

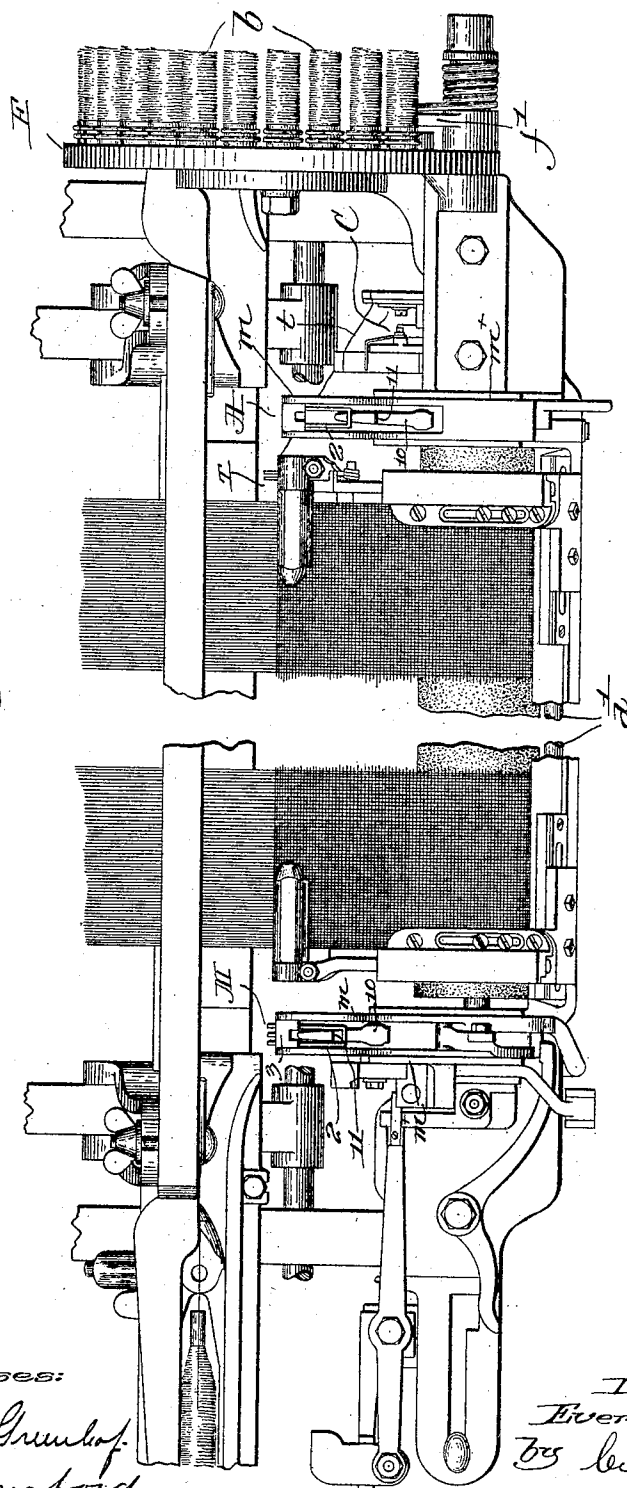
No. 823,248.

PATENTED JUNE 12, 1906.

E. S. WOOD.
FILLING DETECTING MECHANISM FOR LOOMS.
APPLICATION FILED SEPT. 27, 1905.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

Fred. S. Grunhof.
W. C. Lunsford.

Inventor.
Everett S. Wood,
by Lewis R. May Jr.
Attys.

E. S. WOOD.
FILLING DETECTING MECHANISM FOR LOOMS.
APPLICATION FILED SEPT. 27, 1905.

2 SHEETS—SHEET 2.

Fig. 2.

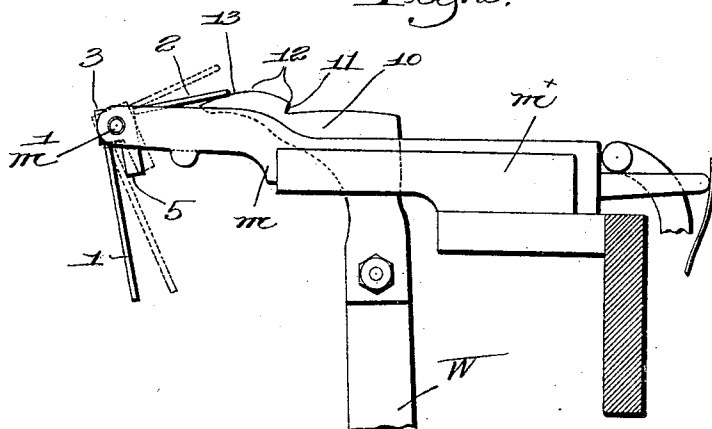


Fig. 3.

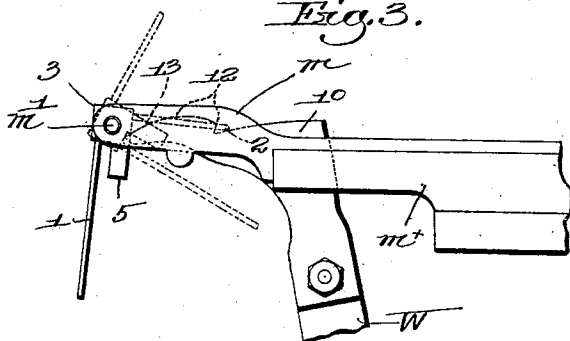


Fig. 6.

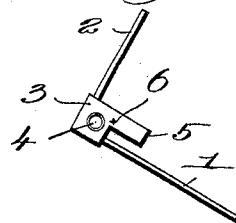


Fig. 5.

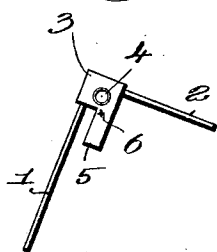


Fig. 7.

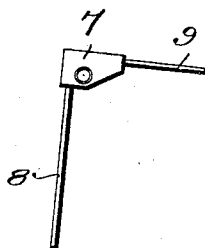
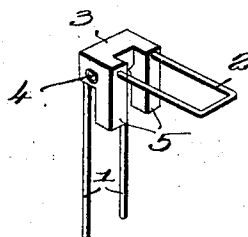


Fig. 4.



Witnesses:

Fred. S. Greenleaf.
W. C. Lumsford.

Inventor.

Everett S. Wood,
by Busby & Gregory
Attys.

UNITED STATES PATENT OFFICE.

EVERETT S. WOOD, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO
DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPO-
RATION OF MAINE.

FILLING-DETECTING MECHANISM FOR LOOMS.

No. 823,248.

Specification of Letters Patent.

Patented June 12, 1906.

Application filed September 27, 1905. Serial No. 280,265.

To all whom it may concern:

Be it known that I, EVERETT S. WOOD, a citizen of the United States, and a resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Filling-Detecting Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to filling-detecting mechanism for looms, and more particularly to the structure of the filling detector or fork and the hook on the vibrator or weft-hammer with which the tail of the fork coöperates upon detection of filling failure.

One of the objects of my invention is the improvement in the operation of the filling-fork, whereby it is made more uniform in its vibrations, the novel structure of both fork and hook coöperating to attain this object.

Another object of my invention is the decrease in the resistance offered by the fork to the filling, so that it is not necessary to set the fork so that the tines thereof extend as far through the grate or grid as is now requisite. This results in less breakage of filling where very fine filling is used, and it also decreases the amount of kinky filling.

As will appear hereinafter, my present invention is particularly adapted for use in double-detector "feeler looms"—i. e., with two filling-forks located at opposite sides of the loom and with a filling-exhaustion-indicating mechanism to effect filling replenishment prior to complete exhaustion of the filling in the running-shuttle.

A thread-cutting device is necessary on feeler-loom, said device cutting the outgoing or spent filling and then drawing the severed filling end forward and holding it until the temple thread-cutter severs it close to the edge of the cloth. If this is not done, the filling end, which is several inches long, is liable to be caught and woven into the cloth, making a defect therein. When the double filling-forks are used, this filling end is drawn across the adjacent fork (usually at the right-hand side of the loom, where the replenishing mechanism is located) at the moment when the coöperating hook is in its forward position. As this movement of the filling end by the

cutting and holding device is quite rapid, the ordinary fork is thrown violently upward by engagement with the filling end and rebounds against the latter, tending either to break it or to pull it out of the holder. In the construction hereinafter to be described the fork is held out of the way of such filling end to such an extent that it is only slightly engaged. As a result the fork will be thrown upward to a very much smaller degree, and even if thrown hard enough to rebound the filling end cannot be broken or pulled out of the holder, as the construction of the hook is such that the movement of the fork on the rebound is so limited that the elasticity of the filling is amply sufficient to prevent its breakage.

The various novel features of construction and operation embodied in my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a top plan view, centrally broken out, of a double detector-loom provided with filling-replenishment mechanism and with a thread cutting and holding device of the character referred to with one embodiment of my invention applied thereto. Fig. 2 is a side elevation of a filling-fork and its coöperating hook, on an enlarged scale, embodying my present invention, the weft-hammer and hook being shown in its forward position. Fig. 3 is a similar view showing the weft-hammer in its rearward position and with the fork shown in full lines in position to detect. Fig. 4 is a perspective view of my improved filling-fork. Fig. 5 is a side elevation thereof in the position it would assume if perfectly free on its pivot. Fig. 6 is a like view showing the normal swing of the fork when engaged by the filling, corresponding to the dotted-line position, Fig. 3. Fig. 7 is a side elevation of the ordinary filling-fork for purposes of comparison and to be referred to hereinafter.

In the loom shown in Fig. 1 I have partly shown filling-replenishing mechanism at the right-hand side comprising a hopper F to hold the filling-carriers *b* and a transferer *f'* and a controlling rock-shaft *d'* to govern the operation of such mechanism, all substantially as in the Northrop patent, No. 529,940,

the rock-shaft being turned by or through one or the other of the two detecting devices, one at each side of the loom.

If the loom is provided with filling-exhaustion-indicating mechanism such, for instance, as shown in United States Patent No. 789,472, granted to me, and another the 9th day of May, 1905, the rock-shaft *d'* will be turned by such mechanism to effect filling replenishment prior to complete exhaustion of the running-filling. This particular filling-exhaustion-indicating mechanism is not herein shown, as it forms no part of my present invention, and various forms of such mechanism are well known in the art.

The two filling-forks and their cooperating hooks are alike, and hence only one will be described in detail; but for convenience I have indicated the main filling-fork at M and the auxiliary filling-fork at A in Fig. 1. In said Fig. 1 I have shown at T a temple thread-cutter of any suitable construction, and at C a thread cutting and holding device to sever and hold the outgoing filling end and to bring it into range of the temple thread-cutter, the device C being substantially such as forms the subject-matter of United States Patent No. 683,423, granted to C. H. Draper on September 24, 1901, to which reference may be had for its detailed operation.

The fork-slides *m* and their stands or guides *m'*, mounted on the breast-beam of the loom, are of usual construction, each slide having a transverse pivot-pin *m'*, on which the fork is fulcrumed in usual manner.

Referring to Figs. 4, 5, and 6, each fork in accordance with my invention comprises usual tines 1 and a tail or loop 2, rigidly connected with a body 3, having an opening 4 for the pivot-pin *m'*, the body being conveniently made as a casting in which the tines and tail are embedded. The body is so shaped as to bring the center of gravity of the fork as a whole nearly under its fulcrum when the fork is in its normal position—i. e., when the fork is in position to be engaged by the filling—and herein this is effected by providing the body with depending extensions 5 in front of the opening 4. In Fig. 5 the center of gravity is indicated at 6, and if the fork were perfectly free on its fulcrum it would assume the position shown therein with the center of gravity directly beneath the fulcrum. In actual practice the normal position of the fork is more nearly that shown in full lines, Fig. 3, owing to the hook, to be referred to, but still the center of gravity is very nearly under the fulcrum. Consequently the fork is nearly balanced, and it is easily lifted by engagement with the filling; but as the fork is turned by such engagement the center of gravity rises until at the highest position of the fork such center of gravity is in substantially the same horizontal plane as the fork fulcrum or axis *m'*. This is shown

in Fig. 6, wherein the fork is shown by itself, and the corresponding position is shown by dotted lines, Fig. 3. Such rise of the center of gravity means that there is a constantly-increasing resistance to the rise of the fork, tending as a result to prevent the fork from tilting to its highest possible position. If, however, the fork is swung or tilted to this high position, its center of gravity is then in the position most advantageous to effect a quick return of the fork to its normal position. As the fork falls or returns to normal, there is a decreasing tendency to such movement, due to the fact that the center of gravity is gradually approaching the vertical below the fork-fulcrum, and this is of great importance, as it tends very materially to lessen the rebound of the fork when its tail strikes the hook of the vibrator.

For the purpose of comparison I have illustrated in Fig. 7 a fork of usual construction, comprising a body 7, tines 8, and tail 9, the center of gravity of the fork being so near the horizontal through the fork-axis that when the fork is in its normal position (see Fig. 7) its resistance to the filling is great and at its maximum. When the fork is tilted, however, the center of gravity rises above the horizontal and the resistance to the tilting movement is a gradually-diminishing one, manifestly giving the fork a tendency to rise to an extreme height and in actual practice frequently resulting in the fork striking at the upper part of its movement and rebounding forcibly. This usual type of fork will begin its descent slowly, but with a constantly-accelerated movement, which results in a greater rebound when the fork-tail strikes the hook. These objections are so well recognized that it has been customary to make the forks excessively heavy, and while it has thereby been possible to prevent the fork from rising too high or from falling too slowly the very grave objection has been introduced of greater resistance to the filling and the manifest disadvantages flowing therefrom. By the novel fork construction herein illustrated I am enabled to use a very much lighter fork, thereby obviating the objection of the resistance to the filling, and the turning movement of my novel fork is quicker and more readily responsive to the filling with much less strain thereupon.

In connection with the fork I have devised a novel form of hook carried by the vibrator or weft-hammer, the cooperation of the fork and hook increasing the regularity of action of the former by decreasing the distance for the latter to move on its return swing, thereby diminishing the rebound. Referring to Figs. 2 and 3, the vibrator or weft-hammer W has fixedly secured to it the hook 10 with a shoulder 11 to cooperate with the fork-tail upon detection of filling failure to thereby move the fork-slide *m* outward on the for-

ward swing of the weft-hammer in well-known manner to effect a change in the operation of the loom, such as a replenishment of filling or stoppage of the loom. The end of the hook behind the shoulder is peculiarly shaped along its upper edge, the part adjacent the shoulder rising slightly from the shoulder rearward, as at 12, and the adjacent part 13 out to the point of the hook is an arc so shaped that as the weft-hammer moves the arc will constitute a dwell or rest portion on the cam-like upper edge of the hook between its point and shoulder. Now if the fork is set so that its tines will extend exactly the correct distance through the grid, as the lay beats up the fork will be raised by the filling to such a height that the hook on its forward stroke will pass under its tail, and the rise 12 will pass under and support the tail without permitting practically any return swing of the fork until the hook returns to its inner or rearward position. (Shown in Fig. 3.) In other words, the rise 12 is so proportioned that it will just pass under the fork-tail, supposing the latter to have been lifted by the filling to clear the shoulder 11, and manifestly there can be no drop of the tail nor return movement of the fork and no rebound, as there is no chance for the fork to attain any momentum nor, in fact, to begin any return movement. The fork-tail passes from the part 12 on the hook to the rest 13, as the hook continues its forward movement and slides on such part without either rising or falling, as the part 13 is a dwell or rest. Of course the fork is not free to return to its normal position till on the rear stroke of the weft-hammer the hook-shoulder 11 passes behind and clears the fork-tail. I make the hook in this form, because otherwise the fork-tail might be lifted a certain distance less than the rise or high part on the hook, and the latter would then as it moved forward strike the tail and tilt or throw the fork higher than the position to which it was moved by the filling. This action of the fork would be undesirable, as thereby movement would be imparted to the fork at some time later than its engagement with the filling, thus permitting a less time for the fork to become quiescent.

The general advantages of the fork and co-operating hook constructed in accordance with my invention have been pointed out, the structure being adapted to any filling-detecting mechanism, whether of the single or double fork type, as will be manifest; but the structure is additionally adapted for use in a loom provided with a thread cutting and holding device.

Referring to Fig. 1, at the right-hand side the filling end *t* of the outgoing filling-supply is supposed to have been cut and clamped by the device C and drawn forward by the latter into position to be severed close to the cloth by the temple thread-cutter T. The filling

end *t* is thus drawn across the right-hand filling-fork A, Fig. 1, when its hook 10 is in its forward position, as shown in Figs. 1 and 2, and by reference to the latter figure it will be seen that at such time the rest 13 acts upon the tail to position the tines, as in full lines, so far forward that they will be engaged very slightly by the filling end and as a result of such engagement will be given a very slight swinging movement to about the dotted line position, Fig. 2. Even if the swing is hard enough to cause rebound of the fork the latter cannot break the filling end or pull it out of the holding or clamping member of the device C, as the hook limits such rebound movement.

Referring to Fig. 4, it will be seen that the depending extensions 5 are laterally separated, this being done to afford a proper clearance for the point of the hook when in its rearmost position.

My invention is not restricted to either single or double detector looms, as will be manifest from the foregoing, nor is it restricted to the precise construction and arrangement herein shown and described, for the same may be modified or rearranged 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. In filling-detecting mechanism for looms, a movable support, a filling-fork fulcrumed thereon and adapted to be tilted by engagement with the filling, and means including a hook, to coöperate with the fork and move its support upon detection of filling failure, said hook having a cam-surface to coöperate with and retain the fork in tilted position for a predetermined period after tilting thereof by the filling.

2. In filling-detecting mechanism for looms, a slidable support, a filling-fork mounted therein and movable relatively thereto by engagement with the filling, and means to move the slidable support by or through coöperation with the fork upon detection of filling failure, said means also acting to retain the fork in abnormal position for a predetermined period when moved thereinto by engagement with the filling.

3. In filling-detecting mechanism for looms, a slidable support, a filling-fork mounted therein and movable relatively thereto by engagement with the filling, means to effect movement of said support by or through the fork upon detection of filling failure thereby, and a device to coöperate with and retain for a predetermined period the fork in the position to which it is moved by engagement with the filling.

4. In filling-detecting mechanism for looms, a filling-fork adapted to be intermittently engaged and tilted by the filling when in-

tact, and means to prevent rebound of the fork when so tilted.

5 5. In filling-detecting mechanism for looms, a filling-fork adapted to be intermittingly engaged and moved by the filling when intact, and means to cooperate with and retain the fork in substantially such position for a predetermined period after movement thereinto.

10 6. In filling-detecting mechanism for looms, a filling-fork adapted to be intermittingly engaged and tilted by the filling when intact, and means to prevent the immediate return of the fork thereafter to detecting position.

15 7. In filling-detecting mechanism for looms, a filling-fork adapted to be intermittingly engaged and tilted by the filling when intact, means to retain the fork in tilted position for a predetermined period and to permit its gradual return thereafter toward detecting position, to prevent rebound of the fork.

20 8. In filling-detecting mechanism for looms, a filling-fork adapted to be intermittingly engaged and tilted by the filling when intact, a vibrating hook having a shoulder to cooperate with the fork upon filling failure, and a cam-surface on the hook to hold the fork in tilted position until the hook has made a predetermined movement, whereby rebound of the hook is prevented.

30 9. In filling-detecting mechanism for looms, a filling-fork adapted to be intermittingly engaged and tilted by the filling when intact, said fork having a tail, a vibrator, a hook fixedly mounted thereon and having a shoulder to engage the tail upon filling failure, and a cam-surface on the hook comprising a rise and a dwell or rest, to successively engage the tail when the fork is tilted and prevent its return until the hook has moved forward, and then back far enough to carry its shoulder past the fork-tail.

40 10. In a loom, a filling-fork, adapted to effect a change in the operation of the loom upon detection of filling failure, a temple thread-cutter, a device to cut and hold the filling end and draw the latter into cooperative relation with the temple thread-cutter, the latter and said device being located adjacent the filling-fork, and means to retract such fork to prevent improper engagement thereof with the filling end.

50 11. In a loom provided with automatic filling-replenishing mechanism, and with a filling-fork, in combination, a temple thread-cutter and a thread cutting and holding device, located at the replenishing side of the loom, said device cutting and holding the filling end of the outgoing filling, and bringing it into range of the temple thread-cutter, and means to act upon the filling-fork and retract the same to prevent breakage of the said filling end by the fork.

12. A filling-fork for looms, adapted to

65 rock on a transverse axis, and means to bring the center of gravity of the fork below and substantially under its axis when the fork is in detecting position.

70 13. A filling-fork for looms, comprising a body portion adapted to rock on a transverse axis, tines and a tail connected with the body, and an enlargement on the body and in front of, and extending below the axis thereof, to bring the center of gravity below such axis when the fork is in detecting position.

75 14. A fork-slide, a filling-fork fulcrumed thereon, and means to bring the center of gravity of the fork substantially under its fulcrum when the fork is in detecting position, upward movement of the center of gravity toward the horizontal when the fork is tilted acting to gradually increase the resistance exerted by the fork, and to effect its quick return to detecting position.

80 15. A filling-fork for looms, comprising a body portion and tines, constructed and arranged to bring the center of gravity of the fork below and substantially under its fulcrum when the fork is in detecting position.

85 16. In a filling-fork for looms, a body portion adapted to rock on a pivotal support, tines carried by the body, and depending extensions on the latter to cause the center of gravity of the fork as a whole to fall below the axis on which the fork rocks when the fork is in detecting position.

90 17. A filling-fork for looms, having a body portion adapted to be rocked on a transverse axis, and an extension on the body to bring the center of gravity of the fork below its axis of movement when the fork is in detecting position.

95 18. A filling-fork adapted to rock on a transverse axis and provided with a tail, means to bring the center of gravity of the fork below the axis thereof when the fork is in detecting position, a vibrating hook to cooperate with the fork-tail upon detection of filling failure, and means on the hook to cooperate with the fork-tail and maintain the fork in tilted position for a predetermined period after cooperation with the filling.

100 19. In filling-detecting mechanism for looms, a fork-support and a filling-fork fulcrumed thereon having its center of gravity below the fulcrum when the fork is in detecting position.

105 20. In a loom provided with filling-exhaustion-indicating mechanism adapted to effect a replenishment of the running-filling prior to complete exhaustion thereof, and two filling-detectors, in combination, a temple thread-cutter, a device to cut and hold the filling end and move the latter into cooperative relation with the temple thread-cutter, the latter and said device being located adjacent one of the filling-detectors, and

means to prevent improper engagement of such detector with the filling end when filling replenishment is effected.

21. In a loom provided with filling-exhaustion-indicating mechanism adapted to effect a replenishment of the running-filling prior to complete exhaustion thereof, and two filling-detectors, in combination, a temple thread-cutter, a device to cut and hold the filling end and move the latter into coöperative relation with the temple thread-cutter, the latter and said device being located adjacent one of the filling-detectors, and means to act upon such detector and retract it from the path of the filling end when the latter is moved by the cutting and holding device.

22. In a loom provided with automatic filling-replenishing mechanism, and a filling-

feeler to control the operation thereof, in combination, a filling-detector located at the replenishing side of the loom, a temple thread-cutter, a device to cut and hold the filling end and move it into coöperative relation with the temple thread-cutter upon filling replenishment, said cutting and holding device being located adjacent such filling-detector, and means to keep the latter away from the filling end when the same is moved by the cutting and holding device.

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

EVERETT S. WOOD.

Witnesses:

GEORGE OTIS DRAPER,
ERNEST W. WOOD.