No. 711,737. Patented Oct. 21, 1902.

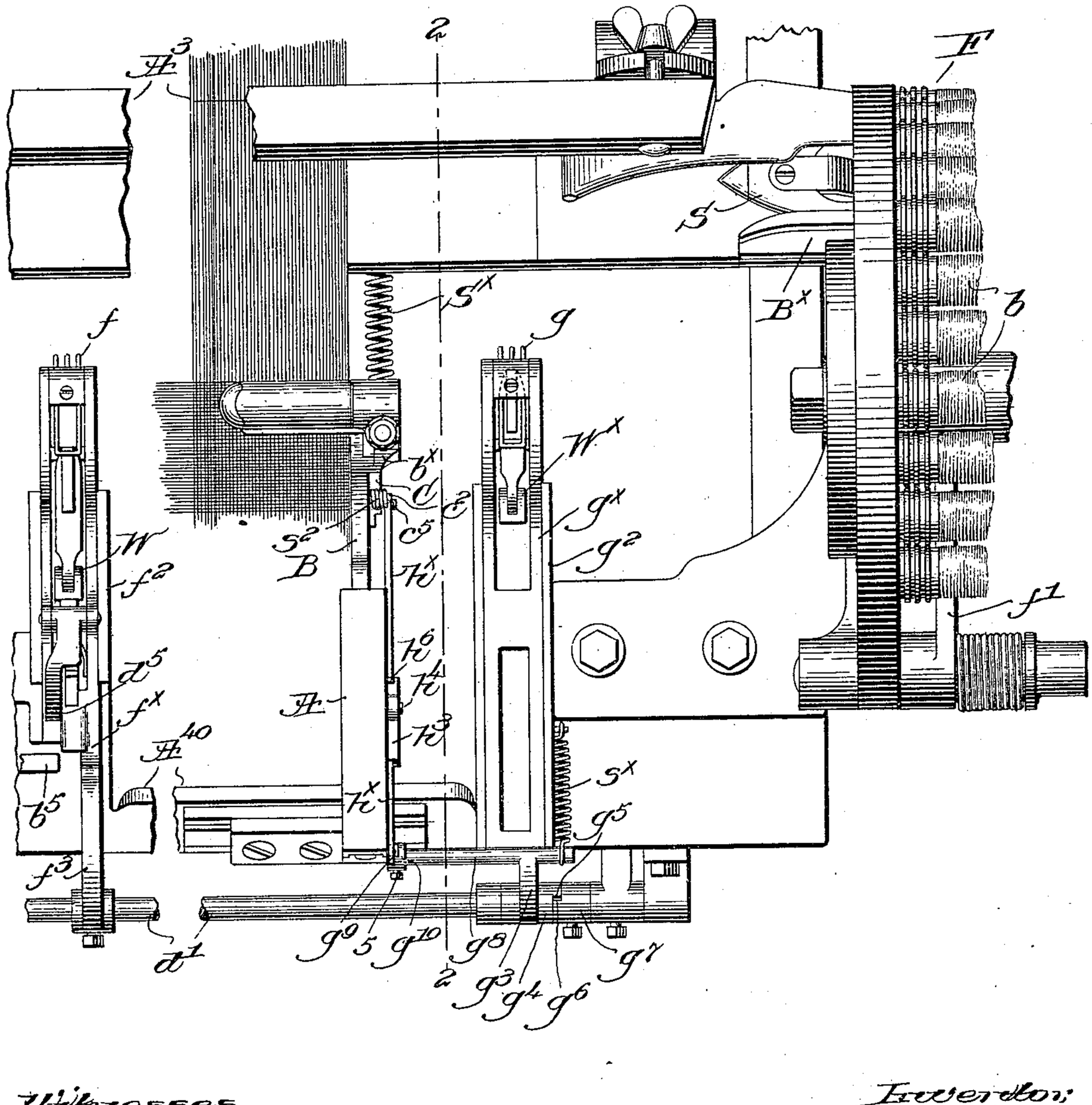
C. F. ROPER.

THREAD PARTER FOR FILLING REPLENISHING LOOMS.

(Application filed Jan. 13, 1902.)

(No Model.) 2 Sheets—Sheet 1.

Fig: 1.



Witnesses,
Edward H. Allen.
Adolph L. Waisen.

Inventor:
Charles F. Roper;
by Crosby & Gregory.
Attys.

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Fig: 2.

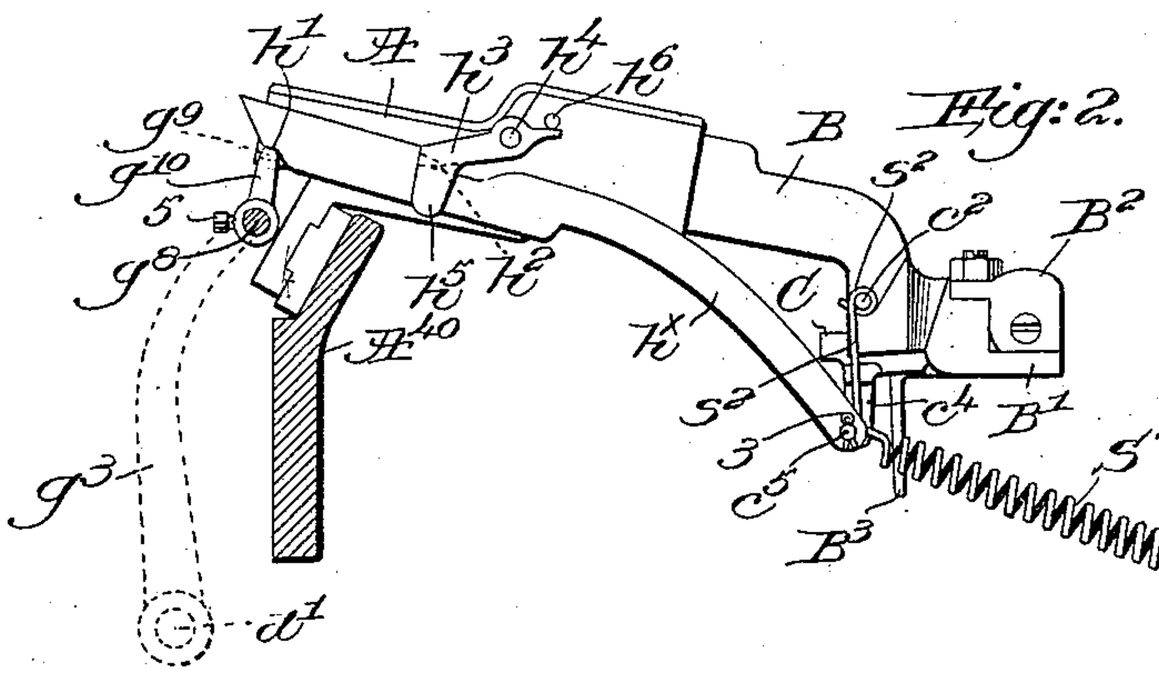


Fig: 3.

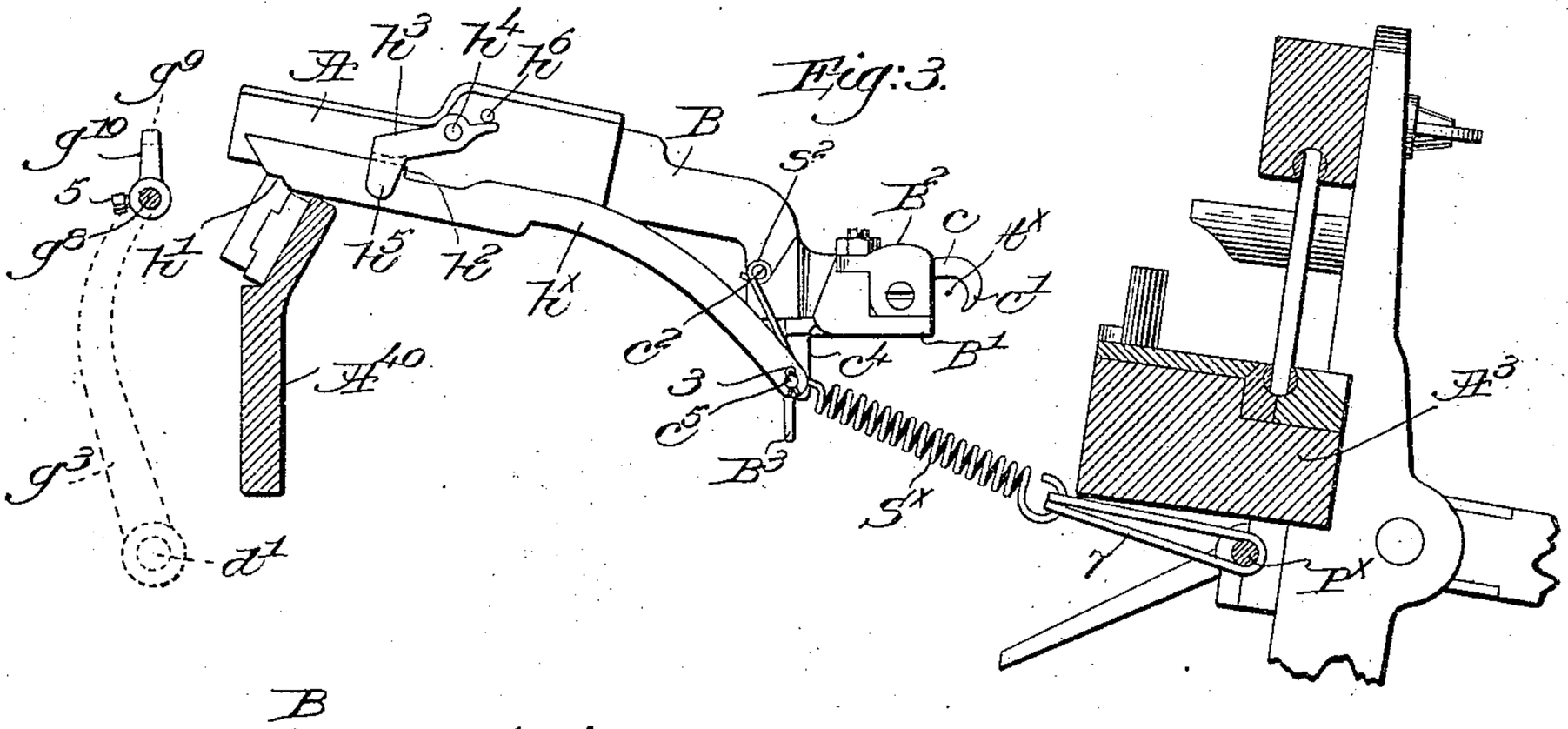


Fig: 4.

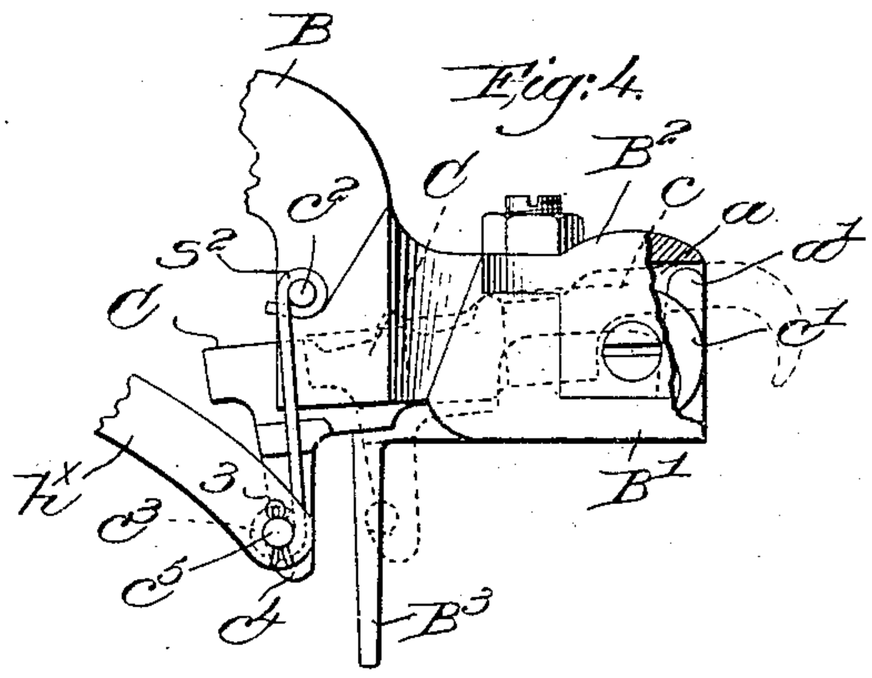
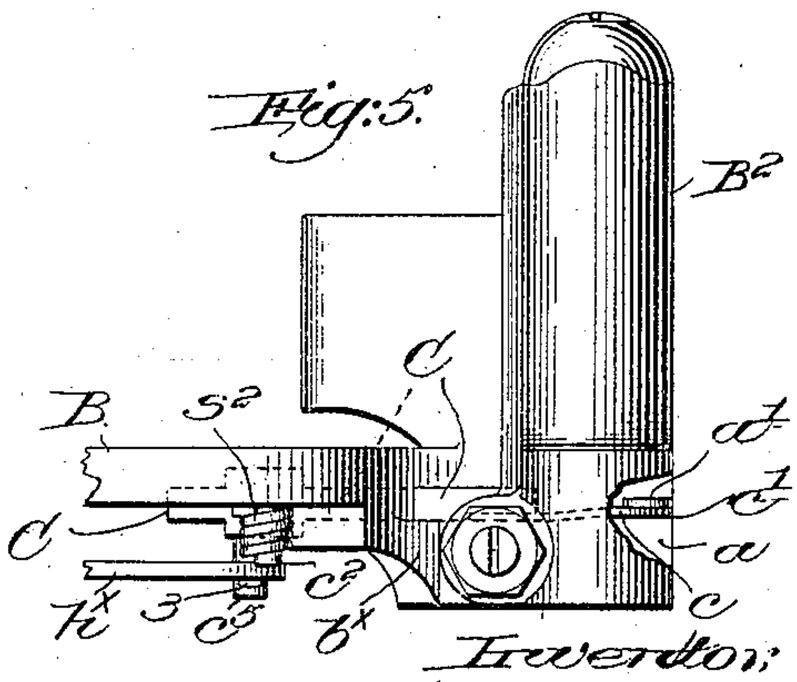


Fig: 5.



Witnesses,
Edward F. Allen.
Adolph L. Kaiser

Inventor;
Charles F. Roper;
by Crosby Gregory.
Attys.

UNITED STATES PATENT OFFICE.

CHARLES F. ROPER, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

THREAD-PARTER FOR FILLING-REPLENISHING LOOMS.

SPECIFICATION forming part of Letters Patent No. 711,737, dated October 21, 1902.

Application filed January 13, 1902. Serial No. 89,420. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. ROPER, a citizen of the United States, residing at Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Thread-Parters for Filling-Replenishing Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

Looms provided with automatic filling-replenishing mechanism have been so constructed that the operation of such mechanism is effected upon failure of the running filling either by breakage or exhaustion or when the filling in the shuttle is exhausted to a predetermined extent, such latter type being technically termed "feeler-looms." In both cases, or where a combination of both types is employed, the first shot of the shuttle following replenishment lays a filling end which extends from the replenishing mechanism to the edge of the cloth. Various devices mounted on the temple and independently thereof have been employed to sever this filling end, preferably close to the selvage, to prevent weaving in of the loose end if it is permitted to break, and a number of such devices are very successful and are widely employed. From one to a number of picks elapse after the filling end has been laid before it is severed, and with feeler-looms this somewhat-delayed action of the parting means is not objectionable; but in looms wherein the mechanism which governs the operation of the loom is controlled by or through filling-detectors upon failure of the filling it is of great importance to promptly sever the filling end, so that it cannot interfere with a filling-detector on the replenishing side of the loom.

In United States Patent No. 659,628 a loom is shown having two filling-detectors located on opposite sides, one controlling stopping or filling replenishing mechanism, and take-up mechanism controlled by both detectors to arrest the take-up and permit let-back when filling failure occurs, to thereby prevent thin places in the cloth. Manifestly in such a loom if means are not provided for preventing the filling end from acting on the filling-detector at the same side of the loom the detector cannot properly perform its proper functions. If the filling end be promptly and surely severed just after replenishment, it will be evident that there can be no interference with the filling-detector near it, and my present invention, relating more particularly to a double-detector loom of the general character shown in the patent referred to, has for its object the production of novel means for severing the filling end promptly and surely immediately after filling replenishment.

The various novel features of my invention will be fully described hereinafter and particularly pointed out in the following claims.

Figure 1 is a top or plan view, centrally broken out, of a portion of a loom provided with automatic filling-replenishing mechanism with one embodiment of my present invention applied thereto, the parts being shown in normal position. Fig. 2 is a transverse view, partly in section, on the line 2 2, Fig. 1, looking toward the left and showing the thread-parter in normal inoperative position. Fig. 3 is a similar view showing the thread-parter in position to act upon and sever the filling end. Fig. 4 is an enlarged detail, partly broken out, to show more clearly the construction of the thread-parter; and Fig. 5 is a top or plan view, also partly broken out, of the temple and the thread-parter mounted thereon.

I have not herein shown take-up mechanism, as any suitable type thereof may be employed—such, for instance, as in the patent referred to—and inasmuch as the take-up mechanism itself has nothing to do with my present invention.

The lay A^3, breast-beam A^{40}, the automatic filling-replenishing mechanism, herein shown as located at the right-hand side of the loom and comprising essentially a filling-feeder (indicated at F) to contain a supply of filling-carriers *b*, and a transferrer *f'* to remove the filling carriers or supplies one by one from the feeder to the shuttle may be and are all of well-known construction, substantially as shown in United States Patent No. 529,940. The operation of the replenishing mechanism

is controlled by suitable means, which may be substantially as in this patent, the only member of such means herein shown being the controlling rock-shaft d', mounted in suitable bearings on the loom-frame and having attached to it an upturned arm f^3 in the path of movement of the slide $f^\times$ of a filling-detector f, (see Fig. 1,) the slide being mounted in a suitable stand f^2, secured to the breast-beam and at the side of the loom opposite the replenishing mechanism. Upon detection of filling failure by the fork or detector f, which will occur on the shot of the shuttle S from right to left, the actuator or weft-hammer W will in usual manner operate through the tail of the detector to move the slide $f^\times$ outwardly to rock the shaft d' and effect a change of filling when the shuttle has been shot back to the shuttle-box $B^\times$ adjacent the replenishing mechanism. A second filling detector or fork g is mounted in usual manner on a slide $g^\times$, supported in a stand g^2, secured to the breast-beam on the side adjacent the replenishing mechanism and operated by its actuator or weft-hammer $W^\times$ upon detection of filling failure on the shot of the shuttle from left to right. The outward movement of the slide $g^\times$ acts through an upturned arm g^3, loosely mounted on the shaft d', to rock the latter, but only enough to arrest motion of the take-up mechanism, and to effect this the hub g^4 of the arm g^3 is provided with a shoulder g^5, Fig. 1, to coöperate with an opposed shoulder g^6 on a collar g^7, fast on the rock-shaft. Sufficient clearance is provided between the shoulders to cause sufficient rotation of the rock-shaft b' to arrest take-up, but not to operate the replenishing mechanism. The arm g^3 has a laterally-extended head g^8 in the path of the slide, and a suitable spring $s^\times$ maintains the head in engagement with the slide.

So far the mechanism described is substantially as in Patent No. 659,628 and operates in substantially the same way.

When filling replenishing is effected, the first shot of the shuttle thereafter from the box $B^\times$ will lay the filling from the said shuttle-box across the lay, and the part of the filling between the shuttle-box and the cloth is usually termed the "filling end," and as will be manifest by referring to Fig. 1 this filling end will be laid in front of the detector g, and my present invention provides means for parting this filling-thread so surely and promptly after it is laid that it cannot interfere with the proper functions of the filling-detector g.

I have herein shown a temple-stand A, secured to the breast-beam in any suitable manner, the slide-bar B having the pod B′ recessed at a and having secured within the recess an upright fixed blade or knife a', Figs. 4 and 5, and these parts, together with the cap B^2 and the depending heel B^3, attached to the pod, may be and are substantially as in United States Patent No. 585,465, to which reference may be had. The thread-parter C is inserted in the slotted or recessed portion a of the pod and the correspondingly-slotted ear $b^\times$ of the shank B, the outer end of the thread-parter having a depending lug c^4, provided with a lateral pin c^5, the thread-parter C having a thickened body portion and a thinner resilient and rearwardly-extended blade-like portion c, secured to or forming a part of the body and having its rear end downturned and hooked, as at c', the blade portion preferably being made of steel and secured to the heavier body portion. Referring to Fig. 5, it will be seen that the blade c is bent laterally toward the upright fixed blade a', so that when the thread-parter is extended into dotted-line position, Fig. 4, and thereafter retracted into full-line position it will wipe over the upright edge of the blade a' and act with a shearing cut upon the filling over which the hooked end c' extends when the filling is present. A stud c^2, laterally extended from the shank, has coiled about it an actuating-spring s^2, one end of the spring being held against the shank, while the other depending end is carried down to a hook about the pin c^5, as at c^3, the spring normally acting to retract the thread-parter into the position shown in Figs. 1, 2, and 4, with its hooked end in the recess or slot a, and thereby housed. The pin c^5 has pivotally mounted upon it and held thereon in any suitable manner, as by a cotter-pin 3, one end of a link $h^\times$, which is extended upward and outward to rest upon a support g^9, which forms the top of a ⌐-shaped arm g^{10}, adjustably secured, as by a set-screw 5, on the laterally-extended head g^8. The lower edge of the link $h^\times$ is provided with a depression or seat h', to be entered by the support under normal conditions, as shown in Fig. 2, and the upper edge of the link is notched to present a shoulder h^2, adapted to be engaged by a suitable detent-pawl h^3, shown as fulcrumed at h^4 on the side of the temple-stand A and having a depending ear h^5, which overhangs the side of the link and prevents lateral displacement thereof without interfering with its longitudinal movement. A stop-pin h^6 for the tail of the pawl prevents improper movement thereof.

Referring to Fig. 2, it will be seen that when the thread-parter is retracted and in its normal position the pawl h^3 will then engage the shoulder h^2 and will positively prevent any movement of the thread-parter in opposition to the action of its actuating-spring s^2, and thereby the thread-parter will be maintained inoperative independently of such actuating-spring.

A spring $S^\times$ is attached at one end to the depending lug c^4 conveniently by hooking the spring around the pin c^5, and the other end of the spring is attached in any suitable manner to a part of the lay—as, for instance, by a strap 7, looped about the usual protector-shaft $P^\times$, Figs. 2 and 3—the spring being so

arranged as to be relaxed on the forward beat of the lay and put under tension on the backward beat. If the detent-pawl h^3 is disengaged from the link $h^\times$, the thread-parter will be moved into the position shown in Fig. 3 on the next backward stroke of the lay, as will be obvious, the tension of the spring $S^\times$ when subjected to the pull of the lay being greater than that of the actuating-spring s^2. When the lay beats up and relaxes the spring $S^\times$, then the actuating-spring will be free to act to retract the thread-parter and to return it to normal position.

When the loom is running properly, the head of the arm g^3 will be maintained in the position shown in Fig. 1, with the link-support g^{10} in the position shown in Fig. 2 to hold the link up, so that the pawl h^3 can engage the shoulder h^2, as described, and the periodical pulling action of the spring $S^\times$ will have no effect on the thread-parter. If, however, the filling fails, it will be detected by one or the other of the detectors, depending upon the pick on which it fails, or it may be detected by both. If the detection is first made by the detector f on the pick from right to left, then on the return pick a change of filling will be effected when the shuttle is in the box $B^\times$, and as the shuttle is about to enter that box on the shot from left to right the detector g will detect the absence of filling, and the slide $g^\times$ will be moved outward in well-known manner, swinging the arm g^3 with it and withdrawing the support g^9 from beneath the link $h^\times$, so that the latter will drop onto the breast-beam, and thus disengage the link from its pawl h^3, the stop h^6 then acting to prevent the pawl from following down. This occurs while the lay is forward and the filling is being replenished, and then the lay begins to move back. Inasmuch as the thread-parter has been released the pull on the spring $S^\times$ will move it into operative position, (shown in Fig. 3,) and while the lay is going back the shuttle is thrown from right to left, so that the filling is laid in the shed and the filling end will extend from the replenishing mechanism to the nearer edge of the cloth. The lay beats up with the shuttle in the left-hand shuttle-box, and the filling just laid is beaten in at the fell; but the forward movement of the lay slackens the tension of the spring $S^\times$ sufficiently to permit the actuating-spring s^2 to operate, retracting the thread-parter; but it does not then engage and part the filling end, as the latter is not brought into the field of action of the parter until the filling has been beaten in. The beating-in is effected as the lay completes its first forward stroke following replenishing, and the lay then moves back, and on such backward movement the shuttle is thrown from the left-hand box to the one at the right-hand side of the loom; but on its backward stroke the lay again stretches the spring $S^\times$ and moves the thread-parter again into operative position, and this time the hooked end of the parter extends over the filling end $t^\times$, as in Fig. 3, ready to engage it. It must be remembered that the weft-hammers move once for every two beats of the lay, operating alternately, and thus the weft-hammer $W^\times$ will not have released the detector g from its control until after the second pull by the lay on the spring $S^\times$, so that when such pull occurs the thread-parter is still free to be moved into operative position the second time. Now the shuttle having been shot from left to right, the lay beats up the second time after replenishing, and as it moves forward it relaxes the tension of the spring $S^\times$, and the actuating-spring s^2 operates the thread-parter, retracting it and severing the filling end $t^\times$ by the shearing action of the lower edge of the parter as it is drawn across the upright edge of the blade a', the severing being effected before the detector q can detect the presence or absence of the running filling. As the parter is retracted the spring s^2 returns the link $h^\times$ to its normal position, riding up over the support g^9, which in the meantime has returned to the position shown in Fig. 2, and the pawl h^3 will engage the shoulder h^2, whereby the thread-parter will be maintained in its inoperative position, so that the detector at the replenishing side of the loom can properly perform its function of feeling for the running filling on every alternate forward beat of the lay. Should the filling fail on the shot from left to right and be first detected by the detector g, the thread-parter will be operated as described, and on the next beat-up of the lay the detector f will detect absence of filling and the parter will be projected as the lay goes back and retracted as it beats up with the shuttle in box $B^\times$, this second operation of the parter accomplishing nothing, but the detector g will again detect absence of filling on such beat-up, and from this point the operation of the parts is precisely as has been described when the detector f is the first to detect filling failure. Consequently there will be four operations of the thread-parter when failure is detected first by detector g, with severance of the filling end by the fourth operation, as opposed to two operations of the parter and severance of the filling end by the second operation, when failure is first detected by detector f. When the temple is moved outward by the beat-up of the lay in usual manner, the arm $h^\times$ will slide over the support g^9 and return to the position shown in Fig. 2 when the temple moves inward as the lay goes back, the support g^9 still maintaining the pawl h^3 in holding engagement with the shoulder h^2 of the link.

The structure shown in Fig. 1 also provides for effecting stoppage of the loom should a predetermined number of filling changes take place successively—as, for instance, if the first filling-supply inserted in the shuttle misthreads—and, referring to Fig. 1, the inner

end of the knock-off lever b^5 is shown in the path of and to be engaged by the dog d^5, substantially in the manner shown and described in United States Patent No. 529,943, dated November 27, 1894.

My invention is not restricted to the precise construction and arrangement herein shown, 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 thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a loom provided with automatic filling-replenishing mechanism, a thread-parter, means operative by or through failure of the filling to render said thread-parter operative to act upon the filling end laid on the shot following replenishment, and means to actuate the thread-parter to sever such filling end.

2. In a loom provided with automatic filling-replenishing mechanism, a normally inactive thread-parter, means operative by or through filling failure to render the thread-parter active with respect to the filling end laid on the shot following replenishment, and means to actuate the thread-parter to sever such filling end and to thereafter return the thread-parter to inactive condition.

3. In a loom provided with automatic filling-replenishing mechanism, a thread-parter to sever the filling end laid on the shot following filling replenishing, means, including a filling-detector, to render said thread-parter operative upon detection of filling failure, and separate means to actuate the operative thread-parter and sever such filling end.

4. In a loom provided with automatic filling-replenishing mechanism, a thread-parter located adjacent the edge of the cloth, to sever the filling end laid on the shot following filling replenishing, means, including a filling-detector at the replenishing side of the loom, to render said thread-parter operative upon detection of filling failure, and means to actuate the thread-parter when rendered operative, to thereby sever the filling end.

5. In a loom provided with automatic filling-replenishing mechanism, a normally inoperative thread-parter to sever the filling-thread between the replenishing mechanism and the edge of the cloth, means operative upon detection of filling failure, and including a filling-detector, to effect movement of the thread-parter into position to act upon the thread, and means to actuate the operatively-positioned thread-parter, to first sever the thread and thereafter to return to normal position.

6. In a loom provided with automatic filling-replenishing mechanism, a thread-parter, a filling-detector, means, released upon detection of filling failure by said detector, to normally maintain the thread-parter inoperative, means to effect operative positioning of the thread-parter when released, and a device to actuate the operative parter to sever the filling-thread.

7. In a loom provided with automatic filling-replenishing mechanism, a thread-parter, means to operatively position it, an actuating device to operate the thread-parter when so positioned, to sever the filling-thread, and means rendered inoperative by or through filling failure, to normally maintain the thread-parter out of operative position.

8. In a loom provided with automatic filling-replenishing mechanism, a normally inoperative thread-parter, intermittingly-acting means to effect operative positioning of the parter, means, including a filling-detector, to permit such positioning upon detection of filling failure, and an actuator to effect the operation of the thread-parter when so positioned.

9. In a loom, a temple provided with a thread-parter, means, released by or through filling failure, to normally maintain the thread-parter inoperative, means to effect operative positioning of the latter when released, and a device to actuate the thread-parter when operatively positioned, to sever the filling-thread.

10. In a loom, a temple provided with a thread-parter, means, released by or through filling failure, to normally maintain the thread-parter inoperative, periodically-acting means to effect operative positioning of the latter when released, and independent means to actuate the thread-parter after it has been so positioned, to sever the filling-thread.

11. In a loom, a temple provided with a thread-parter, means to maintain it inoperative, a filling-detector, operatively connected with said means to release the thread-parter upon detection of filling failure, means to operatively position the thread-parter when released, and a device to actuate the latter when operatively positioned.

12. In a loom, a temple provided with a thread-parter, means, released by or through filling failure, to normally maintain the thread-parter inoperative, means to effect operative positioning of the latter when released, and a spring to actuate the operatively-positioned thread-parter to sever the filling-thread.

13. In a loom, a temple provided with a thread-parter, a spring to actuate it and to return it to inoperative position, means released by or through filling failure, to positively maintain the thread-parter inoperative, and means to effect operative positioning of the thread-parter when released.

14. In a loom provided with automatic filling-replenishing mechanism, a temple provided with a thread-parter, means operative by or through failure of the filling to render said thread-parter operative to act upon the filling end laid on the shot following replen-

ishment, and means to actuate the thread-parter to sever such filling end.

15. In a loom provided with automatic filling-replenishing mechanism, a temple provided with a thread-parter, means to maintain it inoperative, a filling-detector, operatively connected with said means to release the thread-parter upon detection of filling failure, means to operatively position the thread-parter when released, and a device to actuate the thread-parter when so positioned, to sever the filling end.

16. In a loom provided with automatic filling-replenishing mechanism, a temple provided with a thread-parter, a spring to actuate the latter when operatively positioned, to sever the filling end laid on the shot following replenishment, and means operative upon filling failure to automatically effect operative positioning of the thread-parter in readiness to act upon the filling end.

17. In a loom provided with filling-replenishing mechanism, two filling-detectors located at opposite sides of the loom, controlling connections between said mechanism and one of the detectors, a thread-parter near the other detector, means, released by or through detection of filling failure by such detector, to permit operative positioning of the thread-parter, means to operatively position the latter when released, and a device to actuate the thread-parter after it has been so positioned.

18. In a loom provided with filling-replenishing mechanism, two filling-detectors located at opposite sides of the loom, controlling connections between said mechanism and one of the detectors, a temple near the other detector, provided with a thread-parter, means, released by or through detection of filling failure by such detector, to normally maintain the thread-parter inoperative, means to position the latter, when released, to act upon the filling end laid on the shot following replenishment, and a spring to actuate the operatively-positioned thread-parter to sever the filling end.

19. In a loom provided with filling-replenishing mechanism, the lay, a temple having a relatively movable thread-parter, a spring to actuate it, means actuated by the movement of the lay to position the thread-parter in readiness to be actuated, means to maintain the thread-parter inoperative independently of its actuating-spring, and a filling-detector operatively connected with such latter means, to effect release of the thread-parter upon detection of filling failure by the detector.

20. In a loom provided with automatic filling-replenishing mechanism, a temple provided with a relatively movable thread-parter having a downturned, hooked end, a spring to actuate the thread-parter and to return it to inoperative position, means released by or through filling failure, to retain the thread-parter inoperative independent of its spring, and means to act upon the thread-parter and operatively position it when released, the hooked end thereof being thereby brought into position to overhang the filling-thread to be severed.

21. In a loom provided with filling-replenishing mechanism, the lay, a temple having a relatively movable thread-parter, a spring to move it to sever the filling-thread, means to positively maintain the thread-parter inoperative, a filling-detector operatively connected with said means, to effect release of the thread-parter upon detection of filling failure, and yielding means connecting the thread-parter and the lay, to move the former into operative position, when released, by or through the backward stroke of the latter.

22. In a loom, a temple-stand, a temple supported thereby and provided with a relatively movable thread-parter having a downturned, hooked end, a spring to actuate the thread-parter and return it to inoperative position, a link connected with the thread-parter, a detent on the temple-stand to engage the link and hold the thread-parter inoperative, means, rendered inoperative upon filling failure, to normally maintain the link in engagement with the detent, and means to operatively position the thread-parter when the link is disengaged from its detent.

23. In a loom, a temple provided with a relatively movable, resilient and laterally-bent thread-parter having a downturned, hooked end, a fixed upright blade on the temple, a spring to retract the thread-parter and draw it across the fixed blade with a shearing action, to sever the filling-thread, means, released by or through filling failure, to normally maintain the thread-parter retracted, and means to move the thread-parter when released against its spring into position to engage the filling-thread preparatory to severing the same.

24. In a loom, mechanism to govern its operation, two filling-detectors, controlling connections between said mechanism and one of the detectors, a thread-parter, means, released by or through detection of filling failure by the other detector, to normally maintain the thread-parter inoperative, means to operatively position the latter when released, and a spring to retract the operatively-positioned thread-parter, to sever the filling-thread and restore the thread-parter to the control of the means for maintaining it inoperative.

25. In a loom, filling-replenishing mechanism at one side thereof, a temple at the same side, provided with a thread-parter to sever the filling end laid on the shot following replenishment, a filling-detector to detect filling failure on the shot of the shuttle toward the said mechanism, means, released by or through detecting action of the detector, to maintain the thread-parter inoperative, the

lay, means operated on the backward stroke thereof to position the thread-parter when released in readiness to act upon the filling end, and a spring operative upon forward movement of the lay to actuate the operatively-positioned thread-parter to sever the filling end and thereafter restore it to the control of the means for maintaining it inoperative.

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

CHARLES F. ROPER.

Witnesses:
GEORGE OTIS DRAPER,
ERNEST W. WOOD.