point on a pin 41 on the frame 1 in such a position that the end 40′, which acts as the guard for the pawl 30, will extend under the end of said pawl. The other end 40″ of said shield 40 is connected by a pin 42 to a boss 43, extending out from the free end of the weighted indicator-lever 23 of the auxiliary pattern-chain 11. The pawl guard or switch 44 for the pawl 31, which operates the ratchet-wheel 27 of the auxiliary pattern-chain cylinder 10, is pivoted at about its central point on a pin 45′ on the frame 1, with its outer end 44′, which acts as a shield for the pawl 31, adapted to extend under the outer end of said pawl. The inner end 44″ of said pawl-guard 44 is connected by a pin 45 with a boss 46, which extends out from the free end of the weighted indicator-lever 18 on the main pattern-chain 4.

From the above description, in connection with the drawings, the operation of my mechanism will be readily understood by those skilled in the art.

Supposing the parts to be in the position shown in the drawings and the loom running,

as long as a tube 7′ on the main pattern-chain 4 comes under the weighted indicator-lever 18 said lever will remain down and hold the pawl-shield 44 up, as shown in Fig. 3, to prevent the pawl 31 on the arm 29 from engaging the ratchet-wheel 27 to turn the auxiliary pattern-chain 11. A roll 7 on said auxiliary pattern-chain 11 being under the weighted indicator-lever 23 (see Fig. 1) will hold said lever up and keep the end 40′ of the pawl-guard 40 down, as shown in Fig. 3, so that the pawl 30 will engage with the ratchet 21 and turn the main pattern-chain 4. The next turn of the main pattern-chain 4 (shown in the drawings) will bring a roll 7 under the weighted indicator-lever 18, (see Fig. 1,) which will raise said lever and at the same time lower the end 44′ of the pawl-shield 44 connected with said lever 18, so that on the return movement of the arm 29 the pawl 31 will engage with the ratchet-wheel 27 and move the auxiliary pattern-chain 11, to bring a tube 7′ under the weighted indicator-lever 23, (see Fig. 2,) which will cause said lever to drop down and at the same time raise the end 40′ of the pawl-guard 40 connected with said lever 23, so that on the return movement of the arm 29 the pawl 30 will be held out of engagement with the ratchet 21, thus leaving the main pattern-chain 4 at rest as long as the multiplier-chain 11 runs and a tube comes under the indicator-lever 23. As soon as a roll comes under said lever 23, the same is raised and the pawl-guard 40′ dropped, and then the main pattern-chain 4 is operated as above described, and so the operation continues.

If at any time the filling runs out, the lock connection or joint between the connector-rod 35 and the arm 32 operates, through the chain 36 attached to the filling stop-motion shaft, to release the arm 32 and allow the pawl-arm 29 to stop instantly, and also the pattern-surfaces, even though the loom continues to run through its momentum. After the filling is replaced, the return movement of the filling stop-motion shaft will slacken the chain 36 and allow the spring-actuated pawl 38 to act to push out the head 31 and bring the pin 33 on the arm 32 into the notch 34′ and hold it there to make a connection between said arm 32 and the head 34 of the connector-rod 35.

It will be understood that the details of construction of my mechanisms may be varied, if desired. For instance, instead of making the pawl-carrying arm 29 and the operating-arm 32 separate and mounting them fast on the rock-shaft 28, they may be made in one piece, as an angle-lever, and mounted loose on a stud fast in the frame 1.

Instead of having the arm 32 connected to the head 34 of the vertically-moving rod 35 by a lock-joint, as shown in the drawings and above described, said arm 32 may be pivotally attached to the upper end of said rod 35 and the lock-joint arranged at the lower end of said rod 35, and the chain 36 extends down from the stop-motion shaft and is connected to the rod 35 at its lower end to operate the lock-joint, as above described.

In case more than two boxes are used at one end of the loom one or more additional indicator-levers, similar to lever 14, are added to the main pattern-chain 4, and said levers connected with the box-motion mechanism by connectors similar to connector 17.

The advantages of my improvements will be readily appreciated by those skilled in the art. By arranging the main pattern-chain and the auxiliary or multiplier pattern-chain alongside of each other and on separate studs or shafts, each provided with a hand-wheel, I am enabled to turn either chain independently of the other for any purpose.

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

1. In a loom provided with a main pattern chain, and an auxiliary or multiplier pattern chain, arranged alongside of each other on two separate studs, each stud provided with a hand wheel, and adapted to be turned, to move either chain independently of the other, the combination with the main pattern chain, the pattern chain cylinder, and the ratchet wheel connected with said cylinder, and the multiplier pattern chain, pattern chain cylinder, and the ratchet wheel connected with said cylinder, of means for operating the main pattern chain, and the multiplier pattern chain, said means consisting of a swinging arm carrying two pawls thereon, one adapted to engage and operate the ratchet wheel connected with the main pattern chain cylinder, and the other adapted to engage and operate the ratchet wheel connected with the multiplier pattern chain cylinder, and a pawl shield to prevent the pawl from operating the main pattern chain, said shield connected with and operated by the indicator lever on the multiplier pattern chain and said indicator lever, and a pawl shield to prevent the pawl from operating the multiplier pattern chain, said shield connected with and operated by the indicator lever on the main pattern chain and said indicator lever, substantially as set forth.

2. In a loom, provided with a main pattern chain, and an auxiliary or multiplier pattern chain, arranged alongside of each other, on two separate studs, each stud provided with a hand wheel, and adapted to be turned, to move either chain independently of the other, the combination with the main pattern chain, the pattern chain cylinder, the stop wheel, lock lever, and ratchet wheel connected with said cylinder, and the multiplier pattern chain, pattern chain cylinder, stop wheel, lock lever, and ratchet wheel connected with said cylinder, of means for operating the main pattern chain, and the multiplier pattern chain, said means consisting of a swinging arm carrying two pawls thereon, one adapted to engage and operate the ratchet wheel connected

with the main pattern chain cylinder, and the other adapted to engage and operate the ratchet wheel connected with the multiplier pattern chain cylinder, and a pawl shield to prevent the pawl from operating the main pattern chain, said shield connected with and operated by the indicator lever on the multiplier pattern chain and said indicator lever, and a pawl shield to prevent the pawl from operating the multiplier pattern chain, said shield connected with and operated by the indicator lever on the main pattern chain and said indicator lever, substantially as set forth.

3. In a loom provided with a main pattern chain, and a multiplier pattern chain, arranged alongside of each other on two separate studs, each stud provided with a hand wheel, and adapted to be turned to move either chain independently of the other, means for operating the pattern chains, consisting of a swinging arm carrying thereon two pawls, one adapted to engage the ratchet wheel connected with the main pattern chain cylinder and said ratchet wheel and cylinder, and the other adapted to engage the ratchet wheel connected with the multiplier pattern chain cylinder and said ratchet wheel and cylinder, and means for communicating motion to said swinging arm from some driven part of the loom, in combination with a lock-joint or give-way connection, intermediate said swinging arm, and said driven part of the loom, for the purpose stated, substantially as set forth.

4. In a loom provided with a main pattern chain, and a multiplier pattern chain, the combination with a swinging arm carrying two pawls thereon, one pawl adapted to engage a ratchet wheel connected with the main pattern chain cylinder and said ratchet wheel and cylinder, and the other pawl adapted to engage a ratchet wheel connected with the multiplier pattern chain cylinder and said ratchet wheel and cylinder, of a vertically moving rod adapted to communicate motion to said swinging arm through an intermediate connection, and a lock-connection for said rod, and means for disconnecting said rod, to automatically stop the motion of said swinging arm, for the purpose stated, substantially as set forth.

5. In a loom provided with a main pattern chain, and a multiplier pattern chain, the combination with a swinging arm carrying two pawls thereon, one pawl adapted to engage a ratchet wheel connected with the main pattern chain cylinder and said ratchet wheel and cylinder, and the other pawl adapted to engage a ratchet wheel connected with the multiplier pattern chain cylinder and said ratchet wheel and cylinder, of a vertically moving rod, to communicate motion to said swinging arm, and a lock-connection for said rod, and means for disconnecting said rod to automatically stop the motion of said swinging arm, said means, consisting of a connection from said rod to the stop motion shaft of the loom, so that the operation of said stop motion shaft to stop the loom will disconnect said rod, substantially as set forth.

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