H. G. KIMBALL.

LOOM FEELER MOTION.

APPLICATION FILED FEB. 11, 1918.

1,298,352.

Patented Mar. 25, 1919.

Fig. 3.

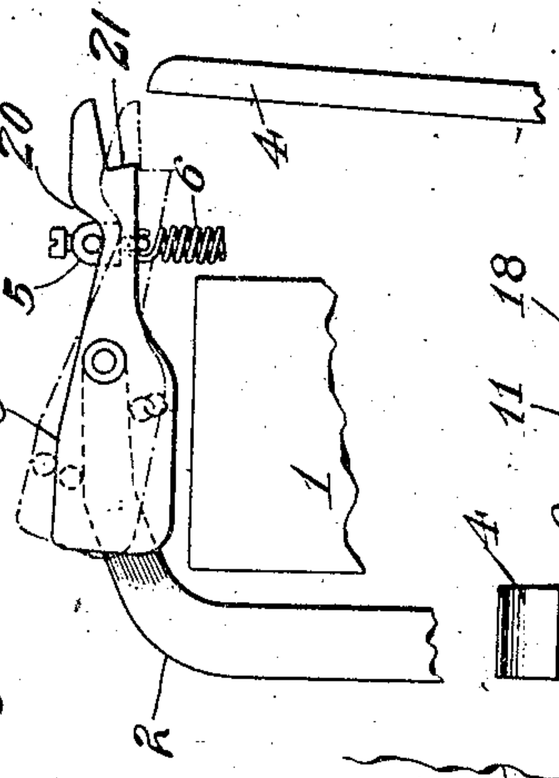



Fig. 4.

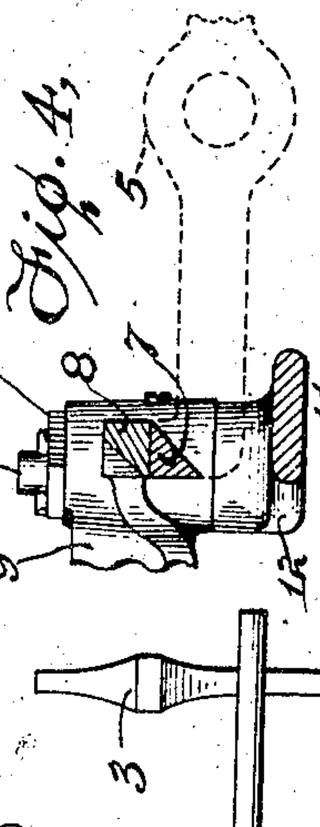



Fig. 5.

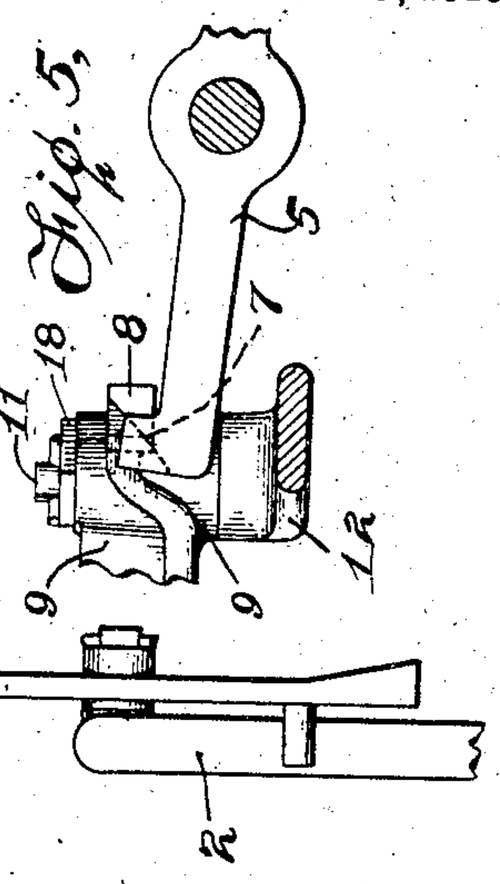



Fig. 6.

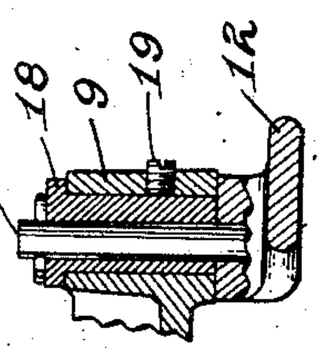



Fig. 1.

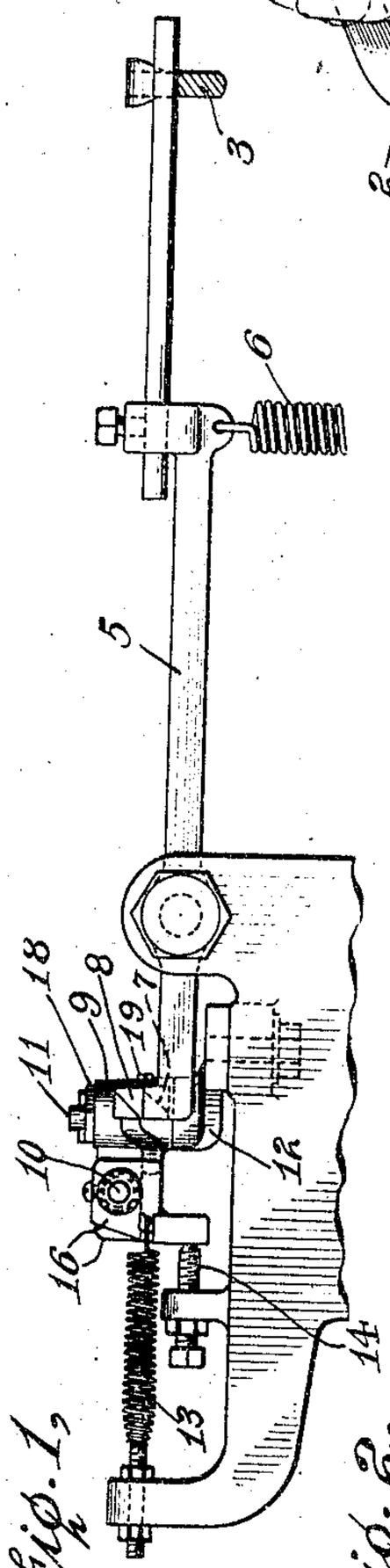
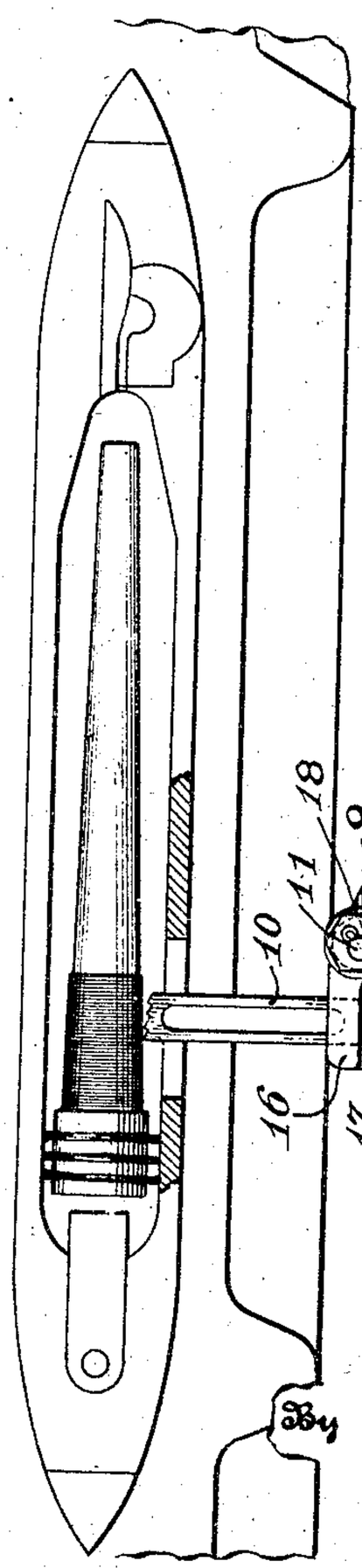
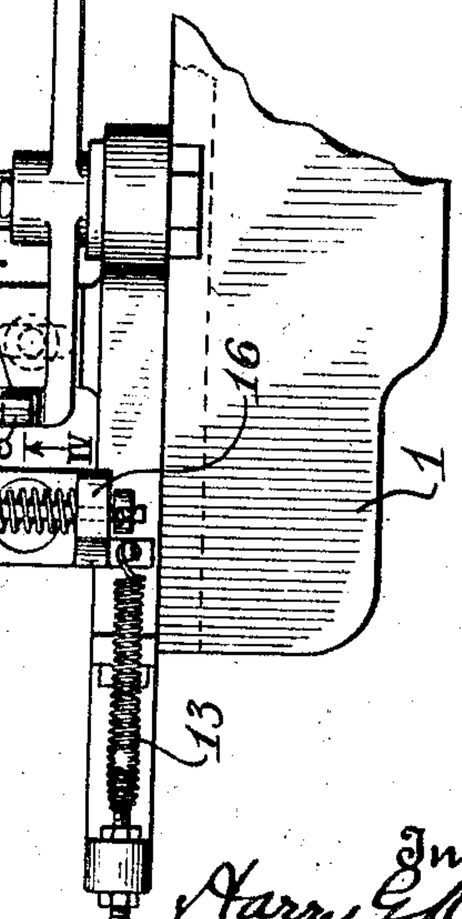



Fig. 2.

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# UNITED STATES PATENT OFFICE.

HARRY G. KIMBALL, OF BRONXVILLE, NEW YORK, ASSIGNOR, BY MESNE ASSIGNMENTS, TO DRAPER CORPORATION, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

## LOOM FEELER-MOTION.

1,298,352. Specification of Letters Patent. Patented Mar. 25, 1919.

Application filed February 11, 1918. Serial No. 216,639.

*To all whom it may concern:*

Be it known that I, HARRY G. KIMBALL, United States citizen, residing in Bronxville, Westchester county, N. Y., have invented the following described Improvements in Loom Feeler-Motions.

The invention is specifically an improvement in side-slipping feelers, that is to say in weft depletion indicators wherein a change in the operation of the loom is controlled and called by a contact feeler or finger which feels the weft in the shuttle on the beat-up of the lay and slips sidewise thereon or on its partially denuded bobbin or carrier, when the weft is nearly exhausted and thereby stops the loom or replenishes the weft without stopping it. The improvement consists in a combination of the principal elements of the side-slipping feeler system so organized as to reduce or minimize the mass, and hence the inertia, of those feeler parts which are moved by the weft on each normal and also on each call-changing action and so organized as to permit the use of very light spring pressures for restoring the said parts to their weft feeling position and to avoid the imposition of heavy or sudden strains upon the members which are directly controlled by the varying conditions of the weft, thereby producing a feeler mechanism which is very sensitive and also very durable and which can be set to work with reliable uniformity on a close margin of depletion. By reason of the lightness and delicacy of feeling contact of mechanism so constructed, it is incapable of crushing fine wefts or of abrading the surface of enameled bobbins and various other advantages are also incident upon the same conditions, as well as upon other incidental and collateral features of the herein disclosed structure which will be made apparent in connection with the following description and the drawings wherein—

Figure 1 is an elevation of the feeler mechanism;

Fig. 2 a top plan;

Fig. 3 a side elevation of a portion of the actuating train including the dog;

Fig. 4 a section through the latch and catch;

Fig. 5 a side elevation thereof in a different position; and

Fig. 6 an axial section through the pivot of the feeler carrier.

The feeler mechanism will be understood to be mounted as usual on a supporting bracket 1 in position to be engaged by the weft in the shuttle on the beat-up stroke of the lay and to bring about weft replenishment or loom stoppage through the control of some suitable train of mechanism represented in the present case by the usual crank arm 2, on the weft replenishing starting shaft, carrying a pivoted dog 3 adapted to be struck by the weft-hammer 4 but normally counterbalanced on its pivot so as to be out of the path of said weft-hammer. This dog is governed by a lever 5 herein termed its controller which is subject to the tension of a spring 6 or other force urging it in the direction to swing the dog into interposition between the said arm and weft hammer and thereby cause the actuation of the arm 2 by the weft hammer 4 in the usual manner. The controller 5 swings the dog in the manner just described on the attainment of a predetermined degree of depletion of the weft which is determined and indicated by the side-slipping of the contact tip of the feeler finger and for this purpose the said controller 5 is provided with a latch 7 engaged and held out of action upon the dog by a complementary catch 8 formed on the carrier 9 upon which the feeler finger 10 is mounted. The carrier 9 is pivotally mounted on a pivot pin 11 upstanding from a fixed bracket 12 said pin being substantially perpendicular to the normally engaging faces of the latch and catch and said engaging faces being substantially radial to the fulcrum axis of controller 5 so that the turning of the carrier on its pivot will release the lever without encountering more resistance than is represented by the friction of one face against the other. By giving the said faces a slight inclination with reference to the direction of the pressure of one upon the other this resistance to turning may obviously be reduced to a negligible amount or, the inclination may be sufficient to exert a slight camming action on the carrier in the direction to disengage it from the controller 5. In any event, the swinging movement of the carrier is not appreciably restrained by reason of its engagement with the controller notwithstanding that the latter may be heavy and the spring 6 relatively powerful. The carrier is preferably skeletonized in form for the sake of lightness of

weight and is urged by a spring 13 against an adjustable stop screw 14 which determines its normal position. The said spring requires to be no stronger than will suffice to swing the carrier on its pivot and retain it in the position in which it holds the controller 5 out of action as just described. The feeler finger 10, being also skeletonized as indicated in Fig. 2, is mounted on the carrier 9 to move relatively thereto against the pressure of a spring 15 and its path of movement is offset to the axis of the carrier pivot 11 so that the line of push of the weft upon the finger and through the latter upon the carrier, will be on one side of the carrier's pivot and exert a tendency to turn the carrier against the pull of its spring 13. The end of the weft feeler 10 is provided with a serrated or slightly oblique face according to the invention disclosed in United States Letters Patent, No. 1,258,727, March 12, 1918, and is thereby adapted to have a sufficient purchase on the mass of weft on an unexhausted bobbin to restrain the turning tendency upon the carrier exerted thereon by the push of the weft. On such occasions, herein termed the normal action of the mechanism, the weft merely pushes the feeler finger forwardly in the carrier against the pressure of spring 15. When the weft in the shuttle becomes depleted to such extent as to be incapable of affording such a purchase the contact end of the finger slips thereon or thereover sidewise or longitudinally of the bobbin and the push of the weft turns the carrier and thereby disengages the latch and catch 7 and 8, whereupon the controller 5 interposes the dog 3 between the weft hammer and the actuating arm 2 thus producing replenishment of weft or change of the loom. The contact or feeler finger 10 in the case illustrated is mounted to slide in two ears or guides 16 of the carrier and the spring 15 embraces the round shank of the finger between the ears, thrusting at one end upon the forward ear and at the other upon an abutment nut 17 which is adjustable on the shank to vary the spring tension. It will be apparent that other finger and spring arrangements will give the same effect and that the duty of the finger spring 15 is merely to restore the finger after it has been pushed forwardly by the weft and, since the finger is of little mass, the spring tension can be similarly slight and the contact with the web correspondingly delicate. The carrier spring 13 is similarly of very light tension as above explained since it has merely to restrain and restore the carrier and it is also adjustable so that it can be set to provide a counter force of appropriate magnitude to oppose the side-slipping movement of the feeler. Except for the resistance represented by the yarn itself the tension of this spring is practically the only force which opposes the side-slipping because the inertia and pivotal friction of the carrier have been reduced to an inappreciable minimum and on this account the adjusted tension of said spring becomes an accurate index of the degree of depletion at which slippage occurs and is the controlling factor of such slippage, thereby enabling the mechanism to work with a high degree of uniformity on any setting. Thus in both the normal and abnormal conditions of the mechanism the weft is required to push against extremely light opposing resistances and wear of the weft carrier is thereby reduced to a minimum while extreme sensitiveness to the condition of the weft results from the lightness of contact. As shown in Fig. 2, the spring 15, is stiffer than the spring 13, so that, when the bobbin is bare opposite the feeler tip, the spring 13, yields more readily than the spring 15, with the result that the impact of the bobbin upon the feeler tip has the initial effect of swinging the feeler carrier rather than of thrusting the feeler tip forwardly. The degree of offset of the line of push from the carrier pivot is made adjustable by forming the hole for the pivot pin 11 eccentrically in a bushing 18 which is rotatably housed in the hub part of the carrier. By rotating the bushing in the carrier the said hole may be shifted toward and from the line of push. A set screw 19 is provided to secure the adjustment.

The result of the side slip of the feeler finger upon a denuded bobbin results in swinging the feeler carrier so that its catch 8, is swung to the right (Fig. 2) beyond the latch of the controller thus disengaging the catch and latch. Thereupon, as the controller is swung by the spring 6, the latch 7, is lifted to the position illustrated in Fig. 5. Then, when the lay retreats and relieves the feeler finger from pressure, the spring 13, pulls the feeler carrier toward its normal stationary position thereby moving the catch 8, to the left to the position shown in Fig. 5, where it catches and holds the controller latch. The controller and feeler carrier remain in this latched position thus holding the dog 3, down in the position shown in dotted lines in Fig. 3, until positively restored or reset by the action of the weft hammer. The depression of the dog 3, to the dotted line position shown in Fig. 3, brings its shoulder 21, into the path of the weft hammer 1. As the weft hammer 4, moves forwardly it encounters this shoulder thereby moving the dog 3, and the crank arm 2, forwardly and hence setting into action the weft replenishing mechanism. Also this forward movement of the weft hammer is utilized to reset the controller and feeler carrier to their normal stationary positions. The dog 3, has a cam 20, normally occupying a position in the rear of the inner (right

hand) end of the controller. As the weft hammer completes its forward movement this cam 20, encounters the inner end of the controller thereby lifting it against the pull of the spring 6, and hence lowering the latch end of the controller. As shown in Figs. 4, and 5, the back faces of both the catch 7, and the latch 8, are inclined, that is to say the faces which are opposite the normally engaging faces of the catch and latch. In the position shown in Fig. 5, these inclined back faces of the catch and latch are in engagement with each other. Consequently, when the latch 7, is depressed through the action of the weft hammer, its inclined back face riding down the inclined back face of the catch 8, forces the catch 8, to the right until the complete descent of the latch frees the catch. Thereupon, the spring 13, swings the feeler carrier to normal position against the stop 14, thereby bringing the catch 8, above the latch 7. Then, when the weft hammer moves backwardly freeing the dog 3, the dog and the arm 2, are moved to the rear in the customary manner by the usual spring acting upon the starting shaft, and the cam 20, on the dog passes to the rear of the controller, so that the dog 3, is returned to its normal full line position shown in Fig. 3, owing to the greater weight of its front end, and the spring 6, acting upon the controller 5, brings the upper engaging face of the latch 7, in contact with the under engaging face of the catch 8, as shown in Fig. 4. Accordingly, the feeler carrier and controller resume their normal engaging and stationary relation.

It is preferred to provide inclined back faces on both latch and catch shown but obviously the desired resetting effect can be produced by an inclined face on one or the other or otherwise associated therewith for the purposes stated.

It will be observed that when released by the feeler carrier the controller 5 is latched and remains displaced until the dog has operated the actuating arm 2 because it can only be reset as the result of such operation and consequently there can be no failure to transmit the call by reason of an uncertain or ineffective stroke of the weft hammer upon the dog. It will be apparent also that the dog may be organized in the loom mechanism in various ways with the effect above described and to function either by being shifted into or out of interposed relation to the other members and that the feeler can be mounted in or upon its carrier and the carrier upon its support in many mechanically different ways while still preserving the above described simple relation and also that various other modifications, substitutions, additions and subtractions and other changes from the form above described may be resorted to without departing from the principle of the invention as identified in the following claims.

I claim—

1. A loom feeler motion having, in combination, a normally stationary pivoted feeler carrier 9, having guides 16, 16, offset to one side of its axis and a catch 8, having its back face inclined; a stop 14; a light spring 13, normally holding the feeler carrier stationary against the stop; a feeler finger 10, slidingly mounted in the guides of the feeler carrier in a line offset from the axis of the feeler carrier; a spring 15, pressing the feeler finger rearwardly, said spring being stiffer than the spring 13; a controller 5, having a latch 7, normally below said catch, said latch having its back face inclined and adapted when said carrier swings to engage the back face of the catch to enable the carrier to be restored to normal position; a spring 6, acting upon the controller to normally maintain its latch in engagement with said catch and to move the controller when the catch and latch are disengaged by the swing of the carrier; and restoring means acting upon the controller in opposition to the spring 6, to move the controller latch below the catch.

2. A loom feeler motion having, in combination, a normally stationary pivoted feeler carrier, having a catch with its back face inclined, a spring normally holding the feeler carrier stationary, a controller having a latch with its back face inclined, said latch normally engaging said catch, a spring acting upon the controller to normally maintain its latch in engagement with the catch and serving to move the controller to bring the back faces of the latch and catch into register when the carrier swings, and restoring means acting upon the controller in opposition to its spring to move the latch into normal relation to the catch.

3. A loom feeler motion having, in combination, a normally stationary feeler carrier pivoted to a fixed support and movable only when the weft is nearly exhausted and having guides offset to one side of its axis, a stop, a light spring normally holding the feeler carrier stationary against the stop, a feeler finger slidingly mounted in the guides of the feeler carrier in a line offset from the axis of the feeler carrier, a spring pressing the feeler finger rearwardly, said spring being stiffer than the carrier holding spring, and a controller supported independently of the carrier which is brought into action when released by the swing of the carrier against the opposition of its holding spring.

4. A loom feeler motion having, in combination, a normally stationary feeler carrier pivoted to a fixed support and movable only when the weft is nearly exhausted and a light spring normally holding the feeler carrier stationary, a feeler finger mounted

on the feeler carrier to move thereon in a path offset from the axis of the feeler carrier, a spring pressing the feeler finger rearwardly, and a controller which is brought into action when released by the swing of the carrier against the opposition of its holding spring.

5. A loom feeler motion having, in combination, a normally stationary feeler carrier pivoted to a fixed support and moving only when the weft is nearly exhausted, and a feeler finger mounted on said carrier to move thereon in a path offset from the axis of the said carrier, said carrier being swung by the impact of a depleted weft carrier upon the feeler finger as said finger slips sidewise along said weft-carrier.

6. A loom feeler motion having, in combination, a normally stationary feeler carrier mounted on a stationary support and moving only when the weft is nearly exhausted and having a catch, a spring normally holding the feeler carrier stationary, and a controller supported independently of the carrier and having a latch normally engaging said catch and thereby restraining the controller from movement, said controller moving when, upon depletion of weft, the carrier moves thereby disengaging the catch and latch.

7. A loom feeler motion having, in combination, a normally stationary feeler carrier mounted on a stationary support and moving only when the weft is nearly exhausted, a controller normally engaging said carrier and restrained from movement thereby, said feeler carrier on the depletion of weft moving relatively to and independently of said controller thereby disengaging and releasing said controller, and means for moving the controller when so released by the feeler carrier.

In testimony whereof, I have signed this specification.

HARRY G. KIMBALL.