Sept. 30, 1941. W. H. DIETRICH 2,257,228

PILE FABRIC LOOM CONSTRUCTION

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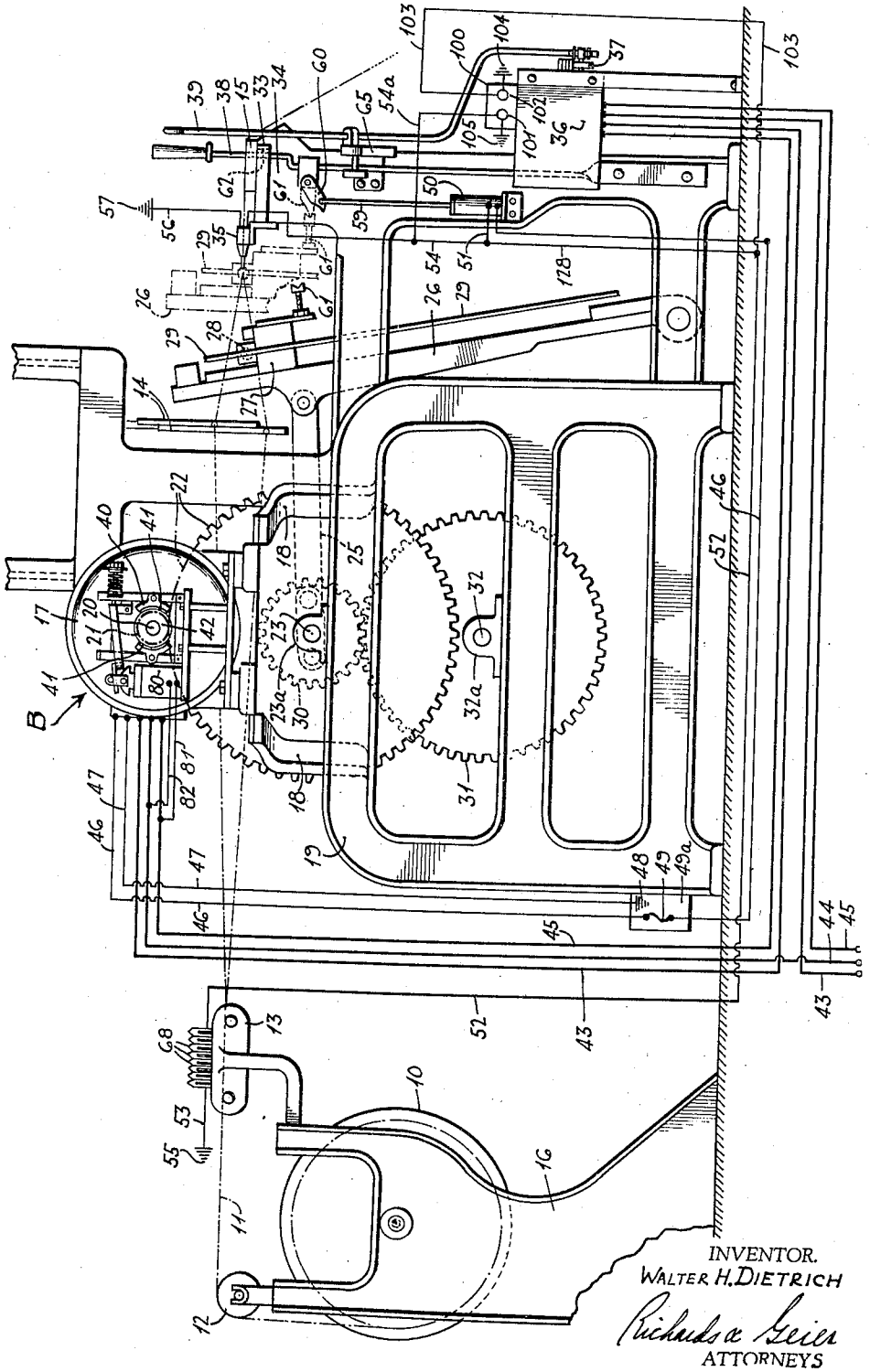


Fig. 1.

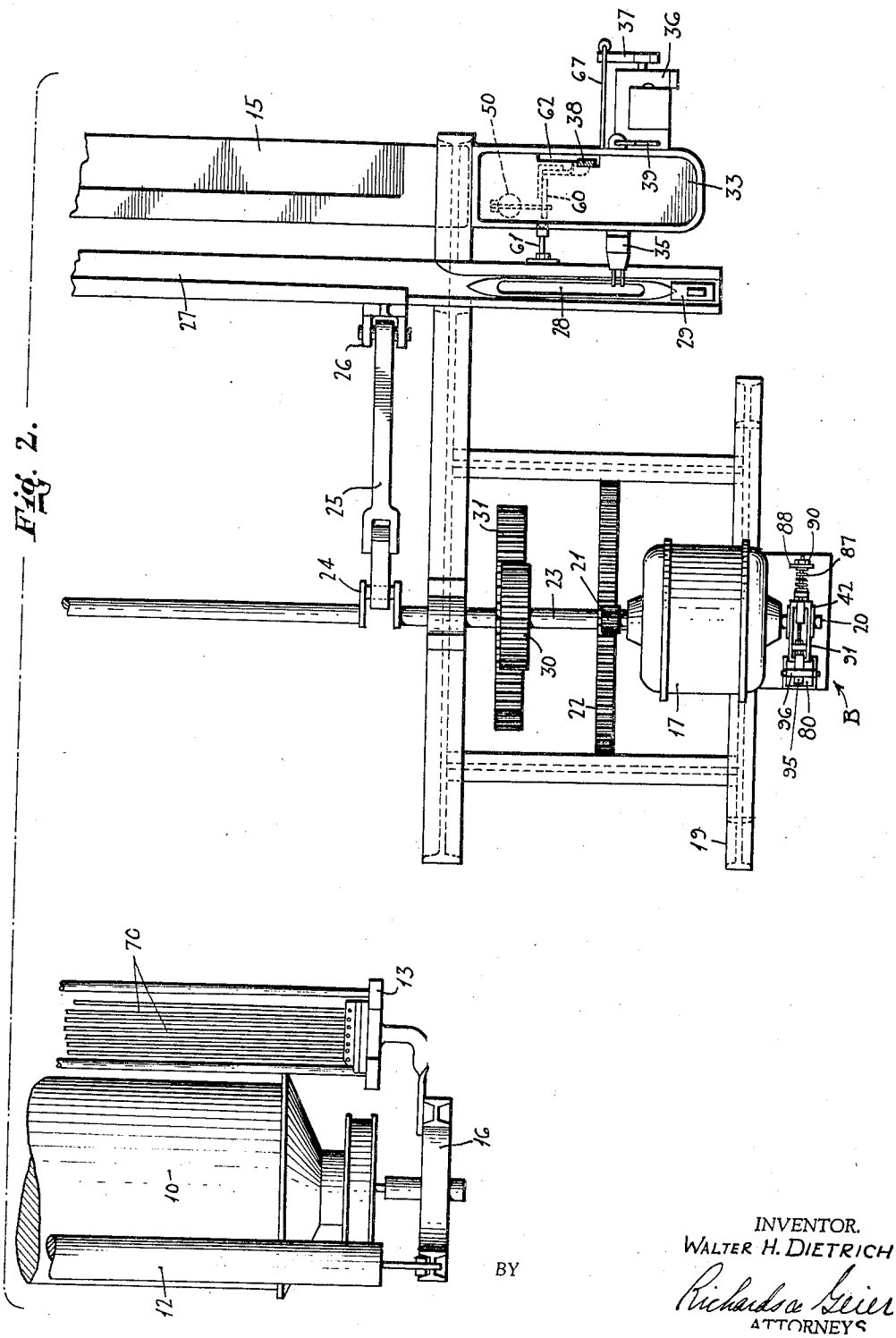
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Fig. 2.



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Fig. 3.

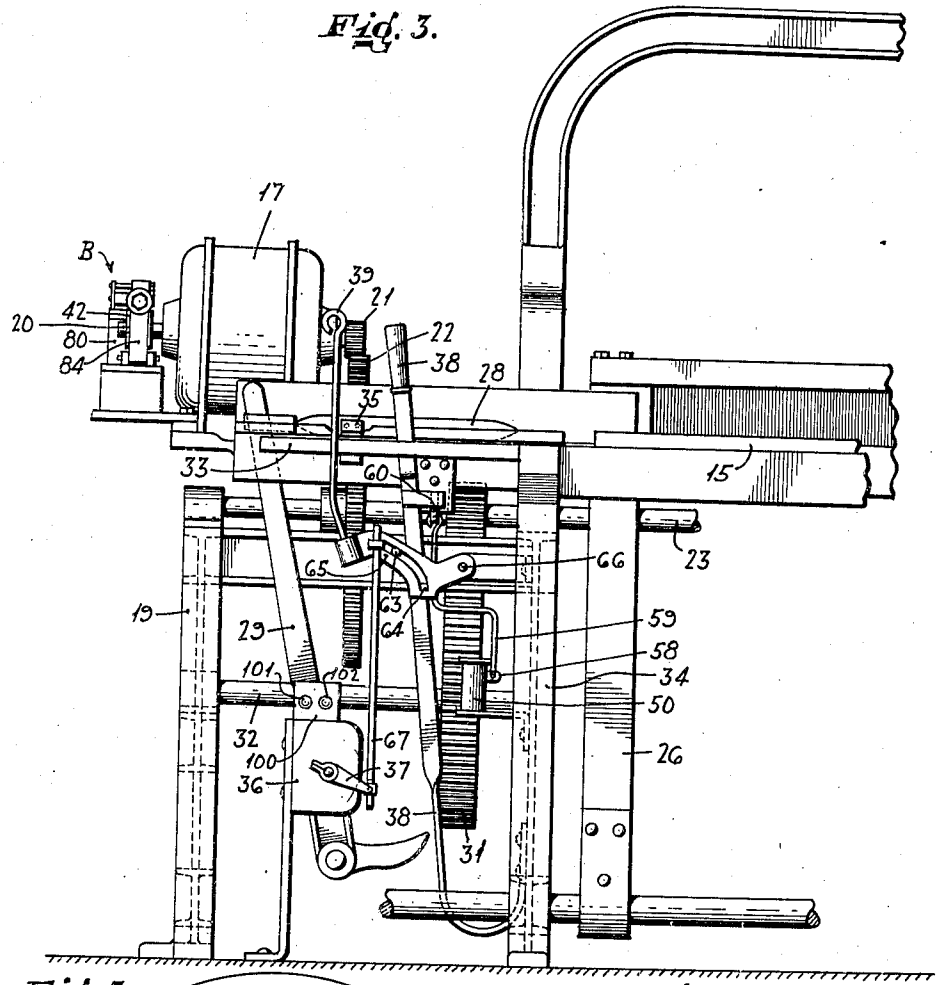


Fig. 5.

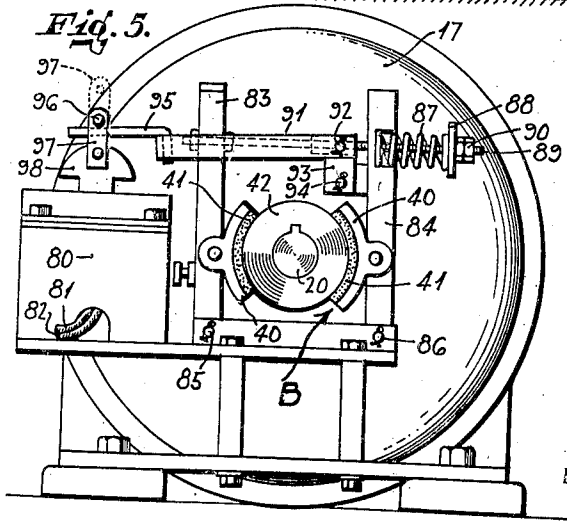


Fig. 6.

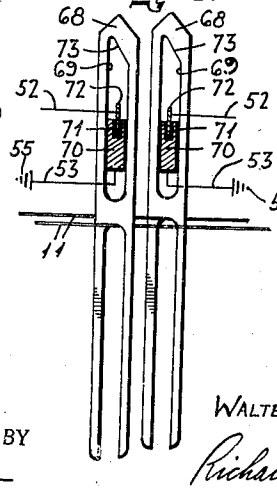
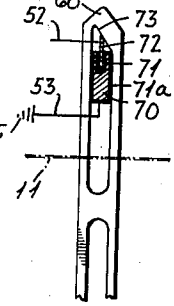


Fig. 7



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Fig. 4.

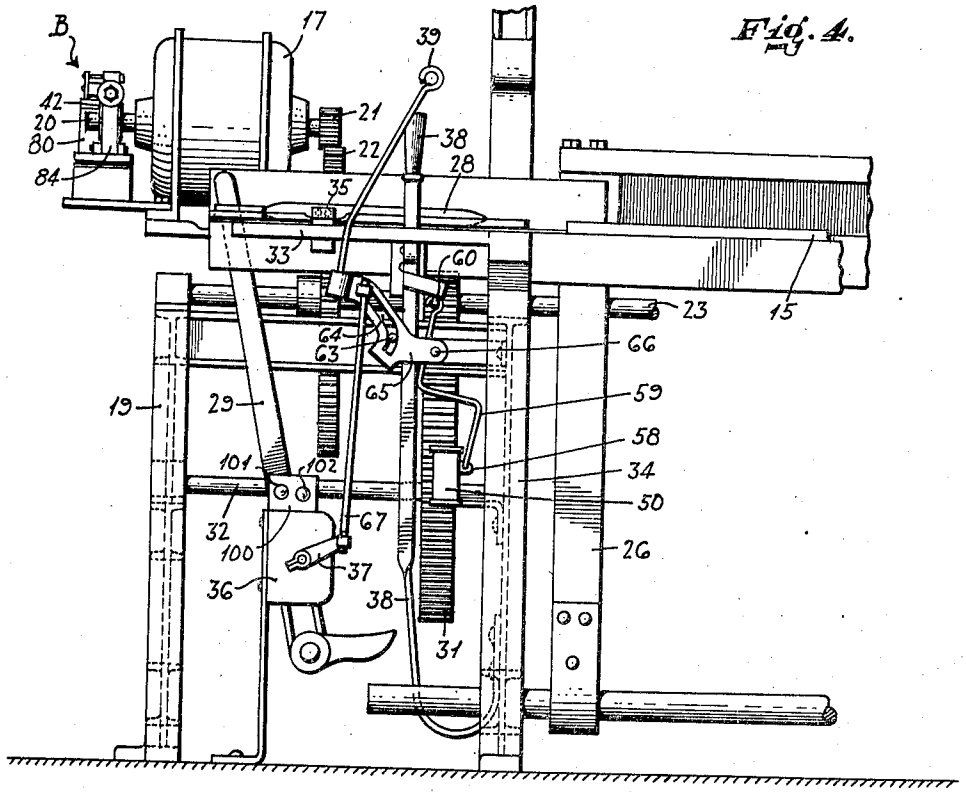


Fig. 8.

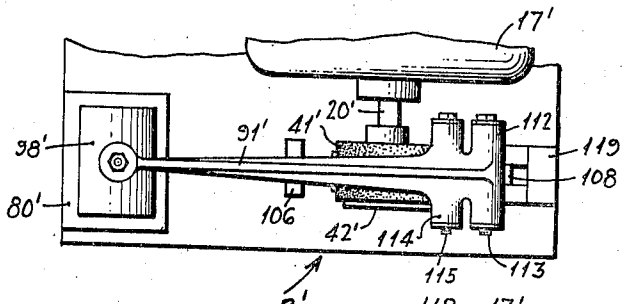
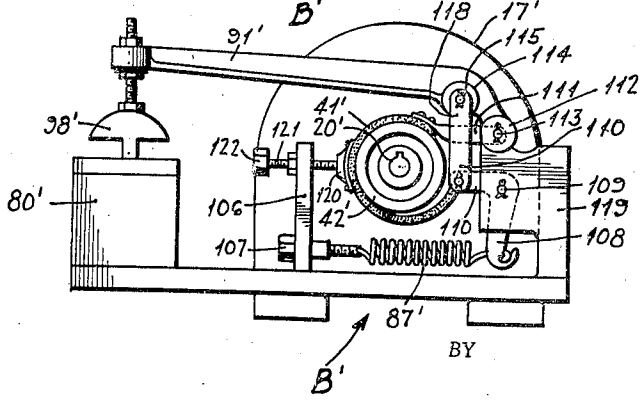


Fig. 9.



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UNITED STATES PATENT OFFICE

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PILE FABRIC LOOM CONSTRUCTION

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Application October 5, 1939, Serial No. 298,034

3 Claims. (Cl. 139—336)

The present invention relates to pile fabric looms and particularly relates to methods of operating pile fabric looms.

In the usual type of pile fabric looms, the loom is quite heavy and when the loom is operating with the lay moving backwardly and forwardly there is substantial inertia which makes it difficult quickly to stop the loom and it is also quite difficult for the weaver or loom operator to adjust the various parts of the looms to a desired position to enable ready repair or reattachment of either the warp or filling ends or replacement of the shuttles when exhausted.

It is, therefore, among the objects of the present invention to provide an improved loom mechanism or attachment which will permit more rapid stoppage of the loom and enable more ready adjustment or replacement of shuttles or repair of warp or filling ends with less damage to the goods.

Still further objects and advantages will appear from the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the invention.

According to the above objects, it has been found most satisfactory to provide an elevated readily accessible electromagnetic braking device immediately associated with and preferably on the same shaft as the motor for driving the loom.

In the preferred construction, in addition to the shipper lever utilized for latching the loom in operating position, a smaller jogging lever is utilized for moving the loom or the lay thereof into desired position or into the desired part of the cycle in which it should be to enable repair, replacement of shuttles or tying up of either warp or filler ends, as the case may be.

Referring to the drawings which illustrate several of the various possible embodiments of the present invention, but to which the present invention is by no means restricted since the drawings are merely by way of illustration and not by way of limitation.

In the drawings:

Figure 1 is a diagrammatic side view of a pile fabric loom showing the electro-magnetic brake but only illustrating one warp, the wire connections of the electrically operated parts particularly in connection with two warps.

Figure 2 is a diagrammatic plan view of one side of the loom structure of Figure 1 from above.

Figure 3 is a front elevational view of one side of the loom and shows the shipper handle in on position.

Figure 4 is a similar view to Figure 3 and shows the shipper handle in off position.

Figure 5 shows the electromagnetic brake upon an enlarged scale as compared to Figure 1.

Figures 6 and 7 are enlarged detailed elevational views of the drop contact elements associated with the warp ends, Figure 6 illustrating two of the elements in "off" or normal operating position and Figure 7 illustrating one of the elements in "on" machine stopping position.

Figures 8 and 9 illustrate an alternative brake construction, Figure 8 being a top plan view and Figure 9 being a side elevational view thereof, both of the views showing the side of the motor.

In the loom shown in Figures 1 to 3 only one warp is shown to enable a clearer showing, it being understood, however, that in a pile fabric loom there are a plurality of warps, for two ground fabrics and an intervening pile, which warps have separate carrying and guiding elements as will be more fully described in connection with Figure 10.

The loom as shown in Figures 1 and 2 comprises a warp beam **10** carrying the warp **11** which passes over a whip roll **12** and then goes through a warp stop motion device contact assembly **13** which is automatically operated after the breakage of a warp thread. The warp **11** passes through harness frames **14**, goes over a breast beam **15** (see Figure 2), and is wound in the usual way on a roll, not shown in the drawings.

The warp beam **10** is carried by a separate support **16**.

An electric motor **17** is carried by the supports **18** and **19** (see Fig. 1). The electric motor **17** is a conventional split phase reversible motor manufactured by the General Electric Company, which motor is described on the name plate as "Textile Mill Motor, model No. 64A231, type KQ–3934–6–1–1200, 60 cycles, 2 phase, 220 volts, 1 H. P., 3.15 amps. #MJ–1246." The motor shaft **20** carries a pinion **21** (see Fig. 2) meshing with a toothed wheel **22** which is keyed to a crank shaft **23**. The rotation of the crankshaft **23** is transmitted through the crank **24** and the crank connector **25** to the lay sword **26** which carries the lay **27**, and the shuttle **28**, shown in Figure 2. The picker **29** is used for driving the shuttle **28** across the warp.

The crankshaft **23** also carries a pinion **30** which engages a toothed wheel **31** mounted on a shaft **32**. (See also Figs. 3 and 4.)

The rotation of the wheel **31** is transmitted to other parts of the loom not shown in the drawings.

A weft feeler **35** is connected with a plate **33** carried by a support **34** and is used to initiate the automatic stopping of the loom as soon as the filling of the shuttle has been exhausted.

A switch box **36** (see Figs. 1 to 4) comprises a switch actuating element **37** which may be

actuated to cut off the supply of the electrical current to the motor 17 and may be shifted to move the lay 27 forward or backward. The switch actuating element 37 may be operated by hand by swinging a shipper rod 38 or a jogging lever 39.

The shipper rod 38 is moved automatically into an off position upon subsequent forward movement of the lay 27 after a warp thread breaks and the warp stop motion device 13 is energized or after the shuttle 28 has run out of filling and the circuit is closed across the weft feeler 35.

A magnetic brake B, (see Figs. 1 and 5) is situated at the side of the motor 17 and is provided with brake shoes 40 with friction linings 41 which surround a brake wheel 42 keyed to the shaft 20. The brake shoes 40 are applied automatically to stop the rotation of the shaft 20 as soon as the current supply to the motor 17 is interrupted.

The electrical current for feeding the motor 17 is supplied by the main leads 43, 44 and 45. The leads 43 and 45 are connected with the motor 17 through the switch box 36, while the lead 44 is connected directly with the motor 17.

The secondary electrical circuit (see Fig. 1) which is used for the operating of the warp stop motion device 13 and the weft feeler 35 comprises two conducting wires 46 and 47 connected with a coil which forms a part of the windings of the motor 17 and is not shown in the drawings.

A shunt current in parallel with that flowing through the motor 17 will flow through the wires 46 and 47 at a low voltage of about 10 or 12 volts.

The wire 47 is grounded to the machine at 48 while the wire 46 passes through a fuse box 48a having a fuse 49 and is connected with the winding of a magnet 50. The wire 51 (see Fig. 1) leading out of the magnet 50 is connected with a wire 52 leading to the warp stop motion device 13 and is also connected with a conduit 54 leading to the weft feeler 35. Wires 53, one of which is shown in Figure 1, are connected with the opposite end of the device 13 and are grounded to the machine at 55 while a wire 56 connected with the other end of the weft feeler 35 is grounded at 57.

The magnet 50 is provided with a member 58 shown in Figures 3 and 4, which is attached to a rod 59 operating a pawl 60 carried by the shipper rod 38. In the on position, in Figure 1, there is no current flowing through the magnet 50. As soon as a warp thread breaks and/or as soon as the shuttle runs out of filling an electrical current will flow through the wires 46 and 51 and will energize the magnet 50. Then the magnet 50 will move the rod 59 upwardly so that the pawl 60 will also move upwardly into the position shown by broken lines in Figure 1.

The reciprocating lay 27 carries a dagger 61 which will strike the pawl 60 when the latter is in its upward position and this will release the shipper lever 38.

As shown in Figures 3 and 4, the lower part of the lever 38 is bent to form a resilient spring which is connected with a part of the frame and which has a tendency to move the lever 38 into the "off" position shown in Figure 4.

The lever 38 is held in its "on" position shown in Figure 3 by the walls of a recess formed in a slot 62 which is cut through the plate 33, as shown in Figure 2.

After the pawl 60 has been struck by the dagger 61 the shipper rod 38 will move to the right from the position shown in Figure 1 and move it out of the recess, so that the rod will swing within the slot 62 and will return to the "off" position shown in Figure 4.

A pin 63 carried by the shipper lever 38 slides in a slot 64 located in a connecting member 65 which is pivotally connected at 66 to the frame of the machine. The member 65 carries the jogging lever 39 as well as a rod 67 which is connected with the switch lever 37.

When the rod 38 moves into the "off" position shown in Figure 4, the pin 63 will move to the right, shifting the rod 67 and the switch lever 37 upward and thus opening the switch.

However, the jogging lever 39 may be operated independently of the shipper lever 38 to move the lay 27 short distances forwardly and backwardly, since due to the provision of the slot 64 in the member 65 the lever 39 may be moved up and down by hand without changing the position of the rod 38. The jogging lever 39 is usually operated by the weaver in the moving of the lay either forwards or backwards for short distances while inserting new ends or for other necessary repairs.

Referring to the jogging lever 39, when this lever is thrown in one direction, it will actuate the switch 36 through the elements 37 and 67 to turn the motor 17 to move the lay in one direction. When the jogging lever 39 is thrown in another direction, the motor 17 will be actuated in the opposite direction and a reverse movement of the lay will be obtained.

The warp stop motion device 13 is illustrated in detail in Figures 6 and 7. Each one of the warp threads 11 carries a separate thin drop blade element 68 made of copper or other conducting material and having a slot 69. A conducting electrode bar 70 projects through the slot 69 and carries one end of the wire 53, the other end of said wire being grounded to the machine at 55. The bar 70 is provided with an insulating portion 71 which surrounds a conductor 72 connected with one end of the wire 52.

In the position shown in Figure 6 no current can flow between the wires 52 and 53 due to the provision of the insulator 71. It should be noted that the number of drop elements 68 and cooperating parts must correspond to the number of the warp threads since each thread carries a separate drop element 68. In Figures 6 and 7 each drop wire 68 is provided with separate connecting wires 52 and 53. These wires may be interconnected to form a single lead shown diagrammatically in Figure 1.

As soon as a warp thread breaks, the corresponding drop element 68, which is guided by electrode bars 70, drops to a position shown in Figure 7. In this position the conductor 72 connected with the wire 52 comes in contact with the slanting wall 73 of the drop wire 68. A positive electrical connection will then be established between the wire 52, the conductor 72, the drop wire 68, the face 71a of the electrode bar 70 and the wire 53.

Since the wire 53 is grounded to the machine while the wire 52 is connected with the magnet 50 which is supplied with electrical current from a coil of the motor 17, the above-mentioned electrical connection will produce a current flowing through a circuit which comprises a coil of the motor 17, the electro-magnet 50 and the dropped element 68.

This current will energize the magnet 50 which

will move the plunger 58 upward, thus placing the pawl 60 in a position in which it will be struck by the dagger 61 as soon as the oscillating lay sword 26 is brought again into its foremost position. The movement of the pawl 60 will free the shipper rod 38 which will swing into the "off" position and open the main electrical switch 37 thus interrupting the flow of the current to the motor 17.

The magnet brake B, with the shoes 40, which automatically stops the rotation of the motor shaft 20 as soon as the current supply to the motor 17 is interrupted, is shown in detail in Figure 5.

The brake comprises a solenoid situated within a casing 80 and connected with the main wires 44 and 45 by means of conduits 81 and 82. The brake shoes 40 are carried by supports 83 and 84, which may move on pivots 85 and 86.

A spring 87 presses against the support 84 and against a plate 88 which is carried by a rod 89 movable with respect to the support 84 and connected with the support 83. A nut 90 screwed onto the rod 89 is used to hold the plate 88 in position and also to vary the force exerted by the spring 87.

A lever 91 is pivoted at 92 to the rod 89 and is firmly connected with a link 93 which is pivoted at 94 to an extension piece forming a part of the support 84.

An extension 95 is firmly connected with the lever 91 and may come into contact with a pin 96 carried by a link 97 which is connected with the plunger 98. The plunger 98 is moved by the solenoid situated within the solenoid casing 80.

In the position shown in Figure 5 current is supplied to the motor 17, and, consequently, to the solenoid. The plunger 98 is situated in its lowest position and the arm 95 is in contact with the pin 96. The left end of the lever 91 is lower than its right end, so that the link 93 presses against the support 84 and moves it to the right against the action of the spring 87. Consequently the brake shoes 40 exert no pressure on the brake wheel 42.

As soon as the supply of electrical current to the motor 17 and to the solenoid is interrupted, the solenoid becomes de-energized. Through the action of the spring 87, the lever 91, with its arm 95, swings upward around the pivots 92 and 94, and the arm 95 comes in contact with the under-side of the pin 96, and raises the element 97 into the position shown by broken lines in Figure 5.

The link 93 will swing together with the lever 91 and will move the support 84 to the left so that its brake shoe 40, will be pressed against the brake wheel 42.

At the same time, again the action of the spring 87 pressing against the plate 88, tends to move it to the right. Since the plate 88 is carried by the rod 89, which is connected with the support 83, this pressure will be transmitted to said support 83, which will also press its brake shoe 41 against the brake wheel 42.

In the alternative construction of Figures 8 and 9, similarly functioning parts being indicated by the same numerals primed, the brake band 41' encircles the brake wheel 42', said brake band being intermediately provided with a carrier member 120 which is connected to the threaded rod 121 having the adjustment head 122. The threaded rod 121 extends through and is carried on the upright 106 which also is connected to the adjustable member 107, carrying one end of the coil spring 87'.

The other end of the coil spring 87' is connected to the hook member or lever arm 108 which is pivotally mounted at 109 in the bracket or frame structure 119. The other arm 110 of the hook member 108 is pivotally connected with the link 110.

The lower end of said link is pivotally connected with one end of the said brake band 41'. The upper end 118 of said link 110 is pivotally connected by the pivot pin 115 to the eye 114 of the main lever 91'.

The end of the lever 91' is connected to the reciprocatory armature member 98' which cooperates with the solenoid 80'.

The upper end of the brake band 41' is connected to the supporting arm 111 which is connected to the bracket 119 at the pivot point 113 for the eye 112 of the lever arm 91'.

In operation, the armature 98' is shown in down position with current being on. When the current is cut off, it will be moved into an elevated position by the spring 87' lifting the link 110 and closing the band 41' around the wheel 42'.

This will immediately brake the machine in the same manner as the brake shoes 40 of Figure 5.

It is apparent the specific illustrations above shown have been given by way of illustration and not by way of limitation and that the structures above described are subject to wide variation and modification without departing from the scope or intent of the invention all of which variations and modifications are to be included within the scope of the present invention.

What is claimed is:

1. In a pile fabric loom, a main motor for operating the lay, a main switch for controlling said motor, a shipper lever for controlling said main switch, a jogging lever for controlling said main switch, said jogging lever being connected to said shipper lever and being operable independently of said shipper lever to cause slight forward and backward movements of the lay when the shipper lever has been moved to inoperative position.

2. In a pile fabric loom, a main motor for operating the lay, a main switch for controlling said motor, a shipper lever for controlling said main switch, a jogging lever for controlling said main switch, and a connection between said jogging lever and said shipper lever consisting of a slotted link fixed to said jogging lever and having lost motion in respect to said shipper lever, said jogging lever serving to move said lay short distances backwardly and forwardly when said shipper lever has been moved to disconnect said main switch and stop said motor.

3. In a pile fabric loom, in combination, means for inserting the weft threads, an electric motor for actuating said means, a brake for stopping said motor, electromagnetic means for releasing said brake, means for supplying an electrical current to said motor and said electro-magnetic releasing means, a switch connected with said current-supplying means, a shipper rod, means connecting said shipper rod with said switch, and a jogging lever connected with the last mentioned connecting means, said jogging lever being capable of operating said switch independently of said shipper rod.

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