My invention relates to a new and useful automatic electric feeler for looms to be employed as a weft detector.

An object of the present invention is to generally improve the construction of mechanisms of this character and to provide a solenoid operated lever for actuating an automatic weft replenishment means.

Another object of the invention is to provide a head carrying the detector fingers which head is pivoted for sidewise movements to reduce to a minimum the possibility of damage to the elements and said head being normally maintained in a central position under tension of an appropriate spring.

A further object of the present invention is to provide jackets in which the detector fingers are slidably mounted, said jackets being slidably mounted in the detector head and both the jackets and detectors being urged forwardly or outwardly by springs which allow the fingers and jackets to be forcibly retracted if contacted by the shuttle or other part of the loom.

With the above and other objects in view this invention consists of the details of construction and combination of elements hereinafter set forth and then designated by the claims.

In order that those skilled in the art to which this invention pertains may understand how to make and use the same I will describe its construction in detail referring by numerals to the accompanying drawings forming a part hereof, in which:

Fig. 1 is a perspective view of my improved automatic electric feeler for looms and showing the relation of a bobbin to the detector fingers.

Fig. 2 is a back view thereof with the solenoid supporting arm and associated parts in reversed position relative to the detector fingers.

Fig. 3 is a top plan view of the feeler with a portion of the solenoid supporting arm broken away and illustrating in dotted lines the manner in which the head may be swung from side to side and showing how the detector fingers may be forcibly retracted.

Fig. 4 is a fragmentary sectional view on the line 4—4 of Fig. 2.

Fig. 5 is a section of the head on the line 5—5 of Fig. 4 with one of the jackets and the detector fingers shown in elevation.

Fig. 6 is an underneath view of the device on the line 6—6 of Fig. 2 with the solenoid supporting arm broken off.

Fig. 7 is a view of a modified head and detector finger mounting with the top plate removed.

Fig. 8 is an enlarged detail section on the line 8—8 of Fig. 7.

Fig. 9 is a perspective view of a modified form of solenoid supporting arm for association with the catch lever of a replenishing apparatus.

In carrying out my invention as herein embodied, reference being first had to Figs. 1 to 6, inclusive, 10 represents an angle bracket for attachment to an appropriate portion of a loom in proximity to the usual lay including shuttle boxes for receiving shuttles detachably holding a quill 11, Fig. 1. This quill is of the conventional type except that it is provided with a metal contact band 12 of good electric conductivity.

The angle bracket 10 includes a vertical leg 13 provided with a longitudinal bolt receiving slot 14, whereby said bracket may be adjustably fastened to a loom, and a horizontal bifurcated limb 15 providing a longitudinal aperture 16 in which a base block 17 is slidably mounted for adjustment purposes.

A head 18 of insulating material, preferably of oblong shape, is superimposed on the base block 17 and on top of said head is superimposed a turret collar 19. An axis screw 20 is projected through the turret collar 19, the head 18, the base block 17, with which said screw 20 has threaded connection, and a slot 21 transverse of the inner end of the solenoid supporting arm 22, which inner end underlies the limb 15 of the bracket 10 and the base block 17, and a nut 23 is screwed onto the projecting lower end of said axis screw 20 to hold the parts together.

The turret collar 19 is fastened to the axis screw 20 by a set screw 24, Fig. 4, but when the parts are drawn together by the nut 23 there is sufficient space between the turret collar, head and base block to permit said head to swing from side to side without shifting the turret collar and the base block is held relatively stationary within the recess 16. The base block 17 and head 18 assembly can be adjusted lengthwise of the bracket limb 15 because of the recess 16 and the slot 21 with which the axis screw 22 registers.

Solenoid supporting arm 22 is also adjustable lengthwise of the bracket limb 15 because of the slot 19 and other relatively short slots 27, 28 in said supporting arm 22, Fig. 6, through which project clamping screws 23, 26 that also function as terminal connections for electric conductors. The clamping screws 23, 26 have threaded connection with the bracket limb 15 on opposite sides of the recess 16 and the short slots 27, 28 are parallel with each other and the longer slot 21.

In order to normally maintain the head 18
in a central position parallel with the bracket limb 15 a coil spring 29 has one end fixed on the turret collar 16 and the other end is attached to a post 30 on said head 18 adjacent the rear end of the latter. By reference to Fig. 3 it will be seen that this coil spring is swung to either side of the central position the spring 29 is fixed and will return said head to its central position. Slidably mounted in the head 18 are two spaced parallel tubular metal sleeves or jackets 31, 32 in the horizontal plane. In the forward ends of these jackets are threaded flanged plugs 33 having bores 34 and in the rear ends of said jackets are also threaded similar flanged plugs 35 having bores 36. The jackets are longer than the head and the forward ends thereof project beyond the forward end of said head while the rear ends normally rest adjacent the rear end of the head but can be projected beyond said rear end of the head by sliding movements. The forward ends of the jackets are normally urged outwardly or forwardly by coil springs 37 telescoped over said jackets and in endwise engagement with the flanged plugs 33 and the opposed forward end of the head 18. The flanged plugs 35 stop the outward or forward movements of said jackets.

Detector fingers 38, 39 are slidably mounted in the bores of the screw plugs 33, 35 of the respective jackets 31, 32 through which said fingers project and which latter are normally urged forwardly by coil springs 40, Fig. 5, one of which is telescoped over each detector finger within its respective jacket and in endwise engagement with a shoulder 41 thereon and the opposed rear apertured screw plug 35. The forward ends of the detector fingers are, by preference, provided with rounded knobs 42.

The solenoid supporting arm 22 which is detachably and adjustably mounted underneath of the bracket limb 15, as previously explained, has a leaf portion 43 projecting from either side of said bracket limb. An appropriate solenoid 44 is attached to the underside of the leaf portion 43 in pendant fashion and the lower end of the central opening of the solenoid is closed by a cap 45.

In the central opening the solenoid is mounted the central plunger 46 having a headed rod 47 projecting from the upper end thereof and through the leaf portion 43 of the solenoid supporting arm 22. Ears 48 are formed on said supporting arm 22 inwardly of the leaf portion 43 and between said ears is pivotally mounted a bell crank lever 49 having a foot 50 overlapping the rod 47 and an upwardly projecting branch 51 provided with a number of holes 52 in spaced relation. A connecting wire 53, having an intermediate V-shaped bend 54 therein, has one end removably mounted in either of the holes 52 for attachment to the branch of the bell crank lever 49 and the other end attached to another bell crank lever 55 of the replenishing apparatus. In Fig. 1 the bell crank lever 55 is illustrated as being on the same side of the detector head as the solenoid whereas in Fig. 2 said elements are shown on the opposite side of said detector head thus the bell crank lever 55 in one instance is operated in one direction while in the other instance it is operated in the opposite direction.

When electric current is passed through the solenoid 44 the plunger 46 is raised whereby the rod 47 will lift the foot 50 of the bell crank lever 49 to throw the branch 51 inwardly and transmit the desired motion to the replenishing apparatus through the connecting wire 53 and V-shaped bend 54 will provide for a resilient transmission of motion and relieve any shock incident thereto.

The outward swinging movements of the bell crank lever 55 are limited by an adjustable stop 56 which may be in the form of a screw threaded through the solenoid supporting arm having a boss 57 to provide a desirable long thread for said stop 56 which is held in any adjusted position by the nuts 58.

In the modified form of head 18a, constructed of metal, I have shown it as composed of two sections 15b and 18c fastened together as a unit. In this head is longitudinally slidably mounted the metal tubular jacket 31a and stationary jacket 32a the latter being insulated from the head by a tubular insulator 32b. The jacket 32a and its tubular insulator 32b are stationary in the head and firmly clamped by the two sections of said head. The same as in the first described form, both jackets 31a, 32a are provided with apertured screw plugs 33a at the forward ends and similar apertured screw plugs 35a at the rear ends and only thehead plugs 35b are provided outwardly or forwardly by a coil spring 37a. Detector fingers 38a, 39a are slidably mounted in the apertured screw plugs at opposite ends of the jackets and are urged outwardly or forwardly by the springs 40a, Fig. 8, inside of said jackets the same as shown in Fig. 5. In many instances the feeder or weft detector is so positioned on a loom that one jacket of said feeder is beyond the path of travel of the reciprocating part of the loom moving to and fro relative to the feeder and it is unnecessary that both jackets be retractable wherefore the modified head construction can be utilized.

Instead of the solenoid supporting arm 22 which is associated with the bracket 18, a hanger 59, Fig. 9, may be mounted on the replenishing apparatus remote from the feeder structure described herein. This hanger includes an arm 60 for attachment to a suitable support having a box-like enclosure 61 on its outer end, said enclosure being open at the lower end and housing a solenoid. On one side of the enclosure 61 at the top thereof is a bridge wall 62 from which depends the apron 63 in spaced relation to the adjacent side wall of said enclosure thus providing a passageway 64 for the reception of a conventional lever (not shown) on the replenishing apparatus. Said lever is movable within the passageway 64 and is actuated by the bell crank lever 65 pivoted at 66 between ears 67 projecting from the outer face of the apron adjacent the end of the enclosure which is parallel with the bell crank lever 67. The foot of said bell crank lever 67 projects under the lever on the replenishing apparatus and the lower open end of the bell crank lever 67 and said foot is connected by a wire 59 with the plunger of the solenoid mounted in and housed by said enclosure.

There are two terminals 69 and 70 on the upright leg 13 of the angle bracket 10 and said terminals are accessible on both faces of said leg 13, Fig. 6. A conductor from one side of a source of electricity may be connected with the loom frame to the outer end of the terminal 70, Fig. 1, and another conductor 71, Fig. 6, connects the inner end of the same terminal 70 with one side of the solenoid 44. The other side of said solenoid is connected by a conductor 72, Fig. 6, with the inner end of the terminal 69 and the outer end of said terminal 69, Fig. 1, is connected by a con-
5. In an automatic electric feeler for looms, a bracket for securement to a loom in proximity to the lay, said bracket having a horizontal bifurcated limb, a base block slidably mounted between the branches of said bifurcated limb for longitudinal adjustments, said base block superimposed on said base block, a turret collar superimposed on said head, an axis screw projected through said turret collar, head and base block and having threaded connection with said base block, means to temporarily fasten said turret collar to the axis screw whereby said collar is normally stationary and the head is swingingly movable from side to side, a pair of tubular metal jackets longitudinally slidably mounted in said head with their forward ends extending beyond the forward end of the head, screw plugs having bores mounted in both ends of both jackets, the plugs at the rear ends of said jackets limiting the forward movements thereof by contact with the rear end of the head, coil springs surrounding the forward ends of the jackets between the plugs at the forward ends of the respective jackets and the opposed forward end of the head to resiliently normally urge said jackets forwardly, detector fingers slidably mounted in the bores of the plugs of the respective jackets with the forward ends of said fingers extending beyond the forward ends of the respective jackets, said fingers having shoulders thereon located within the jackets and coacting with the respective forward ends to limit the forward movements of said fingers, coil springs telescoped about the fingers within the respective jackets between the rear end plugs and the shoulders to resiliently urge said fingers forwardly, said fingers adapted to complete an electric circuit through the jackets to a solenoid when both of said fingers simultaneously engage a metal contact band on a quill in a shuttle in the loom, said spring means connected to said turret collar and the head to normally retain said head in a central position and return the head to said central position when swung to either side.

6. The structure according to claim 5, in combination with a solenoid supporting arm underneath of the bifurcated bracket limb and having slot registering with the lower end of the axis screw, means on said screw to hold the supporting arm on the bracket, clamping screws projecting through slots in said supporting arm and threaded into the bracket to hold the supporting arm in various adjusted positions, said supporting arm projecting from a side of the bracket and having an apertured leaf portion at the outer free end, a solenoid attached to said leaf portion in a pendent fashion, a plunger in said solenoid and provided with a rod projecting through the aperture in the leaf portion of the supporting arm, a bell crank lever pivoted between ears on the supporting arm with a foot of said bell crank lever overlying the upper end of the rod, and adjustable means to limit the movements of the bell crank lever in one direction.

7. The structure in claim 5, in combination with a connecting wire having one end attached to the bell crank lever and the opposite end adapted to be attached to a replenishing apparatus, said connecting wire having a V-shaped bend intermediate its ends.

No references cited.