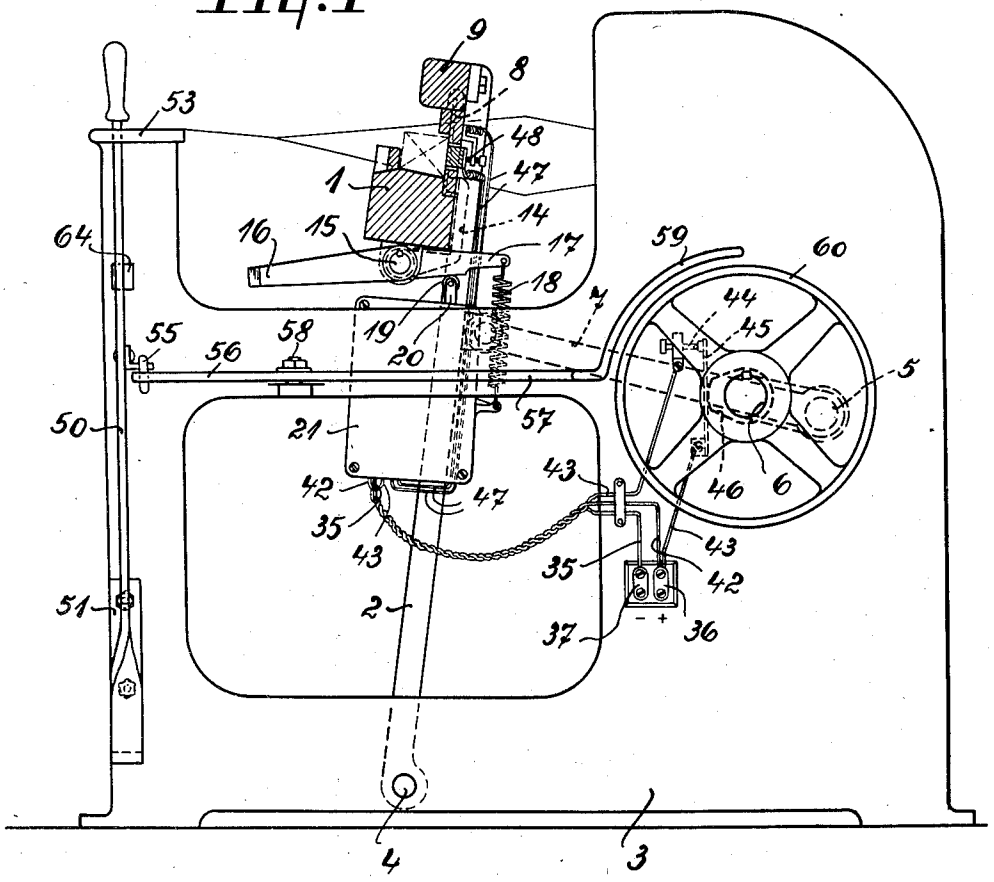
Oct. 16, 1934. O. WITTMERS 1,977,104

DEVICE FOR THE RELEASABLE FIXING OF THE REED OF LOOMS

Filed June 8, 1933 3 Sheets-Sheet 1

Fig. 1



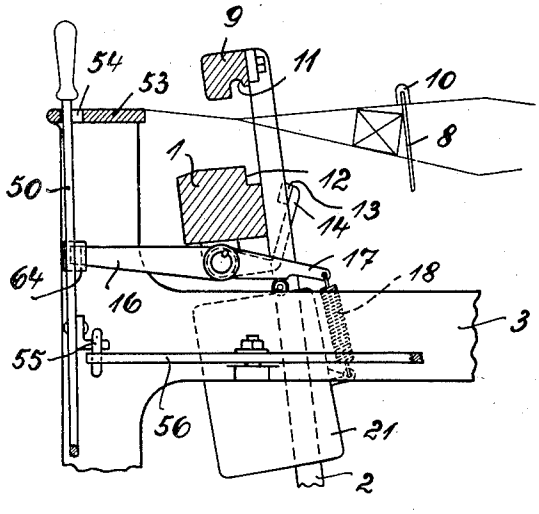


Fig. 3

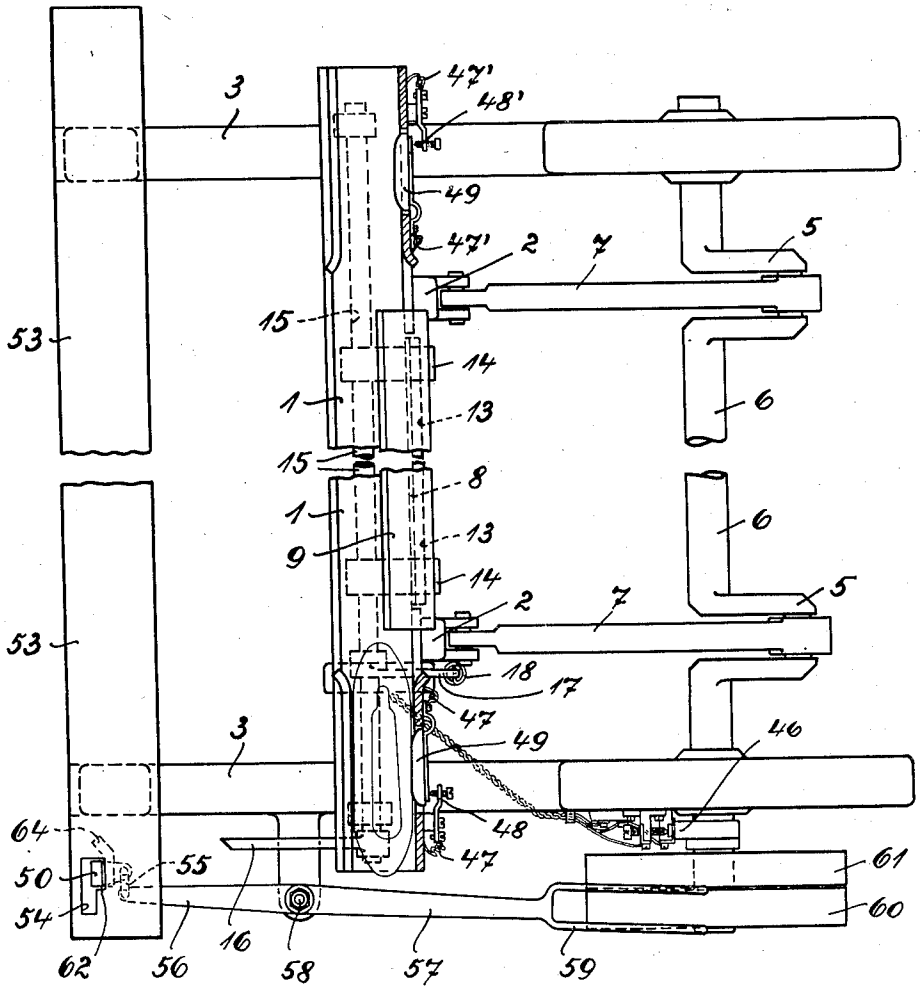
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DEVICE FOR THE RELEASABLE FIXING OF THE REED OF LOOMS

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Fig. 2



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DEVICE FOR THE RELEASABLE FIXING OF THE REED OF LOOMS

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Fig. 4

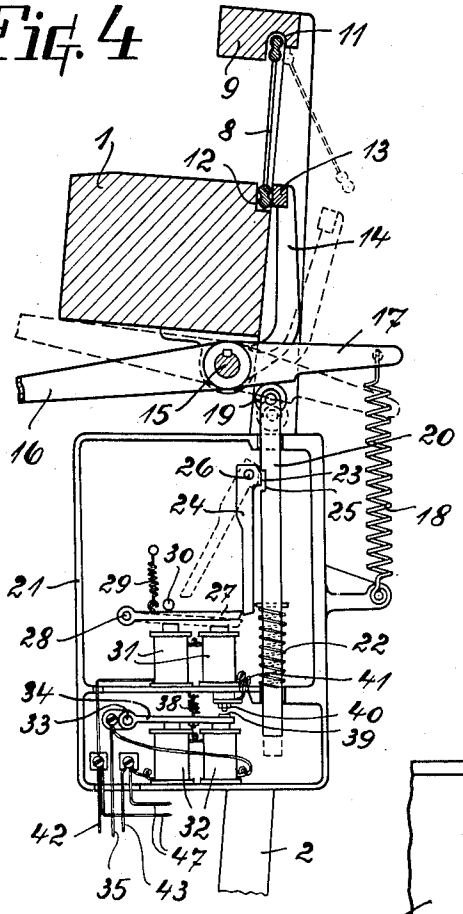
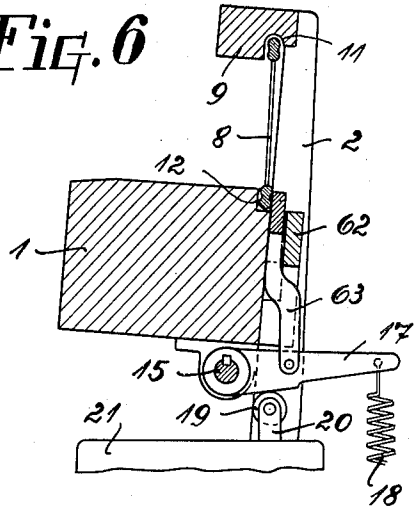


Fig. 6



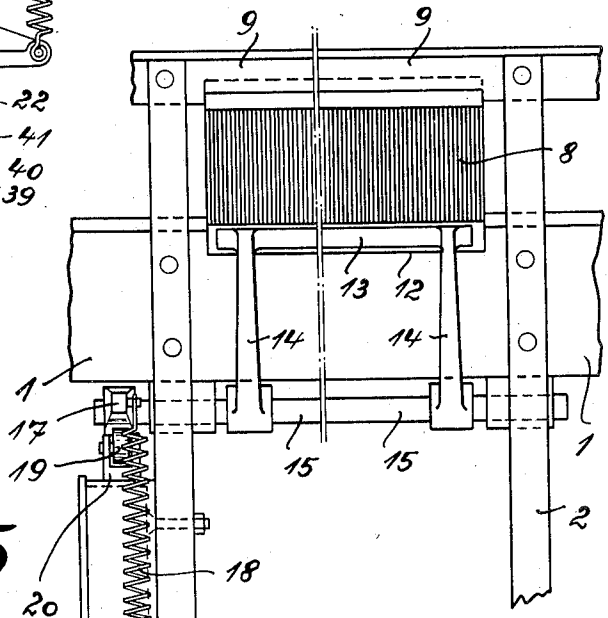
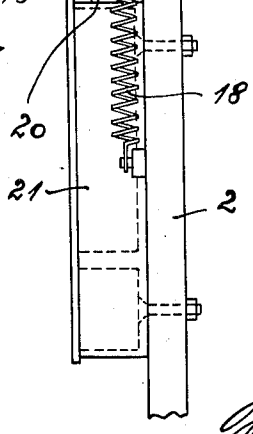


Fig. 5



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UNITED STATES PATENT OFFICE

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DEVICE FOR THE RELEASABLE FIXING OF THE REED OF LOOMS

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Application June 8, 1933, Serial No. 674,927
In Germany November 4, 1932

6 Claims. (Cl. 139—189)

The invention concerns the so-called loose-reed looms, i. e., those in which the reed which beats up the thread is attached to the slay by a releasable device which sets free the support of the reed whenever any disturbance causes the shuttle on its travel to remain stationary before the reed in the shed, instead of running correctly into the shuttle box. In particular, the invention applies to the fixing and releasing of the facing bar which holds back the under edge of the reed in the slay during normal running.

In the loose-reed looms hitherto in use, this end is served by purely mechanical means, which are set in motion by the shuttle every time it enters the shuttle-box, in such a way that the release of the reed-supporting bar, which otherwise occurs automatically if the shuttle does not enter the box, no longer takes place. The load due to the movement of the shuttle by the power essential for the operation of the mechanical means required for this purpose, renders necessary an undesirable increase of striking power.

The object of this invention is a device for the releasable supporting of the reed in looms, in which the reed-supporting bar is borne in such a way that the application of mechanical means operated on the entry of the shuttle is avoided by the use of the armature of an electro-magnet, which in normal working holds the support and the reed in operative position. The circuit of this control magnet is closed by means of several contacts, partly arranged in the two shuttle boxes, and by the entrance of the shuttle into them, and partly by a device operating in rhythm with the loom drive, and is alternately opened and closed in such a way that in case the shuttle at the end of its travel does not enter the box, the contact device there does not operate, and the release of the reed is effected through the action of the magnet or through its failure to act. The utilization of this electric control, instead of the type which must be operated by the impact of the shuttle, decreases considerably the motional resistance of the shuttle and of the power required for its operation, and hence reduces the working power used and lessens the wear on certain parts of the loom. In addition, a more rapid and reliable working of the reed-release mechanism is ensured.

In the drawings are shown the parts of a loom which are concerned in the application of the invention:

Fig. 1 being a vertical section,

Fig. 2 a plan with the slay in position for the weft,

Fig. 3 the slay in beating up position, in section partly corresponding to Fig. 1, and

Fig. 4 a partial vertical section on line IV—IV of Fig. 5 to a larger scale.

Fig. 5 shows the slay from the rear to the same scale as Fig. 4 and seen from a corresponding angle.

Fig. 6 is a vertical section through the slay, corresponding to Fig. 4 and showing a special form of the invention.

On the slay 1, which as usual is carried by the two swords 2 pivotable about the fulcrum 4 attached to the jaws 3 of the frame and is moved backwards and forwards by the two cranks 5 of the crankshaft 6, by means of the push rod 7 attached to the swords 2, the reed 8 is mounted, as usual, between the body of the slay 1 itself—formed as a wooden beam—and its top beam or slay cap 9 which is connected to the slay by means of two supports. This reed is secured by means of a top bar 10 of the upper reed edge, preferably consisting of a somewhat flexible material such as papier maché. The bar engages in a channel 11 which is downwardly open but open wider backwards than forwards. The bottom edge of the reed is secured between a striking face 12, provided along the upper running face of the shuttle at the rear of the slay beam, and the facing bar 13 running along it. This facing bar is held for example, by two carrying levers 14, which rest on a lever spindle 15, which is mounted at the underside of the slay beam 1 in suitable bearings parallel to the striking face 12.

On the supporting arm spindle, there is mounted a forwardly directed disengaging lever 16 and a backwardly directed spring lever 17 whose one end is engaged by a helical spring 18 in such a way that by its spring tension, the facing bar 13 borne by the supporting arms 14 is constrained to swing backwards from its supporting position in the sense of releasing the reed. The spring lever supports itself at a certain distance from its axis of oscillation in the operative position against the tension of the releasing spring 18, by resting on the top end of a locking catch 20, which end is provided with a roller 19. The catch 20 is vertically guided in the control magnet casing 21 arranged below the releasing lever on the adjacent slay sword, so that it can move a certain distance downwards against the tension of a retractile spring 22. In its upper locking position the locking-catch 20 is held by arranging that a short lateral arm 23 of a locking lever 24 set vertically with its long arm in the locking position engages in a lateral excision 25 of this locking catch 20, which is arranged close beside the latter, pivotable about the pin 26.

The bottom arm end of the locking lever 24 is held in the locking position by the horizontally arranged supporting pawl 27 which is fixed round the pin 28 on the wall of the casing. This pawl is held by its holding spring 29 to its upper buffer or stop 30, so that its free end protrudes a short distance into the lateral path of deflec-

tion of the locking lever 24. The body of the supporting pawl 27 may form at the same time, the armature of a releasing electro-magnet 31, which is dead during operation and to which the working current is supplied—for example through the control electro-magnet 32 energized by normal current—only when its normal current circuit is broken by failure of the alternating circuit closing operations which control the shuttle movement.

The armature 34 of the control electro-magnet oscillating about the pin 33 is therefore connected through a lead 35 to one of the terminals 36, 37 and when its magnet coils become wattless, a closing spring 38 causes a contact plate 39 arranged at its upper side to be urged against a contact screw 40, with which one end of the coil winding of the releasing magnet 31 is connected by branch conductors 41, whilst the other end of this coil winding is connected directly to the main conductors 37 through the intermediate conductor 42. One end of the winding of the control electro-magnet 32 is conductively connected directly with the terminal 37 through the lead 35 whilst the other end of the winding is connected to a loop 43, which, proceeding from the connecting terminal 36, leads over the auxiliary contact 44, whose counter-contact spring 45 is moved by means of a cam 46, mounted on the crank-shaft 6 and rotating with same, so that the circuit is only temporarily closed corresponding to the cam angle.

In parallel with the loop 43 are two secondary conductors 47 which branch off from the conductor 42 and in whose path contacts 48 and 48' are arranged which are alternately closed by the brake shoes 49, when the shuttle running into the shuttle boxes arranged at the ends of the slay 1 forces back this brake shoe against its spring pressure. The returning end of the loop conductors 47 unites with the conductor 43 and is connected thereto at the other end of the winding of the control magnet 32. The shuttle box contacts 48 and 48' are arranged in circuit with the conductors 47 and connected in parallel. Hence, the current needed for energizing magnet 32 is supplied to the magnet winding only when one of the contacts 48, 48' has been closed by the shuttle. On the other hand, if both of the contacts in the shuttle box remain open, the actuating current for electro-magnets 32 is interrupted. The magnet system releases the armature 34 and closes contacts 39, 40, closing thereby the circuit for the actuation of the releasing magnet 31. However, since this line is governed also by contacts 44, 45 controlled from the crank shaft, the actuating current is supplied into the magnet system only after this contact has been closed. Then the last mentioned magnet system attracts the armature 47, whereby the release of the sheet is effected.

The cam disc 46 is so shaped, that the contact between the two contact members 44 and 45 is maintained during the time provided for the weft movement of the shuttle through the shed. During the normal functioning of the loom, the normal or rest current energizing the electro-magnet 32 is permanently maintained, and according as the shuttle finds itself in its two limiting positions in one or other of the two shuttle boxes, this takes place over the contact device 48 or 48' provided in the latter, whilst during the weft movement of the shuttle it is effected over the contacts 44, 45 controlled by the cam disc 46.

When the normal current circuit of the control electro-magnet 32 is broken by failure of one of the three alternating monitoring contacts 44, 48, 48', the closing spring 38 causes the armature 34 of the control electro-magnet to be lifted and due to the contact of the contact plate 39 with the contact screw 40, the circuit of the releasing magnet 31 is closed. Hence the latter draws the supporting pawl 27 out of its position supporting the end of the locking lever 24. The latter can therefore follow the pressure of the locking catch 20 and of the releasing spring 18 taken up by the short lateral projection 23 of this locking lever. Consequently the spring can cause the supporting arm spindle 15 and the supporting arm 14 to turn and can withdraw the facing bar 13 from its supporting position. Thus the bottom edge of the reed loses its hold, so that under the action of the thread friction it can deflect backwards and, should the shuttle stick or remain hanging, it does not drive the latter into the narrow part of the shed, thereby tearing the warp threads.

In the further movement of the slay forwards, the front end of the release lever 16 situated on the supporting-arm spindle 15 comes into the reach of a hand lever 50, which serves for the engagement and disengagement of the loom drive. This lever, as is usual in many looms, is fixed by its lower upcurved end 51 to the outer side surface of the frame wall. The hand lever passes near to its upper handle 52 through a guide slot 54 in the breast beam plate 53; the spring action of its lower up-curved end 51 attempts to press it outwards into the slot. The hand lever is movably connected by a member 55 with the one arm 56 of a double lever 56, 57 which is fixed to swing around a vertical pivot 58 on the side wall of the frame. The rear arm 57 of this double lever bears a belt-shifter 59, which, in the swinging backwards and forwards of the double lever opposite the surface of two belts 60, 61, attached tightly or loosely to the driving shaft 6 of the loom, moves so that by means of this shifter the driving belt running on these pulleys may be reversed by the interchange of the fixed pulley 60 and the loose pulley 61.

By the inward movement of the hand lever, and by engaging it in the usual notch 62 on the rear side of its slot 54, the driving belt can be brought by means of the parts 55, 56, 57, 59 onto the fixed pulley 60, and held firmly there. On the inner side of the engaging lever facing the frame wall 3, within the range of movement of the front end of the disengaging lever, a projection 64 is arranged in such a way that the disengaging lever strikes against it, if it is set free by the release of the catch 20 together with the arms 14 and the bar 13, so that it is swung out by the movement of the spring 18 into its upper extreme position determined by the buffer or stop. By this movement, the hand lever is pressed out of its rest-position into the free space of the slot 54, so that it can follow the spring action of its fixing bridle and, through the medium of the double lever 56, 57 and the belt-shifter 59, can transfer the driving belt from the fixed pulley 60 to the loose pulley, and so bring the loom drive to a standstill.

After each releasing action of this kind, which involves a standstill of the loom, and after removal of the cause of disturbance and the return of the reed to the working position, the spring lever 17 under the tension of the spring 18 is again brought to its upper extreme position, on which the locking lever 24 once more returns by its own

weight to the supporting position determined by the catch 27. The disengaging lever 16 in this way takes up its lower working position, in which it passes over without any effect when swinging with the slay on the lateral projection 64 of the engaging lever.

In the example shown in Figure 6, the facing bar 13 which holds the under-edge of the reed firm against the striking reaction, instead of being able to swing, is arranged to be movable in the plane of the reed and transverse to its own longitudinal direction in a guide bar 65 on the rear surface of the slay beam and passes, via two or more pushing arms 63, into mobile connection with the support lever or other lever arms fixed to the support arm spindle 15. The spring lever 17 in this case also comes under the above described arrangement of the release spring 18, the locking catch 20 with its roller 19 and the appertinent control members enclosed in the magnet casing. As is quite obvious, by means of this transversely movable sliding carriage arrangement, the facing bar is held firm in position against the pressure of the striking reaction without further assistance, giving a practically unlimited resistance, so that the use of stop arms is no longer necessary. This arrangement makes it possible to produce with loose-reed looms the heavy textiles which require very high driving power, without the sensitivity of the reed release being adversely affected by the increased resistance of the supporting of the reed by the bar.

Instead of releasing the locking of the support pawl 27 by means of a control magnet 22 operated by the interruption of a normal current, one may eliminate the special magnet 31 and keep it in the locked position by the normal current of the control magnet itself, releasing it on the interruption of the latter by a retractile spring working against this magnet.

Further it is within the scope of the invention to arrange that when acting directly upon the locking pawl 24, the control magnet 22 is operated not by interrupting a normal current maintained during the normal shuttle travel, but by the closure of its circuit occurring during disturbances in same, by releasing this locking pawl and the facing bar of the reed.

I claim:

1. In a device for the releasable fixing of the reed of looms by means of a facing bar to support the under-side of the same, a lever spindle situated along the slay beam, a supporting arm for the facing bar carried by the lever spindle, a spring urged lever arm on the lever spindle, a locking lever in supporting connection with the supporting arm, a locking catch giving releasable support to the locking lever, and a releasing magnet operating the locking catch as an armature.

2. In a device for the releasable fixing of the reed of looms by means of a facing bar to support the under-side of the same, a lever spindle situated along the slay beam, a supporting arm for the facing bar carried by the lever spindle, a spring urged lever arm on the lever spindle, a locking lever in supporting connection with the supporting arm, a locking catch giving releasable support to the locking lever, a releasing magnet operating the locking catch as an armature, a contact connected with the winding of the releasing magnet, a counter-contact situated on the armature of a control magnet and a current source connected with the winding of the release magnet and the counter-contact.

3. In a device for the releasable fixing of the reed of looms by means of a facing bar to support the under-side of the same, a lever spindle situated along the slay beam, a supporting arm for the facing bar carried by the lever spindle, a spring urged lever-arm on the lever spindle, a locking lever in supporting connection with the supporting arm, a locking catch giving releasable support to the locking lever, a releasing magnet operating the locking catch as an armature, a contact connected with the winding of the releasing magnet, a counter-contact situated on the armature of a control magnet, a current source connected with the winding of the release magnet and the counter-contact, a normal circuit connected with the current source and the winding of the control magnet, two interruption contacts fitted on the shuttle boxes and operated by the shuttles, and one auxiliary contact in the normal circuit closed at times by the driving shaft.

4. In a device for the releasable fixing of the reed of looms by means of a facing bar to support the under-side of the same, a lever spindle situated along the slay beam, a supporting arm for the facing bar carried by the lever spindle, a spring urged lever arm on the lever spindle, a locking lever in supporting connection with the supporting arm, a locking catch giving releasable support to the locking lever, a releasing magnet operating the locking catch as an armature, a disengagement lever situated on the lever spindle, a side projection of the engagement lever in reach of the end of the disengagement lever connected with means for the interruption of the loom drive.

5. In a device for the releasable fixing of the reed of looms by means of a facing bar to support the under-side of the same, a lever spindle situated along the slay beam, a supporting arm for the facing bar carried by the lever spindle, a spring urged lever arm on the lever spindle, a locking lever in supporting connection with the supporting arm, a locking catch giving releasable support to the locking lever, a releasing magnet operating the locking catch as an armature, a bar bringing about the supporting effect of the locking lever on the spring-urged lever arm, a guide casing for the bar, fixed to the slay sword and enclosing the locking lever as well as the releasing magnet.

6. In a device for the releasable fixing of the reed of looms by means of a facing bar to support the under-side of the same, a lever spindle situated along the slay beam, a supporting arm for the facing bar carried by the lever spindle, a spring urged lever arm on the lever spindle, a locking lever in supporting connection with the supporting arm, a locking catch giving releasable support to the locking lever, a releasing magnet operating the locking catch as an armature, a contact connected with the winding of the releasing magnet, a counter-contact situated on the armature of a control magnet, a current source connected with the winding of the releasing magnet and the counter-contact, a normal circuit connected with the current source and the winding of the control magnet, a brake shoe in each of the shuttle boxes situated at the ends of the slay, an electric contact on the outer side of each brake shoe, an insulated counter-contact to this, on each shuttle box, and an auxiliary contact in the normal circuit closed at times by the driving shaft.

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