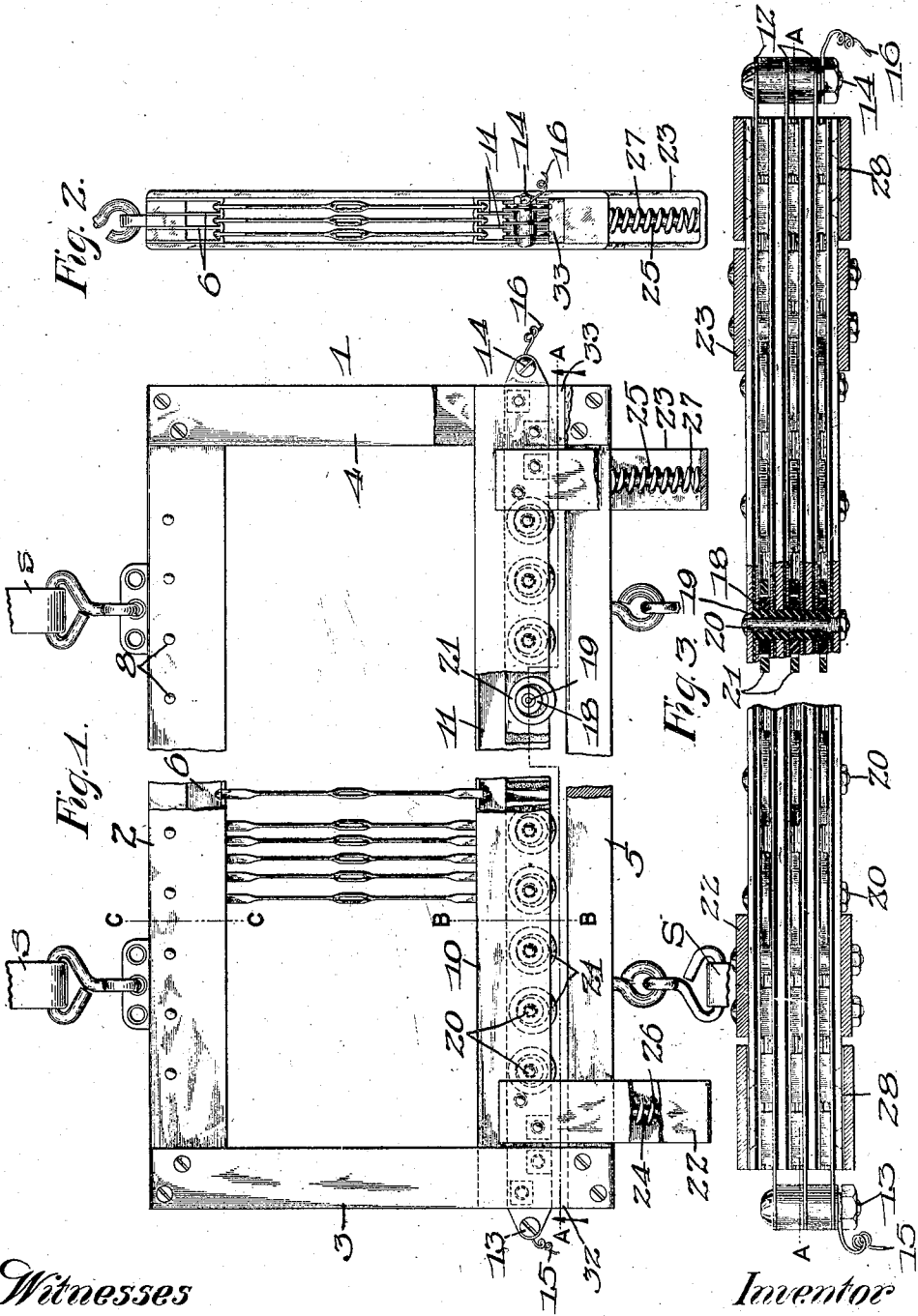


B. A. PETERSON.
 HEDDLE AND HEDDLE FRAME.
 APPLICATION FILED FEB. 15, 1908.

1.061,322.

Patented May 13, 1913.

3 SHEETS—SHEET 1.



Witnesses
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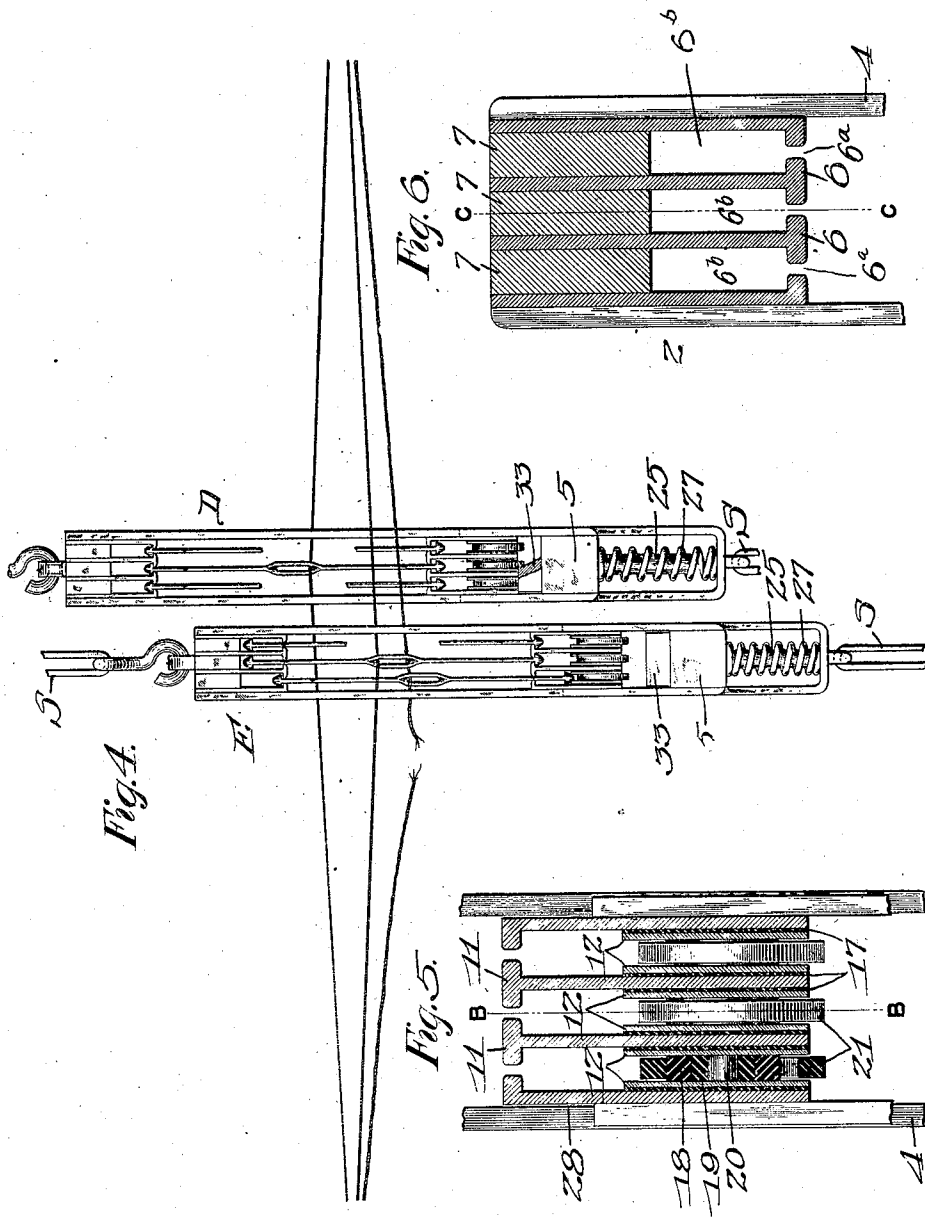
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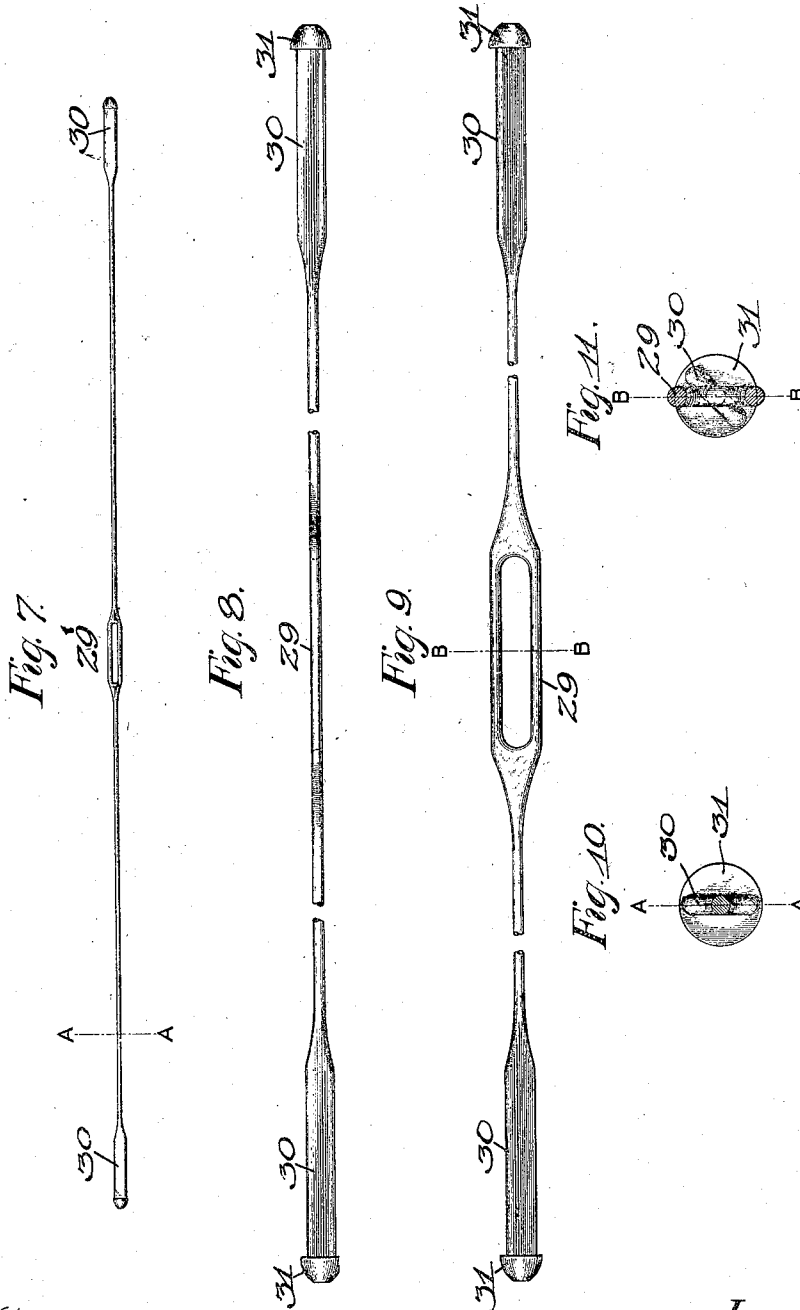
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UNITED STATES PATENT OFFICE.

BURT A. PETERSON, OF ROCKFORD, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO HOWARD D. COLMAN, LUTHER L. MILLER, AND HARRY A. SEVERSON, COPARTNERS AS BARBER-COLMAN COMPANY, OF ROCKFORD, ILLINOIS.

HEDDLE AND HEDDLE-FRAME.

1,061,322.

Specification of Letters Patent.

Patented May 13, 1913.

Application filed February 15, 1908. Serial No. 416,018.

To all whom it may concern:

Be it known that I, BURT A. PETERSON, a citizen of the United States, residing at Rockford, in the county of Winnebago and State of Illinois, have invented certain new and useful Improvements in Heddles and Heddle-Frames, of which the following is a specification.

This invention relates to the general class of textile machines, but more particularly to a heddle, a heddle frame therefor, and means for closing an electrical circuit when one of the heddles assumes an abnormal position.

One of the objects of the invention is to provide means whereby the heddle will serve both its usual function and also as a drop wire to indicate when a thread in the warp has been broken.

Another object of the invention is to provide means whereby a plurality of rows of heddles may be arranged in different planes in the same frame.

Another object of the invention is to provide means whereby the heddle eyes will be maintained in proper position for the convenient passage of the warp threads there-through.

Another object of the invention is to provide indicative means on each heddle whereby the operator may determine at a glance which thread has been broken.

A further object of the invention is to provide means for keeping the contacts clear of lint and other extraneous matter.

A further object is to provide means whereby the contacts will be protected and the danger of combustion from sparks from the contacts will be reduced to a minimum.

Other objects and advantages, as well as the novel details of construction of the invention will be specifically described herein-after, it being understood that changes in form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of the advantages thereof.

In the drawings, Figure 1 is a side elevational view of a heddle frame constructed in accordance with my invention, parts being broken away to show the connection with the heddles, the lower heddle bar and the interior of the guide stirrups. Fig. 2 is an end view of the heddle frame. Fig. 3 is

an irregular sectional view taken on line A A of Fig. 1 and looking in the direction of the arrows. Fig. 4 is an end view of a pair of heddle frames, one of the heddles being shown as making contact for closing the circuit. Fig. 5 is a cross-sectional view through the bottom heddle bar on the line B B of Fig. 1. Fig. 6 is a cross-sectional view on the line C C of Fig. 1. Fig. 7 is an elevational view of a complete heddle. Fig. 8 is an enlarged fragmentary view of a heddle constructed in accordance with my invention and illustrating the edge of the heddle eye. Fig. 9 is an enlarged fragmentary view of the heddle showing the face view of the heddle eye. Fig. 10 is a sectional view on the line A A of Fig. 7. Fig. 11 is a sectional view on the line B B of Fig. 9.

Referring now to the drawings by numerals of reference, 1 is a rectangular frame of which the top heddle bar 2 forms a part.

3 and 4 are the end bars of the frame and are connected to the bar 2 and the bottom frame bar 5 in any suitable manner.

For convenience in description I have referred to the elements 2, 3, 4 and 5 as bars, but as a matter of fact they will generally be frames consisting of a plurality of parts, depending upon the requirement of the particular element. For example, the upper bar 2 is shown as comprising a plurality of inverted T-rails 6 Fig. 6 between which are interposed inserts 7, the whole being secured together by fastening devices, as, for example, rivets 8 (see Fig. 1). By placing the T-rails side by side, slots will be formed extending longitudinally the top bar to receive the headed heddles to be described hereinafter. Each slot consists of the narrow portion 6^a and the wide portion 6^b.

Loosely connected with the frame 1 and supported thereby is a lower heddle bar 10 which may comprise a plurality of T-rails 11 spaced apart and insulated from each other by inserts of suitable insulation. Lying adjacent to and insulated from the rails 11 are contact strips 12 arranged so as to cooperate in pairs between the rails 11. The several contacts 12 extend beyond the ends of the bar 10, and have their respective ends connected by bolts 13 and 14 serving as binding posts to receive the conductors 15 and 16 connected up with an electrical stop motion

for a loom and a suitable source of electric current. Of course, it is obvious that an electrically-operated indicator may be included in the circuit if desired. The contact strips are insulated from the T-rails by the insulating strips 17 and from each other by the insulating spacing washers 18 carried by the insulating sleeves 19 on the bolts 20 which hold the component parts of the bottom bar together. The sleeves 19 insulate the bolts 20 from the contact strips 12, as shown in Fig. 3.

It will be observed that slots are formed in the bottom bar between the spaced rails and washers 18. One advantage in providing the slots is to permit lint and other extraneous matter to pass down through said slots instead of remaining in the slots and covering the contacts. In order to facilitate the removing of the lint, etc., I provide loosely hung rings 21 of, for example, fibrous material. The oscillation of the rings, due to the motion of the bottom bar, will have a tendency to prevent lint gathering on the contacts above the washers 18, but in the event that any lint does accumulate in the slots above the washers, the operator may cause a manual agitation of the rings 21 by running his hand along the lower edge of the lower heddle bar below which a portion of the peripheries of the rings extend.

The lower heddle bar is operatively held in the frame 1 by the guiding stirrups 22 and 23 which are rigid with the lower heddle bar and straddle the frame bar 5. Depending from the lower frame bar are guide pins 24 and 25 surrounded by expansion springs 26 and 27 which bear against the bar 5 and against the ends of the respective stirrups. Thus the tendency will be to keep the lower heddle bar away from the upper heddle bar. The purpose of this will be presently explained. The lower heddle bar is guided in the slots 28 formed by the end bars 3 and 4 of the frame. The heddles employed in connection with the frame preferably consist of a single piece of metal, and may be conveniently swaged and formed from a piece of wire. The form herein shown comprises a body portion having an intermediately located elongated eye 29 with its inner and outer edges convex or rounded to avoid sharp edges which would be liable to injure the thread passing therethrough. The body of the heddle projects from opposite ends of the eye and terminates in an elongated flattened portion 30 at each end provided with a convex-head 31. The flattened portion at each end is disposed at an angle to the plane of the eye 29 and preferably at approximately an angle of forty-five degrees so that when the heddle is in the frame the flattened portion 30 will be free to slide in the constricted portions of the slots, but will not be able to turn in said

slots. Therefore the eyes will be maintained in proper facing order to insure a free and unrestricted passage of the warp threads therethrough.

By reference to Fig. 4 it will be seen that a plurality of rows of heddles may be arranged in one frame in different planes, the number of rows being limited by the number of spaced T-rails or slots provided in the frame. When the frames are assembled in a loom, as indicated in Fig. 4, they are caused to move up and down by the straps S fastened to the upper bar 2 and the lower bar 5, as in the case of ordinary heddle frames. Frame D is shown in the uppermost position of opening the shed and the frame E is in the lowermost position. When either frame is in the position shown at D the heddles are all supported from the bar 2, with their lower heads hanging free in the slots of the lower bar 10, bar 10 being held down by the springs 26 and 27 upon the blocks 32 and 33, which are fastened to the top of the bar 5. This allows the lower ends of the heddles free movement sidewise, so that they may accommodate themselves to the position of the threads and thus produce less wear in weaving. The same conditions exist with the frames in position E, excepting that the upper ends of the heddles are free to move in that case. The frame in the position E is held down by the lower straps S. The stress on the warp threads in the lower shed is transmitted through the heddles by means of their lower heads to the lower bar 10 causing it to move with relation to the bar 2 against the pressure of the springs 26 and 27 until the bottom of the stirrups 22 and 23 rest against the ends of the pins 24 and 25, thus limiting its further movement. As the lower bar 10 is now nearer to the bar 2, the upper heads of the heddles will project into the slots of the upper bar 2 by a distance greater than the distance between the lower ends of the heddles and the contact pieces 12, thus making it possible for a heddle in the case of a broken or slack thread to fall, so that the convex head will bridge the contact strips within its particular slot and cause the circuit to actuate a stop mechanism (not shown) and thus stop the loom. Thus position E is the only position of the frames in which the heddles are able to complete the electrical circuit, the bars 2 and 10 being at all other times at too great a distance from each other for the heddles to reach the contact strips. I am thus able to keep the current on the contacts all the time and avoid the use of external circuit-breakers, as would be necessary if the upper and lower bars were rigid in relation to each other. I am also enabled, by this means, to keep the heddles always in tension, thus tending to keep them straight; for, if the bars 2 and 10 were

a fixed distance apart and close enough for the heddles to reach the contacts, when the frames were in the position shown at D, the heddles would be resting upon the contacts 5 and lifting the upper shed by means of the lower heads, which would tend to bend the heddles out of shape. The springs 26 and 27 insure the bottom bar 10 remaining down at all times, except when in the position 10 shown at E. By making the heads of the heddles convex, the closing of the circuit is insured because the head will have a wedging action between the two cooperating contacts. A good example of this is shown in 15 Fig. 4, the frame to the left being the lower frame and the last heddle to the left being dropped.

By providing the elongated flattened portions near the extremities of the heddles I 20 provide means to indicate which particular heddle has dropped. This will be apparent when it is considered that the operator will be able to readily distinguish the relatively broad flattened portion of the head which 25 has dropped, from the relatively fine or slender intermediate portions of adjacent heddles which are in their proper relative positions.

In order to protect the heddles against 30 deterioration on account of rust or corrosion or the like and also to provide for efficiency of contact between the heddles and the electrical contacts, I might find it expedient to plate said heddles with copper or some other 35 material of great conductivity.

I claim as my invention:

1. The combination of a rigid frame comprising a top bar, a bottom bar and two end bars; a heddle bar slidably engaged with 40 said end bars, spring means tending to move said slidable bar downwardly, heddles supported by said top bar and said slidable bar for vertical movement with relation to both of said bars, and electric contact means carried by and rigidly fixed to said slidable bar 45 in position to be contacted by a heddle whose thread is broken, the heddles being of such length as to be normally out of contact with said contact means when at the lower limit 50 of their movement with relation to the top bar.

2. Means for supporting heddles comprising an approximately-rectangular frame having a fixed heddle bar; a movable heddle 55 bar; and spring-actuated guides for said movable heddle bar.

3. Means for supporting heddles comprising an approximately-rectangular frame having a fixed heddle bar; a movable heddle 60 bar; and spring-actuated guides for said movable heddle bar, said guides being below said movable heddle bar.

4. In a heddle frame, a heddle bar consisting of a plurality of T-rails, inserts 65 spacing said rails apart to provide narrow

spaces between their flanges and wider and relatively deep spaces between their webs, and means for securing said rails and inserts together.

5. A heddle frame comprising a bar having an elongated slot; heddles vertically and horizontally movable in said slot; and broadened portions on the heddles extending in said slot for uniformly facing the heddle eyes at the proper angle for the passage of 75 the thread.

6. A heddle bar having spaced heddle-supporting means; spaced electrical contacts between pairs of heddle-supporting means; and insulation between the contacts and the heddle supporting means. 80

7. A heddle bar having spaced contacts and lint removing devices between said contacts.

8. A heddle bar having electrical contacts; and lint-removing rings between said contacts. 85

9. A heddle bar having spaced electrical contacts; securing devices for holding said contacts to the bar; and lint-removing devices carried by the securing devices. 90

10. A heddle bar carrying an electrical contact and manually-operable lint-removing means.

11. A heddle bar carrying an electrical contact and lint-removing devices arranged at intervals in the length of the bar and manually-operable from one edge of said bar. 95

12. In a heddle frame, a heddle bar consisting of spaced T-rails, contact plates arranged between and insulated from said rails, fastening members securing said rails together, sleeves on said members for insulating them from the contact plates, and washers on said sleeves for insulating the contact plates from one another and for spacing the rails apart. 100

13. In a heddle frame, a heddle bar consisting of spaced T-rails, contact plates arranged between and insulated from said rails, fastening members securing said rails together, sleeves on said members for insulating them from the contact plates, washers on said sleeves for insulating the contact plates from one another and for spacing the rails apart, and lint-removing rings loosely suspended on said washers. 105

14. In a heddle frame, a heddle bar having two oppositely disposed contacts, and a lint-removing device loosely suspended between said contacts. 110

15. A heddle having an eye, a flat portion near one end of the heddle, a constricted portion between the flat portion and the eye, and a head on said flat portion. 115

16. A heddle frame; spaced electrical contacts carried by said heddle frame; said contacts being immovable with relation to each other; and a heddle provided with a head 120 130

whose diameter is greater than the width of the spacing of the contacts said head being adapted to lie against both of said contacts and bridge the space between them.

5 17. In a heddle frame; a heddle bar having a vertical opening extending entirely therethrough, and two contacts fixed in said bar at opposite sides of said opening, the upper portion of said opening being adapted to receive heddles, and said opening permitting the passage of lint downward through and out of the space between said contacts.

15 18. A heddle frame, two electrical contacts carried by said frame and in constant communication with a source of electrical energy, and heddles mounted in said frame and adapted to connect said contacts.

20 19. A heddle frame comprising a top bar, a lower bar and two end bars rigidly connected together, a bar having its ends slidably mounted in said end bars, heddles having their ends suitably engaging said top bar, and said slidable bar, and two contacts carried by and located in the interior of said slidable bar and arranged to be engaged by the lower ends of said heddles.

25 20. A heddle carrier comprising a frame and a bar slidably mounted in said frame, said bar having a space therein, two elongated contact members rigidly fixed to said slidable bar within said space in spaced relation, and heddles mounted in said bar and a portion of the frame, said heddles being adapted to lie against said contact mem-

bers and bridge the space between said members.

21. A heddle carrier comprising a frame and a bar slidably mounted in said frame, two elongated contact members rigidly fixed to said slidable bar in spaced relation, and each arranged to be constantly connected in one side of an electric circuit, and heddles mounted in said bar and a portion of the frame, said heddles being adapted to lie against said contact members and bridge the space between said members.

22. An element of a heddle carrier comprising a plurality of flanged bars, the space between the flanges forming a heddle slot, an elongated contact member adjacent to the inner face of each of said bars, insulating material between said contact member and the adjacent bar, securing members extending transversely through said bars, an insulating sleeve on each of said securing members, and an insulating spacing washer on each of said sleeves.

23. A heddle frame and heddles independently supported therein for vertical and horizontal movement, one of the bars of said frame being slotted, each of said heddles having a flattened eye-facing portion lying in the slotted portion of said bar, said eye-facing portion being held from turning by the walls of the slot.

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Witnesses:

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