

Aug. 30, 1932.

A. HUDSON

1,874,533

FILLING FEELER MECHANISM FOR LOOMS

Filed July 30, 1930

2 Sheets-Sheet 1

Fig. 1.

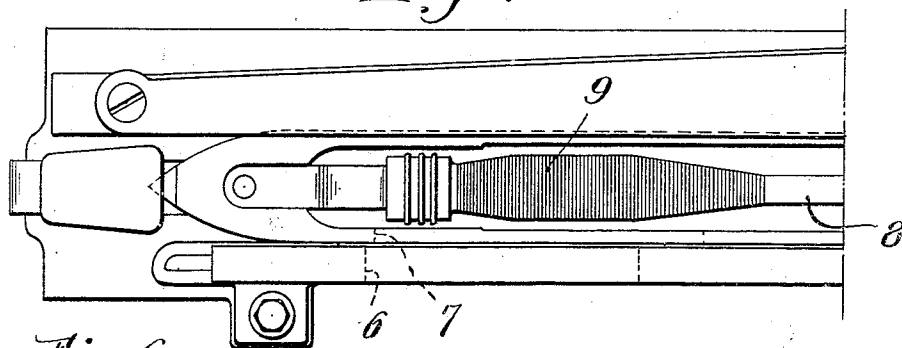


Fig. 6.

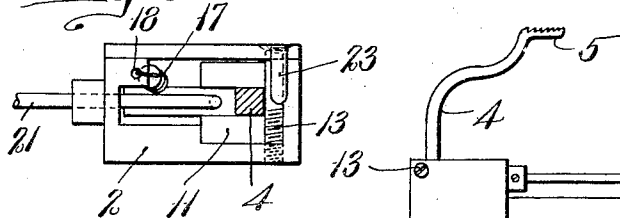


Fig. 2.

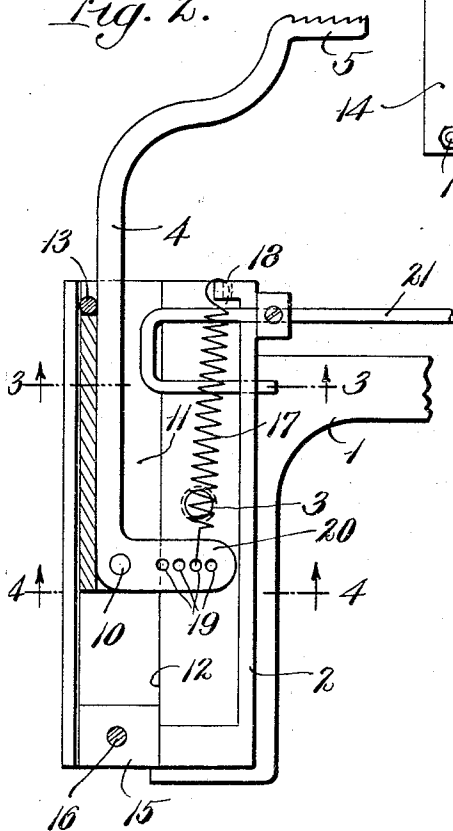


Fig. 3.

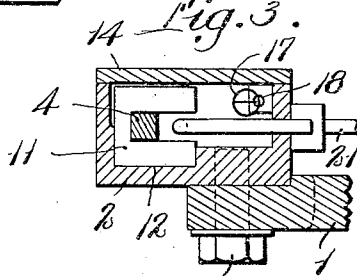


Fig. 4.

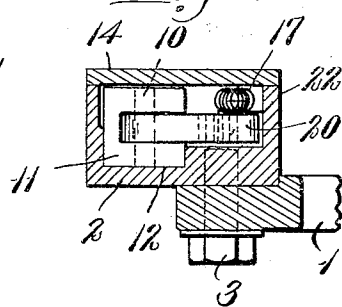
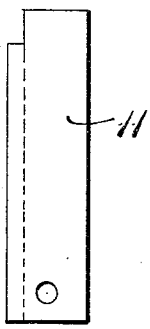


Fig. 5.



Inventor.

Alexander Hudson,
by Robert K. Randall.
att'y.

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A. HUDSON

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2 Sheets-Sheet 2

Fig. 7.

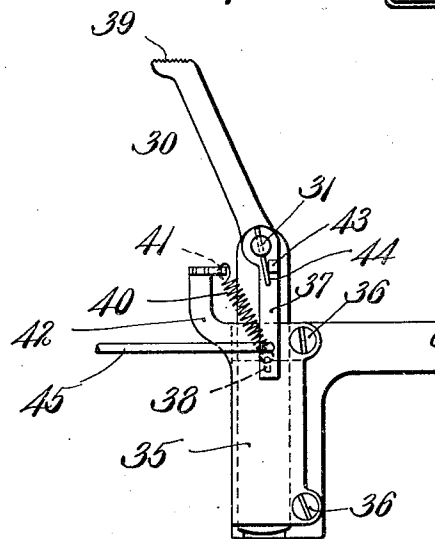
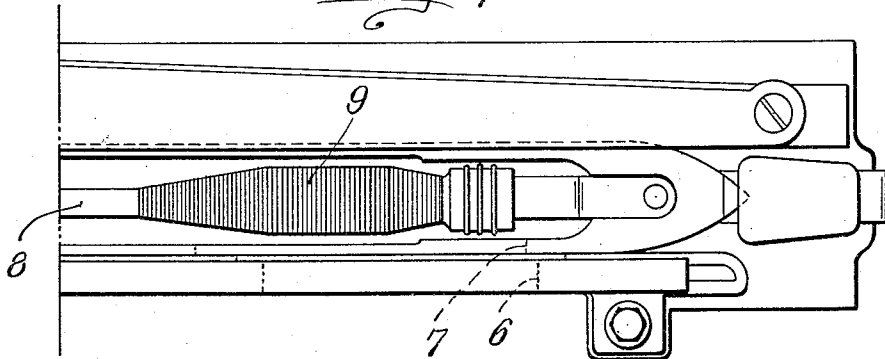


Fig. 9.

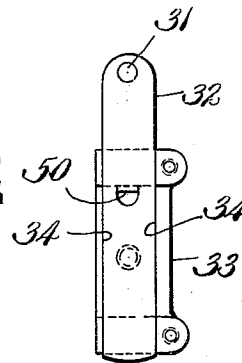
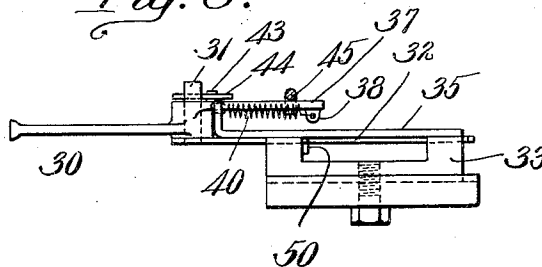


Fig. 8.



Inventor.
Alexander Hudson,
by Robert K. Randall,
att'y.

UNITED STATES PATENT OFFICE

ALEXANDER HUDSON, OF READVILLE, MASSACHUSETTS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE DRAPER CORPORATION

FILLING-FEELER MECHANISM FOR LOOMS

Application filed July 30, 1930. Serial No. 471,851.

The invention has relation to filling-feeler devices which commonly are used in looms for the purpose of detecting the approach of substantial exhaustion of the supply of filling occupying the working shuttle upon the lay of a loom. As is well-known, such devices are employed to bring about a change in the working of a loom when the filling-supply has been reduced to a predetermined minimum, in order to guard against the occurrence, in the cloth being woven, of an incomplete or partial pick of filling which does not extend the full width of the cloth, and which will require to be removed by hand with the loom stopped, in order to avoid production of a defect in the cloth, or will reduce the value of the finished cloth if allowed to remain. In the case of looms equipped with automatic filling replenishing mechanism, the filling-feeler acts to call this mechanism into action, so as to provide thereby a fresh supply of filling upon the lay; in the case of other looms the filling-feeler acts to stop the weaving.

More particularly the invention has relation to filling-feeler devices of the side slipping class.

Filling-feeler mechanisms of the class to which the present invention is applicable comprise, ordinarily, a side-slipping feeler-member having movement forward and rearward of the loom imparted thereto by the feeling action, conjoined with a side-slipping pivotal indicating movement, and a transmitter that is actuated by the said side-slipping movement to indicate, as it is termed, the change in the working of the loom.

The general object of the present invention is to provide an improved filling-feeler mechanism of the side-slipping class characterized by simplicity of construction and freedom from liability to get out of order, and by light and easy action.

A special aim of the invention is to provide a filling-feeler adapted to operate upon delicate and fine filling without the injury to the filling that results from the feeling action of many of the types of such devices hitherto in use. This injury, as is well-known, results from repeated impact of the same spot of the

periphery of the shuttle-contained wound mass of filling against the feeler-member. This impact takes effect many times upon the same turns of the wound mass of filling, before the supply becomes so far depleted as to begin unwinding those turns with resulting shifting of the impact to other turns underlying the original superficial turns. This localized pounding of the wound mass sometimes involves displacement of the said turns, and resulting interference with free delivery of the filling from the wound mass. Sometimes, it results in the cutting or breaking of one or more turns; or in chafing or other injury to the filling. The finer the filling the more subject it is to injury, by reason of the greater length of yarn comprising the wound mass, and its consequent longer duration in the shuttle, and also due to its delicacy and inability to withstand the repeated pounding.

The invention comprises a novel and improved side-slipping feeler device characterized by the provision of a filling-feeler having a laterally offset filling-engaging tip and pivotally mounted on a carrier which moves forward with the feeler-member as the latter is driven forward in the advance of the lay in a feeling action, and by the provision of a single spring acting on the feeler to hold it yieldingly erect in its presentation position, and through its action on the feeler also serving to hold the carrier that is combined with the latter yieldingly rearward and to return such carrier to its rearward position after each feeling action.

Illustrative embodiments of the invention are shown in the accompanying drawings, in which,—

Fig. 1 is a plan view of certain of the parts at the feeler end of a loom, namely a portion of the lay, a shuttle and its filling-supply, and one of the said embodiments.

Fig. 2 is a plan view, on a larger scale than Fig. 1, of the feeler of Fig. 1 with the cover-plate removed and the feeler-carrier in section.

Fig. 3 is a section on line 3—3 of Fig. 2.

Fig. 4 is a section on line 4—4 of Fig. 2.

Fig. 5 is a plan view of the carrier-slide to

which further reference is made later herein.

Fig. 6 is a rear end view of the feeler.

Fig. 7 is a view similar to Fig. 1, showing another embodiment of the invention.

5 Fig. 8 is a side elevation of the feeler alone of Fig. 7.

Fig. 9 is a plan view of the feeler-base with the carrier-slide in place therein, with the cover 35 and other portions removed.

10 Having reference to the drawings:—

The novel filling-feeler of Figs. 1 to 5 is located, as most commonly is the case, at one end of the breast-beam of the loom in which the device is employed, being supported by means of a bracket 1 applied in connection with the frame of the loom. To the outer end of the said bracket the feeler-base 2 is made fast by suitable bolts 3. In this base 2 is slidably mounted a feeler-member 4 having an offset filling-engaging end 5 which is adapted to enter the shuttle as the lay beats up, through the usual feeler slots formed at 6 in the front-plate of the shuttle-box, and at 7 in the wall of the shuttle, to engage and feel the shuttle-contents comprising the bobbin 8 and the wound mass of filling 9 thereon. The feeler-member 4 is pivotally mounted in the channel of the feeler-carrier 11, which comprises a block of U-shaped section, the pivot-pin 10 passing both through the lateral extensions defining the channel and through the feeler-member. This block 11 is adapted to slide freely and easily fore-and-aft of the loom in a guideway 12 milled in the feeler-base 2. Stops are provided to limit the extent of this fore-and-aft movement, one thereof formed by a screw 13 which is put through a cover-plate 14 applied to the feeler-base to cover the working parts, and which thus also serves to hold the cover-plate in place, and a small block 15 fitted into the guideway 12 at the forward end and secured therein by a bolt 16 which also serves to hold the cover-plate 14 in place. A tongue 23 on the cover-plate 14 engages one side of the guideway to help position the plate on the base 2.

The feeler-member 4, as stated, has its filling-engaging end 5 offset with respect to its pivot 10 so that a tendency to rotate about such pivot will occur when the rearward end of the feeler comes in contact with a surface moving with the lay. This type of feeler action is a familiar one in practice, commonly termed the side-slipping principle. A contracting spring 17 anchored to the feeler-base at 18 and hooked into the appropriate one of a series of holes 19 formed in an angularly projecting arm 20 formed on the feeler-member 4, tends to hold the feeler-member swung in a counter-clockwise direction about its pivot 10 into its normal or presentation position, with one of its sides pressed against the bottom of the channel in the feeler-carrier 11. In this erect presentation position the feeler-

member enters the shuttle at each beat of the lay made with the shuttle at the feeler end of the lay, and so long as adequate filling remains in a wound mass upon the bobbin 8 to engage with the serrations on the end 5, the feeler-member 4 will be driven forward with its carrier 11 sliding freely in the guideway 12, the only resistance opposed to such forward movement being the pull of the light spring 17 and the inertia of the two relatively light parts 4 and 11. By changing the obliquity of the spring with respect to the path of the carrier, as by shifting its engagement from one to another of the holes 19, the degree of the resistance of the feeler to being pushed forward in a feeling action may easily be adjusted, and the attendant lengthening or shortening of the power-arm of the feeler-member as measured from the pivot to the spring-engaging means or hole 19 in use results in corresponding increase or decrease of the feeler's resistance to rotation on its pivot in effecting side-slipping, without need to provide means for tightening or loosening the spring.

As the weaving continues the filling is woven off from the wound mass 9 until the few remaining turns thereof are no longer able to restrain the tendency of the filling-feeler 4 to swing about its pivot. When this state is reached, the first result as the lay beats up is to cause the filling-engaging end 5 of the feeler to slip sideways along the surface of the substantially bare bobbin 8, with attendant rotation of the feeler-member upon its pivot 10. Then the continued forward movement of the lay in beating up causes the aforesaid sliding of the carrier 11 along its guideway as before. It is this changed and angularly inclined relation of the feeler-member 4 that is utilized to call into action the weft-replenishing mechanism of the loom.

A fragmentary portion of a transmitting member 21 is shown located in spaced relation with the feeler device, to receive an impulse from the feeler-member when the latter slips sideways and to transmit this impulse to the weft-replenishing mechanism to call the latter into action for the purpose of providing automatically a fresh supply of filling. This transmitting member in the form illustrated herein comprises a wire or rod 21 of which one end, either straight or bent back as shown, enters the feeler-base through appropriate holes or slots in the raised flange 22 at one side and stands in position to be struck by the shank of the feeler-member 4 after it has slipped sideways along the bobbin. The endwise push delivered to the transmitting member either through the primary side-slipping movement of the feeler-member, or through the latter's being driven forward in inclined relation during the remainder of the forward

movement of the lay, or through the combined result of both of these actions, is utilized in any suitable or preferred manner to actuate the controlling devices of the weft-replenishing mechanism and set in motion the latter mechanism to provide a fresh supply of filling.

In the embodiment of the invention that is shown in Figs. 7 and 8, the feeler-member 30 is pivoted upon a pivot 31 fixed in the end of the carrier 32 that protrudes rearwardly from the feeler-base 33, such carrier being mounted for free sliding movement fore-and-aft the loom in guideways 34 in the feeler-base, and limited as to the extent of its movement rearward by a tongue 50, struck down from the material of the carrier, and engaging with the stand. The carrier 32 is retained in place within the guideways by a cover 35 secured to the top of the stand by screws 36. The forwardly-extending tail 37 of the feeler-member is provided at its under side with an ear 38 to which is attached one end of a light contracting spiral spring 40, the opposite end of which is attached to the desired one of a series of spring-engaging devices or holes 41 in the upturned rearward extremity of an arm 42 formed integrally with the cover 35 and extending rearwardly of the ear 38 on the feeler-tail 37 to terminate at one side of the pivot 31 on the rear end of the carrier 32. The feeler-member is provided with a stop 43 which engages with a pin 44 fixed transversely in the protruding upper end of the pivot pin 31 to limit the extent of its pivotal action about this pin 44 on the carrier.

The single spring 40 serves as in the case of the embodiment previously described to perform the two-fold function of holding the feeler-member yieldingly erect in its desired angular presentation position, and through its action on the feeler-member also serving to hold the carrier with the feeler-member borne thereby yieldingly rearward and to return the carrier and feeler-member to their rearward position after each feeling action.

In this form the arrangement of the spring 40 in connection with the spring-engaging holes 41 in the rearward end of arm 42 has the valuable feature of permitting a relative adjustment of the force with which the feeler and its carrier are held rearward, with respect to the force exerted on the feeler to resist its rotation about the pivot 31. Thus, when the rearward end of the spring is attached by means of the hole 41 nearest the pivot 31, the line of the force exerted by the spring (though still oblique with respect to the carrier) is most nearly in line with the direction of movement of the carrier. Consequently, the main force of the spring is exerted in pushing the carrier and the feeler-member rearward toward the lay, while only

a relatively small part of its force goes to resist the rotation of the feeler-member about the pivot 31 and thus to oppose the side-slipping tendency of the serrated filling-engaging end 39 of the feeler-member lengthwise of the shuttle-contents. Whereas, when the spring is engaged with the hole 41 most remote from the pivot 31, the resistance of the feeler-member to being pushed forward with its carrier is diminished; consequently the intensity of its push which imbeds the serrations of the feeler-tip in the turns of filling is reduced. At the same time the component of the spring's force which resists rotation of the feeler-member about the pivot 31 is increased, thus tending to diminish the side-slipping tendency of the feeler-tip lengthwise of the shuttle-contents.

Thus, the means for varying the point of attachment of the rear end of the spring to the fixed part of the feeler-stand comprised by the arm 42, provides for changing the obliquity or angularity of the spring both with respect to the feeler-member and its carrier. Hence, as the rear end of the spring is shifted, it increases the portion of the spring's force resisting the motion imparted to the feeler-member by the shuttle-contents while it decreases that portion of the spring's force which causes the feeler-carrier to resist the motion imparted to it by the shuttle-contents, and vice versa. So the provision for varying the angularity of the spring through shifting its rear end serves to determine the proportion of the spring's force which acts to effect each of the two positioning actions, namely the angular positioning of the feeler-member about its pivot, and the positioning of the feeler and carrier together in their extreme rearward position.

A fragmentary portion of a transmitting member 45 is shown connected with the tail 37 of the feeler-member, to receive an impulse from the feeler-member when the latter slips sidewise, and to transmit this impulse to the weft replenishing mechanism to call the latter into action to effect weft replenishment according to any well-known or desired manner of operation. In the form shown, this transmitting member comprises a light rod or wire, the illustrated end of which is bent down to engage a hole in the feeler-tail. In the normal action of the feeler on non-detecting beats of the lay, the feeler and its carrier are driven forward by the shuttle-contents without rotation of the feeler-member upon its pivot, and the feeler-tail accordingly travels toward and back with attendant idle movement of the extremity of the transmitting member 45. When the feeler-member detects substantial exhaustion of the wound mass of filling within the shuttle, it slips lengthwise along the surface of the shuttle-contents with accompanying rotation about its pivot 31 which carries the tail

37 laterally, pulling the transmitting member 45 endwise, and thereby imparting to the latter an impulse which is employed through connections of well-known type to initiate weft replenishment.

5 The described devices for feeling the filling are of important practical value. The operation of feelers made according to the principles of the invention is characterized by marked saving of wear and tear on the
10 wound filling-supply. The two moving parts of each of the feelers are light and easy on the filling in the repeated feeling operations, and unusually sensitive and accurate in gauging the amount remaining, and responsive in acting to call the change due to the fact that the feeler is unconnected with the transmitting mechanism and has only its own inertia to overcome in performing its
20 side-slipping action and swinging well off-center. In the embodiment of Figs. 1 to 5, the feeler-member is pushed forward by the bobbin with the full weight of the lay behind it, and can be brought into contact with any desired form of transmitting member
25 with assurance of sufficient power to actuate the weft-replenishing mechanism. The use of the single spring engaging directly with the feeler-member to effect the two results of holding and restoring the feeler-member rearward after it and its carrier have been thrust forward, and of holding and restoring the feeler-member erect in proper angular relation to receive the impact of the
30 shuttle-contents, affords a marked advance in reducing cost and upkeep, and in simplifying repairs and adjustment.

While I have illustrated and described certain forms in which the invention may be embodied, I am aware that many modifications
40 may be made therein by any person skilled in the art, without departing from the scope of the invention as expressed in the claims. Therefore, I do not wish to be limited to the particular forms shown, or to the details of construction thereof, but what I do claim is:—

1. A filling-feeler mechanism comprising, in combination, a feeler-stand having a
50 guide, a carrier slidable within said guide, said carrier constituted by a channel having its closed side extending parallel to the direction of its movement, a side-slipping feeler-member pivotally mounted within the said
55 channel between upper and lower cheek-portions of the carrier-slide, a spring engaging with said feeler-member and acting to give the feeler-member and carrier their position rearward and also to swing the feeler-member relative to the carrier into engagement with
60 the closed side of the said channel determining the angular presentation position of the feeler-tip, and a transmitter actuated by side-slipping movement of the feeler-member.

65 2. A filling-feeler mechanism comprising,

in combination, a feeler-stand, a feeler-carrier slidably mounted in said stand, having a U-shaped cross section transversely of the direction of its movement, a feeler-member pivotally mounted within the channel in the feeler-carrier provided by such U-shape, and having a laterally offset filling-engaging tip, and a spring applied to the feeler-member tending to hold it within such channel against the closed side thereof and the carrier rearward when exhaustion of the filling supply permits the filling-engaging tip to slip
70 sidewise and the feeler-member to swing out of the channel. 75

3. A filling-feeler mechanism for looms 80 comprising, in combination, a feeler-stand, a feeler-carrier movable with respect to said stand and having a channel which extends from front to rear as well as laterally thereof, a side-slipping feeler-member occupying
85 the said channel, pivotally combined with the carrier, and having a filling-engaging end which is laterally offset to induce side-slipping, a spring tending to hold the feeler-member swung into normal feeling position
90 within and against the closed side of the channel of the carrier, and in addition to move the carrier rearward on the stand.

ALEXANDER HUDSON.

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