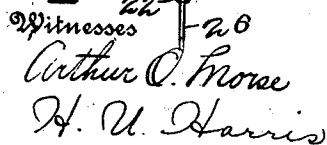


1,065,937.

2 SHEETS--SHEET 1.



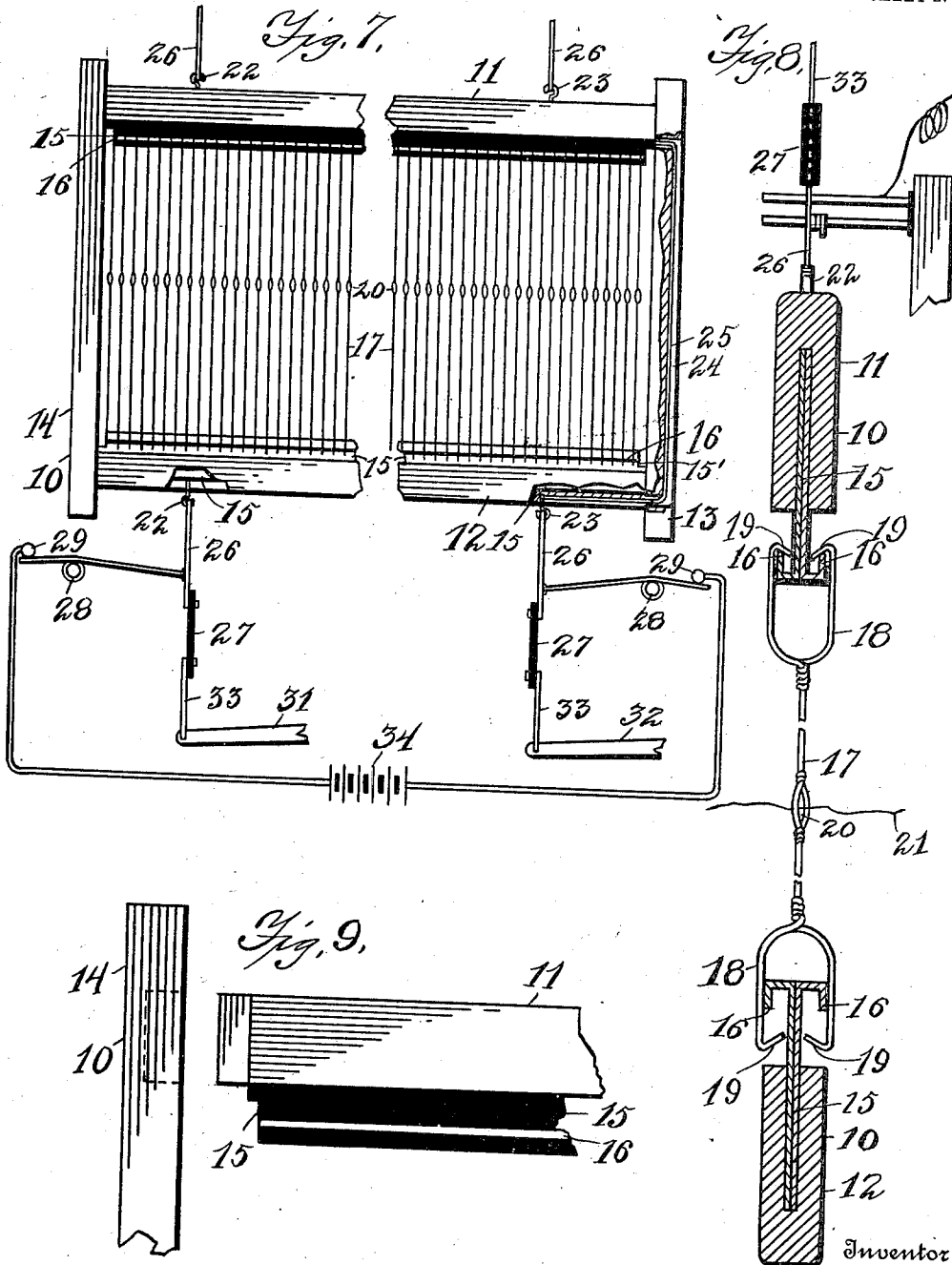
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ELECTRIC WARP STOP MOTION.
APPLICATION FILED APR. 15, 1912.

1,065,937.

Patented July 1, 1913.

2 SHEETS—SHEET 2.



Witnesses

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UNITED STATES PATENT OFFICE.

JOHN HANCO, OF JAMESTOWN, NEW YORK.

ELECTRIC WARP STOP-MOTION.

1,065,937.

Specification of Letters Patent.

Patented July 1, 1913.

Application filed April 15, 1912. Serial No. 690,712.

To all whom it may concern:

Be it known that I, JOHN HANCO, a citizen of the United States, residing at Jamestown, in the county of Chautauqua and State of New York, have invented certain new and useful Improvements in Electric Warp Stop-Motions, of which the following, taken in connection with the accompanying drawings, is a specification.

10 The invention relates to electric warp controlling devices for looms and is specially adapted to be used with the stopping mechanism shown in the patent to Kip *et al.*, No. 813,307, February 20, 1906, for an electrical warp stop motion; and the object of the improvement is to provide a heddle frame having oppositely placed channel flanges lengthwise of the inner edges of the top and bottom rails and a heddle having forked ends oppositely inturned to engage over said channel flanges on the top and bottom rails, the central portion having a thread eye there-through and suitable electric connection to make and break the electrical circuit as the heddle frame falls and rises; and the invention consists in the combination and arrangement of the parts as shown and described in this specification and the accompanying drawings and pointed out in the claims.

15 In the drawings, Figure 1 is an elevation of the heddle frame with the heddles in position, the middle portion being broken away, and showing the electrical connection on the upper side whereby the circuit is alternately made and broken with the rise and fall of the frame, the frame being in the lowered position, thereby completing the electrical circuit. Fig. 2 is a sectional view of the frame at line X X in Fig. 1, showing the heddle in the circuit-breaking position as it is supported on the thread. Fig. 3 is an elevation of the frame with the electric connection disconnected. Fig. 4 is an end elevation of the heddle frame showing the groove in the end piece for the wire connection to the channel flanges of the lower rail. Fig. 5 is a perspective view of the electrical contact pins with the parts in the closed position; and Fig. 6 is a similar view with the parts in the open or disconnected position. Fig. 7 is an elevation of the heddle frame, the middle portion being broken away, showing the electrical connection on the under side whereby the circuit is alternately made and broken with the rise and

fall of the frame, the frame being shown in the raised position, thereby completing the electrical circuit. Fig. 8 is a sectional view of the frame at line X X in Fig. 1 showing the thread broken and the heddle dropped into contact upon the oppositely turned flanges of the upper cross rail. Fig. 9 is a detail enlargement of a corner of the frame the cross bar being detached from the end piece, showing the cutaway notch for inserting the heddles upon the cross bar.

Like numerals of reference refer to corresponding parts in the several views.

20 The numeral 10 designates the heddle frame which comprises a top cross rail 11 and a bottom cross rail 12 connected by the end pieces 13 and 14. The top and bottom cross rails 11 and 12 are preferably made of fiber or wood or other equally good insulating material, and have the two sheet metal plates 15 placed therein back to back so that the channel flanges 16 thereon turn outwardly in opposite directions and exactly opposite one another. The plates 15 are inset in the wood or fiber cross rails 11 and 12 and extend therefrom a sufficient distance to give space for the heddles 17 to move up and down between the flanges 16 and the wood or fiber portion. The faces of one of the pairs of the plates 15 and the outer sides of the upper channel flanges 16 are insulated against electrical contact with the metal heddle 17. The heddle 17 is insulated from contact thus with the upper pair of channel flanges 16, but is always in contact with the pair of flanges on the lower rail so that when the heddle 17 drops into contact with the channel flanges of the upper rail through the breaking of a thread 21 the electrical circuit will invariably be completed. A notch 15' is cut in the end of plates 15 to admit the heddles 17 to the flanges 16.

25 The heddle 17 is preferably made of sheet metal, as shown in Figs. 2 and 4, but may be made of wire, as shown in Fig. 8, with forked ends 18 which extend each side of the channel flanges 16 and the ends 19 of the forks 18 are turned toward one another to engage over the edges of the flanges 16, which edges are left bare on the upper rail to receive the inturned ends 19 and make the electrical contact when the thread breaks. A thread eye 20 is provided in the center of the heddle for the thread 21.

The heddle frame 10 is supported by

means of hooks 22 and 23 on both the top and bottom cross rails 11 and 12; and the electrical connection to the frame 10 is made through said hooks 22 and 23 either on the top cross rail 11, as shown in Fig. 1, or on the bottom cross rail 12, as shown in Fig. 7, the connection being almost exactly the same except that in one case it extends upward from the frame and the other case downward therefrom, and that the heddles 17 always make and break contact with the upper rail.

A groove 24 is provided lengthwise of the outer edge, preferably, of end piece 13 where the electrical connection is made to the top rail 11, as shown in Figs. 1 and 8. A wire 25 extends from one of the hooks 23 along the rail to the groove 24 and through said groove to a connection with the metal plates in the other cross rail being fully insulated from the plates 15 in the first rail; the other hook is inserted in the rail until it forms a contact with the upper edges of the sheets 15.

The heddle frame is supported between the upper and under levers 31 and 32 by means of wire links 26 which connect the hooks 22 and 23 to the insulating links 27 and links 33 which connect to said levers. A pair of pins 28 and 29 are provided alongside of each of the links 26 and a wire 30 is pivotally attached to the link 26 and given a turn around the first pin 28. The end of the wire 30 extends out beneath the second pin 29 which second pin has electrical connection to one of the poles of a battery 34, the pin 29 connecting to one of said hooks being connected to one of the poles to the battery and the pin 29 for the other hook being connected to the opposite pole of said battery 34. It is now apparent that when the heddle frame 10 is raised and lowered by the levers 31 and 32 the connecting links including links 26 will move upward and downward therewith raising and lowering the ends of wires 30 which are attached to said links thereby making and breaking the electrical circuit with pin 29 as the heddle rises and falls. When the electrical connection is made from the upper side of the frame the intumed ends 19 of the heddles 17 will rest on the upper flanges 16 when the heddle frame is in the raised position and the electrical circuit is disconnected at pins 29 and when the frame descends the threads 21 support the heddles 17 so that the intumed ends 19 are raised from the flanges 16 by the threads 21, then the circuit is closed by wires 30 bearing against contact pins 29. Thus it will be seen that the circuit will continue to remain broken at one point or the other until one of the threads 21 breaks, as shown in Fig. 8, when the heddle 17 will immediately fall upon the flanges 16 if in the lower position, thereby immediately closing the circuit and stopping the loom. If

in the raised position the circuit will be closed by the descent of the frame since the heddle with the broken thread will continue to rest upon the flanges 16. It is obvious that this simple form of electrical connection for frame 10 may be attained on the under side of said frame, as shown in Fig. 7, with very little change in said connection and that it will operate the same as when attached to the upper side. It should always be borne in mind, however, whether the electrical connection is made to the upper side or under side that the heddles 17 must contact with the flanges 16 of the upper cross rail when the thread breaks since said contact is made entirely by gravity, the fall of the heddle accomplishing the closing of the electrical circuit. The slight differences in electrical connection will be readily understood by comparing Figs. 1 and 7.

I claim as new—

1. In a device of the class described, a heddle frame comprising upper and lower cross bars and connective end pieces, oppositely turned lengthwise hooked flanges on the inner edges of each of said upper and lower cross bars, heddles having forked and hooked ends to engage over said hooked flanges, the upper lengthwise hooked flanges insulated against contact with said hooked ends except the edge of said flanges, substantially as and for the purpose specified.

2. In a device of the class described, a heddle frame comprising end pieces and cross rails of insulating material, sheet metal plates inserted in the opposite inner edges of said cross rails, the inner edges of said sheet metal plates turned outwardly in lengthwise channel flanges, fork-ended heddles having intumed ends to engage over said channel flanges, and the plates in said upper rail insulated against contact with said fork-ended heddles except the edges of said channel flanges, substantially as and for the purpose specified.

3. In a device of the class described, a frame comprising end pieces and cross bars of insulating material, sheet metal lengthwise flanges on the inner edges of the upper and lower cross rails, heddles having intumed forked ends to engage over said channel flanges, the upper channel flanges insulated against contact with said heddle except on their upper edges, hooks on the upper and lower cross rails for supporting said heddle frame and reciprocally moving the same, electrical connection from one of said hooks on one of said cross rails to the channel flanges thereon and electrical connection from the other hook to the channel flanges on the other cross rail, and means attached to said hooks for making and breaking connection as the heddle frame reciprocally rises and falls.

4. In a device of the class described, a

heddle frame, a pair of supporting hooks on each of the top and bottom cross rails to raise and lower the same, links attached to said hooks, insulating connection for said links, a contact pin alongside each of the links on one side of said frame, contact wires attached one to each of said links at one end and pivotally supported midway of their length to make and break connection with the contact pins as the heddle frame rises

and falls or the thread breaks, and suitable electric connection between said hooks and said heddles, substantially as and for the purpose specified.

In testimony whereof I have affixed my signature in the presence of two witnesses.

JOHN HANCOCK.

Witnesses:

HENRY FOSTER,
H. U. HARRIS.