No. 789,363. PATENTED MAY 9, 1905.

G. M. FOSTER.

CONTROLLING MEANS FOR LOOMS.

APPLICATION FILED OCT. 31, 1904.

2 SHEETS—SHEET 1.

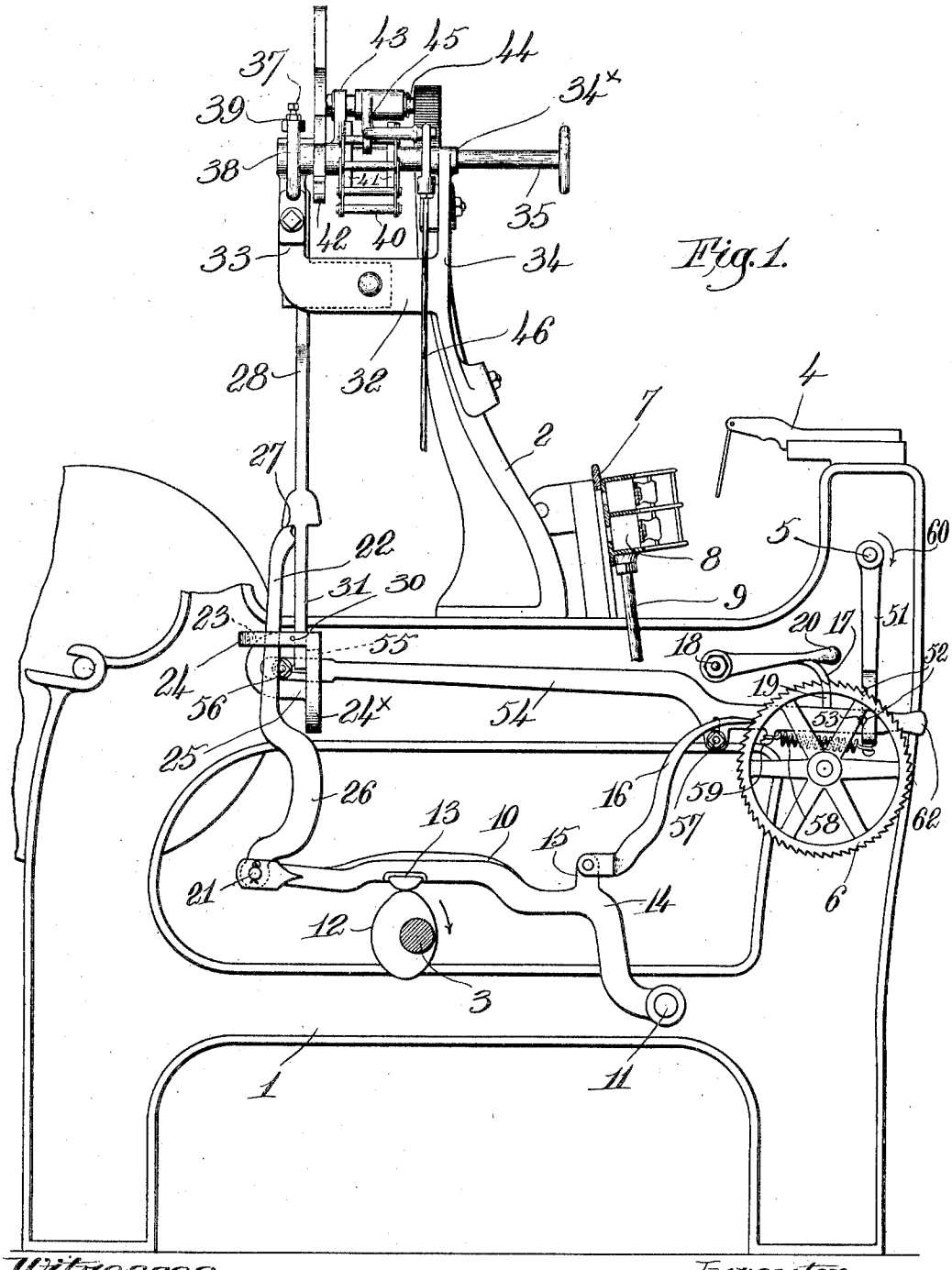

Fig. 1.

Witnesses.
Thomas J. Drummond.
L. Wm. Sutton.

Inventor.
George M. Foster,
by Crosby & Gregory Attys.

No. 789,363. PATENTED MAY 9, 1905.

G. M. FOSTER.

CONTROLLING MEANS FOR LOOMS.

APPLICATION FILED OCT. 31, 1904.

2 SHEETS—SHEET 2.

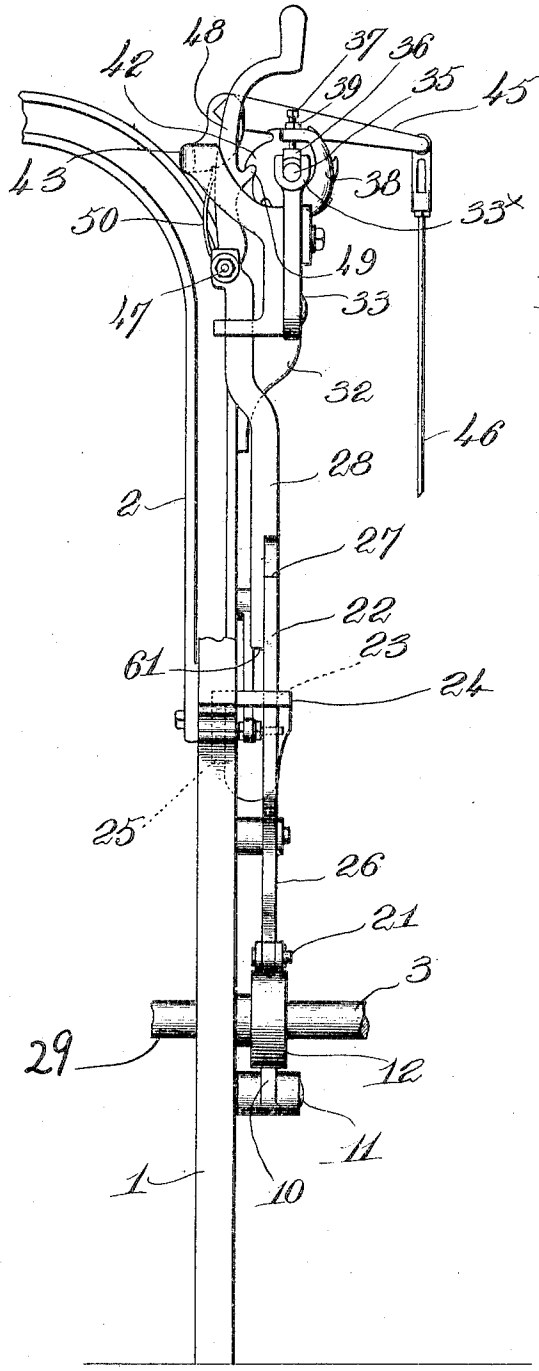

Fig. 2.

Witnesses.
Thomas A. Drummond.
S. Wm. Lutton.

Inventor.
George M. Foster,
by Crosby Gregory Kitty's.

PHOTO-LITHOGRAPHED BY SACKETT & WILHELMS LITHO. & PTG. CO. NEW YORK.

No. 789,363. Patented May 9, 1905.

UNITED STATES PATENT OFFICE.

GEORGE M. FOSTER, OF MANCHESTER, NEW HAMPSHIRE.

CONTROLLING MEANS FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 789,363, dated May 9, 1905.

Application filed October 31, 1904. Serial No. 230,630.

To all whom it may concern:

Be it known that I, GEORGE M. FOSTER, a citizen of the United States, and a resident of Manchester, in the county of Hillsboro and State of New Hampshire, have invented an Improvement in Controlling Means for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates more particularly to looms including as a part of the organized mechanism thereof a pattern-controlled instrumentality—such, for instance, as a shifting shuttle-box instrumentality whose operation is controlled by a pattern-surface. In such a loom when the continuity of its operation is interrupted, as by an abnormal condition of the filling—*i. e.*, its breakage or exhaustion—the pattern-surface should be arrested in order that the piecing up of the filling or the provision of a fresh supply should not cause any change in the timing of the mechanism or produce imperfections in the cloth being woven when the normal operation of the loom is resumed.

My present invention has for one of its objects the production of novel means to arrest the operation of the pattern-surface upon the occurrence of an abnormal condition of the filling.

Another object of my invention is the provision of novel means to arrest the taking up of the cloth at such time simultaneously with the arrest of the pattern-surface.

These and other novel features of my invention will be fully described in the subjoined specification, and particularly pointed out in the appended claims.

Figure 1 is a left-hand side elevation of a sufficient portion of a loom to be understood, showing a pattern-surface, operating means therefor, and means embodying one form of my present invention; and Fig. 2 is a rear elevation of the pattern-surface and the means for arresting its operation illustrated in Fig. 1.

The loom-frame 1, arch 2, on which the pattern mechanism is mounted, the cam-shaft 3, filling detector or fork 4, Fig. 1, the rock-shaft 5, governed by or through the detector upon detection of failure of filling—that is, its breakage or exhaustion—and the take-up-operating ratchet 6 may be and are all of substantially well-known construction.

In the present embodiment of my invention the pattern-surface is adapted to control the operation of a shifting shuttle-box instrumentality, the lay 7 having a shifting shuttle-box 8 mounted thereon and operated by a shifting-rod 9, but as such an instrumentality is well-known and not of my invention I have only partly illustrated the same.

Referring to Fig. 1, a pawl-carrier 10 is fulcrumed at 11 on the loom side and extends rearwardly therefrom, overhanging an actuating-cam 12 on the cam-shaft 3 and coöperating with a roller or other suitable stud 13 on the pawl-carrier to rock the same. The pawl-carrier is bent at 14 and provided with an upturned lug 15, on which is pivoted a take-up-actuating pawl 16, extended upward and forward to normally coöperate with the ratchet 6, and thereby operate the take-up. A detent-pawl 17 is pivotally mounted on the loom side at 18 to prevent retrogression of the ratchet, said detent-pawl having a depending toe 19, for a purpose to be described, and a handle 20, by which the pawl may be thrown out when it is desired to manipulate the take-up manually. At its free rear end the pawl-carrier has pivoted thereto at 21 an upturned elongated pawl 22, which rises and falls as the pawl-carrier is rocked, the pawl passing through a guide-slot 23 (see dotted lines, Fig. 1) in the horizontal flange 24 of a bracket 25, secured to the loom side. The lower portion of the pawl is enlarged to increase its weight and offset, as at 26, to normally throw the pawl forward in operative position and to retain it in coöperation with a shoulder 27 on an upright slide-bar 28, arranged to be reciprocated vertically in an upper guide 29 (see Fig. 2) and in the slot 23 at its lower end. A pin 30, Fig. 1, crosses the slot behind the reduced lower end 31 of the slide-bar to prevent improper movement thereof in the lower guide formed by the slotted flange 24.

At one side of the arch 2 a stand 32 is securely bolted, having upturned arms 33 34,

the former having a slotted bearing $33^{\times}$ (see Fig. 2) for one end of the pattern-shaft 35, the other end thereof passing through a sleeve-bearing $34^{\times}$ on the arm 34. To prevent overrunning of the pattern-shaft or retrograde rotation thereof, I have provided a friction-detent, shown in Fig. 2 as a friction-shoe 36, resting upon the shaft and vertically movable in the slotted bearing $32^{\times}$. An adjustable pressure-screw 37 bears upon the shoe to regulate the friction upon the pattern-shaft, said screw being mounted in an upturned bracket 38, overhanging the bearing and attached to the arm 33, the screw having a suitable check-nut 39 to retain it in adjusted position, all clearly shown in Fig. 2.

A pattern-surface, herein shown as a pattern-chain 40, of common construction is mounted on sprockets 41 on the pattern-shaft, the latter having an attached ratchet 42. The stand 32 has a branch 43, shaped to extend upward around and above the pattern-surface to support a horizontal stud 44, on which is fulcrumed a rocker-arm 45, coöperating with the pattern-chain and having connected with its free end a depending link 46 (broken off in the drawings) and by which the shifting shuttle-box instrumentality is operated. I have omitted the usual connection between the link and said instrumentality, as it is well known and not of my invention and would if illustrated obscure novel features of my present invention.

The upper end of the slide-bar 28 has fulcrumed to it at 47 (see Fig. 2) an upturned pawl 48, having a tooth 49 to coöperate with the pattern-ratchet 42, and thereby advance the pattern-chain 40 step by step by or through the vertical reciprocation of the slide-bar, a spring 50 maintaining the pawl and ratchet in engagement. Each rise of the pawl-carrier 10 will normally act, through the actuating-pawl 22 and the shoulder 27, to elevate or impart the active stroke to the slide-bar 28, causing the pawl 48 to turn the ratchet 42 and advance the pattern-chain one step. The opposite or descending stroke of the slide-bar is effected by gravity herein as the pawl-carrier 10 swings downward, the pawl 48 being thereby retracted in order that its tooth 49 may take a fresh hold on the pattern-ratchet for the next active stroke.

I will now describe means whereby the pattern surface or chain and the take-up are automatically arrested upon the occurrence of an abnormal condition of the filling.

Referring to Fig. 1, the rock-shaft 5 has a rigidly-attached depending arm 51, provided with two notches 52, the lower one normally receiving a lateral pin 53 on the front end of a throw-off member 54, rearwardly extended along the outer face of the loom side. The rear end of said member is slidably mounted in a slot 55 in the upright flange $24^{\times}$ of the bracket 25 and has adjustably secured to it a stud or pin 56, which extends in front of and adjacent the actuating-pawl 22 for the pattern-surface. A second stud or pin 57 is adjustably mounted on the throw-off member 54 nearer its front end and projects beneath and adjacent the take-up-actuating pawl 16, neither of the studs under normal conditions interfering with the operation of said pawls, as will be manifest from an inspection of Fig. 1. A spring 58, secured at one end to the loom side, is attached at its other end to a hook 59 on the throw-off member, said spring tending to pull said member forward and retain the pin 53 in the notch 52, as shown. The toe 19 of the detent-pawl 17 depends onto or just above the top of said member 54, as shown. When the shaft 5 is rocked in the direction of arrow 60, Fig. 1, as upon the detection of filling failure, the throw-off member 54 is moved longitudinally rearward, the stud 56 acting against the pawl 22 to disengage it from the shoulder 27, thereby rendering the pawl inoperative and arresting the operation of the pattern-operating means. At the same time the stud 57 disengages the pawl 16 from the ratchet 6, and the take-up is arrested, the pattern-surface and take-up remaining inert until the rock-shaft 5 returns to normal position, whereupon the spring 58 draws the throw-off member forward to its normal position, permitting the two pawls to resume their work. A stop-shoulder 61 on the slide-bar 28 engages the flange 24 when the pawl 22 is rendered inoperative, limiting the descent of the bar, so that the pawl can reëngage the shoulder 27 after the pawl-carrier 10 has swung down to its lowest position. The weight of the pawls 22 and 16 is sufficient to return them to operative position when the throw-off member is moved forward to its normal position.

It is desirable at times to manipulate the take-up by hand, and the pawl 16 can be disengaged from the ratchet 6 for this purpose by the attendant grasping the handle 62, Fig. 1, and lifting the front end of the throw-off member 54 until the pin 53 enters the upper notch 52 in the rocker-arm 51. Such swinging movement of the member 54 causes the stud 57 to disengage the pawl 16 from the ratchet, and the toe 19 is raised to disengage the detent-pawl 17, the throw-off member being retained in lifted position by engagement of the pin 53 in the upper notch. The take-up mechanism can then be turned forward or back by the weaver with perfect freedom. Such manual operation of the throw-off member does not affect the pawl 22 in any way, as will be manifest.

My invention is not restricted to the precise construction and arrangement herein shown and described, as the same may be modified or rearranged in various particulars by those skilled in the art without departing from the spirit and scope of my invention.

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

1. The combination in a loom having a pattern-surface, and operating means therefor, including a reciprocating member, of an actuating-pawl to normally coöperate with and actuate said member, and means operated by or through an abnormal condition of the filling to automatically disengage said pawl from the reciprocating member and thereby arrest the operation of the pattern-surface.

2. The combination in a loom having a take-up and pattern-surface operating means, each including an actuating-pawl, and a rocking carrier on which both pawls are mounted, of means operated by or through an abnormal condition of the filling to automatically and simultaneously render said pawls inoperative and thereby arrest take up and advance of the pattern-surface.

3. The combination in a loom having a pattern-surface adapted to control the operation of a shifting shuttle-box instrumentality, and take-up and pattern-surface actuating means, each including an actuating-pawl, a rocking carrier on which both pawls are mounted, and a filling-detector, of means operated by or through said filling-detector upon detection of filling failure to automatically and simultaneously render said pawls inoperative, to thereby arrest take up and the advance of the pattern-surface.

4. The combination in a loom having a pattern-surface adapted to control the operation of a shifting shuttle-box instrumentality, and means to operate the pattern-surface including a reciprocating member, of a pawl to normally coöperate with and actuate said member, and means operative by or through an abnormal condition of the filling to automatically disengage said pawl and thereby arrest the operation of the pattern-operating means.

5. In a loom, a pattern-surface, a coöperating pawl and ratchet to advance the same step by step, a reciprocating member on which said pawl is mounted and provided with a shoulder, and an actuating-pawl to engage the shoulder and actuate said member, combined with a filling-detector, and means operated by or through the same upon detection of filling failure to automatically disengage said actuating-pawl from the shoulder of the reciprocating member and thereby arrest advance of the pattern-surface.

6. The combination in a loom having a pattern-shaft and an attached ratchet, a coöperating pawl to rotate said pattern-shaft step by step, and a reciprocating member on which said pawl is mounted and provided with a shoulder, of a constantly-reciprocating actuating-pawl to normally coöperate with the shoulder, a shaft adapted to be rocked by or through detection of filling failure, and means operated by such rocking of the shaft to render the actuating-pawl inoperative and thereby arrest the rotation of the pattern-shaft.

7. The combination in a loom of a pattern-chain, a rotatable shaft on which it is mounted, a coöperating pawl and ratchet to rotate the shaft step by step and advance the pattern-chain, a positively-acting friction-detent for the pattern-shaft, and means to actuate the pawl.

8. The combination in a loom of a pattern-chain, a rotatable shaft on which it is mounted, a coöperating pawl and ratchet to rotate the shaft step by step and advance the pattern-chain, a detent-shoe in frictional engagement with the shaft, positively-acting means to adjust the pressure of the shoe, and means to actuate the pawl.

9. In a loom, a pattern-chain, a pattern-shaft on which it is mounted and having an attached ratchet, a coöperating pawl to rotate the shaft step by step and advance the pattern-chain, an upright longitudinally-reciprocating slide-bar on which said pawl is mounted, said slide-bar having a shoulder thereon, and an actuating-pawl adapted to engage the shoulder and elevate the slide-bar to impart the acting stroke to the pawl thereon.

10. A loom provided with a pattern-surface adapted to control the operation of a shifting shuttle-box instrumentality, a coöperating pawl and ratchet to advance the pattern-surface step by step, a vertically-reciprocating slide-bar on which the pawl is mounted, and a shoulder on the slide-bar, combined with an actuating-pawl to engage the shoulder and lift the slide-bar, a longitudinally-movable throw-off rod to disengage the pawl from the shoulder and thereby arrest advance of the pattern-surface, and means operated automatically upon detection of filling failure to move the throw-off rod and render the actuating-pawl inoperative.

11. The combination in a loom having take-up and pattern-surface operating means, each including an actuating-pawl, of a rocking carrier on which both pawls are mounted, a normally inactive throw-off member having projections to engage and move said pawls simultaneously into inoperative position, and means operated automatically upon detection of filling failure to move the throw-off member into active position and thereby render the two pawls inoperative.

12. The combination in a loom having take-up and pattern-surface operating means, each including an actuating-pawl, of a rocking carrier on which both pawls are mounted, a rotating actuating-cam for said carrier, a longitudinally movable and tiltable throw-off member having projections thereon adapted to engage and render said pawls inoperative, and means to automatically move said throw-off member longitudinally upon detection of filling failure, to simultaneously render the pawls inoperative, manual tilting of said member

rendering inoperative only the take-up-actuating pawl.

13. The combination in a loom having take-up and pattern-surface operating means, each including an actuating-pawl, of a rocking carrier on which both pawls are mounted, a rotating actuating-cam for said carrier, a longitudinally movable and tiltable throw-off member having projections thereon adapted to engage and render said pawls inoperative, and means to automatically move said throw-off member longitudinally upon detection of filling failure, to simultaneously render the pawls inoperative, manual tilting of said member rendering inoperative only the take-up-actuating pawl, and a spring to retain the throw-off member in inoperative position and to return it automatically thereto.

14. In a loom having a pattern-surface adapted to control the operation of a shifting shuttle-box, and actuating means for the pattern-surface, including a reciprocating member, in combination, a pawl normally coöperating with and effecting the active stroke of said member, means operative by or through a change in the condition of the filling to automatically disengage the pawl and said reciprocating member and thereby arrest the operation of the pattern-surface, and a friction-detent for the pattern-surface to prevent overrunning or retrogression thereof.

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

GEO. M. FOSTER.

Witnesses:
JAMES EDMOND,
JAMES C. MURDOCH.