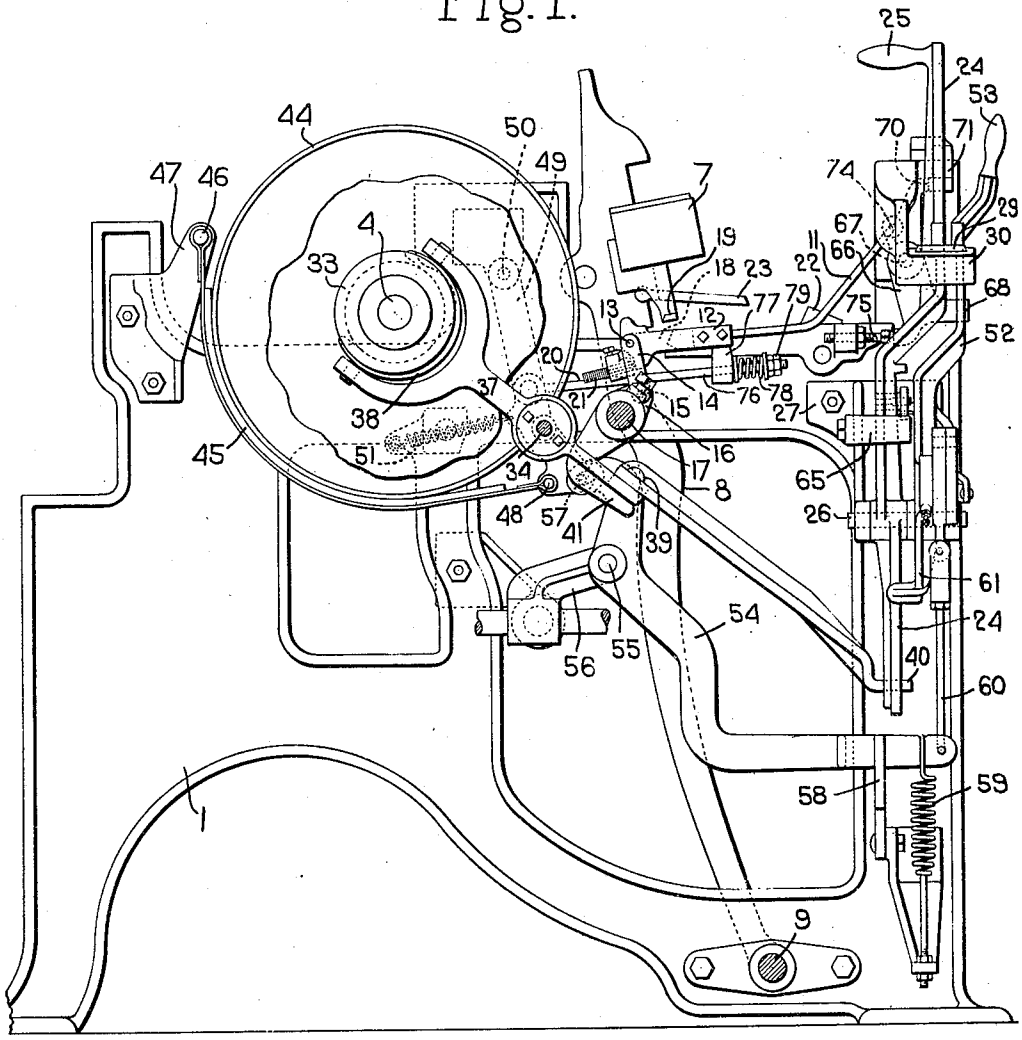
Dec. 1, 1931. W. SEVILLE 1,834,352

LOOM STOPPING AND STARTING MECHANISM

Filed Dec. 3, 1930 3 Sheets-Sheet 1

Fig. 1.



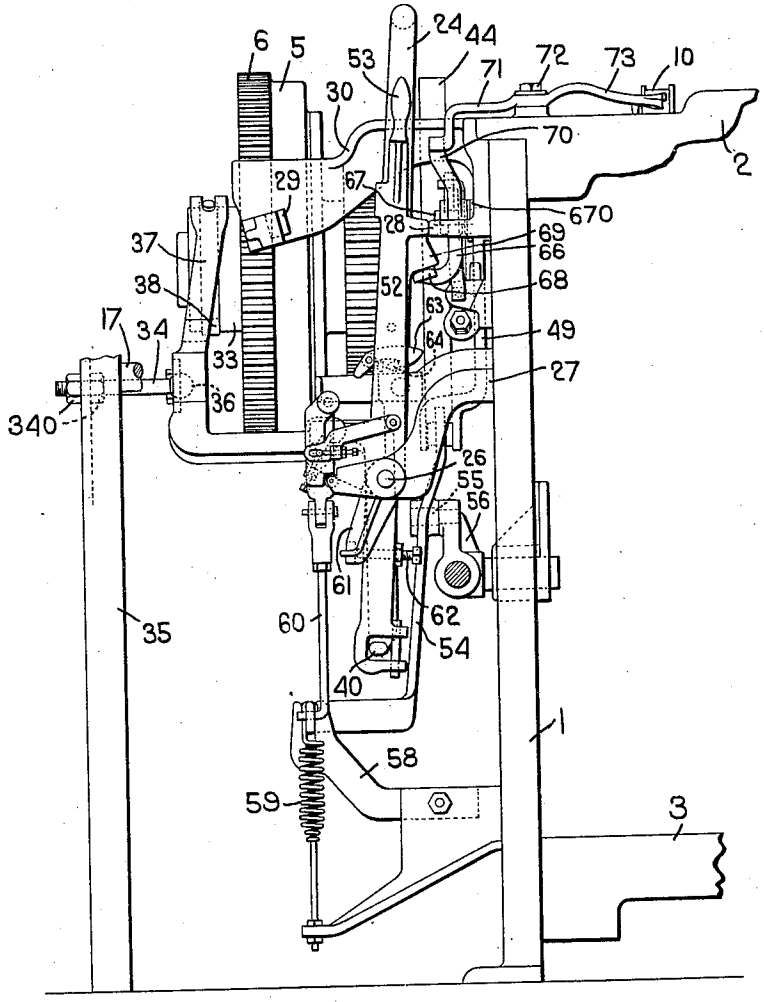
Inventor:
William Seville
by Heard Smith & Tennant.
Attys.

Dec. 1, 1931. W. SEVILLE 1,834,352

LOOM STOPPING AND STARTING MECHANISM

Filed Dec. 3, 1930 3 Sheets-Sheet 2

Fig. 2.



Inventor.
William Seville
by Heard Smith & Tennant.
Attys.

Dec. 1, 1931. W. SEVILLE 1,834,352

LOOM STOPPING AND STARTING MECHANISM

Filed Dec. 3, 1930 3 Sheets-Sheet 3

Fig.3.

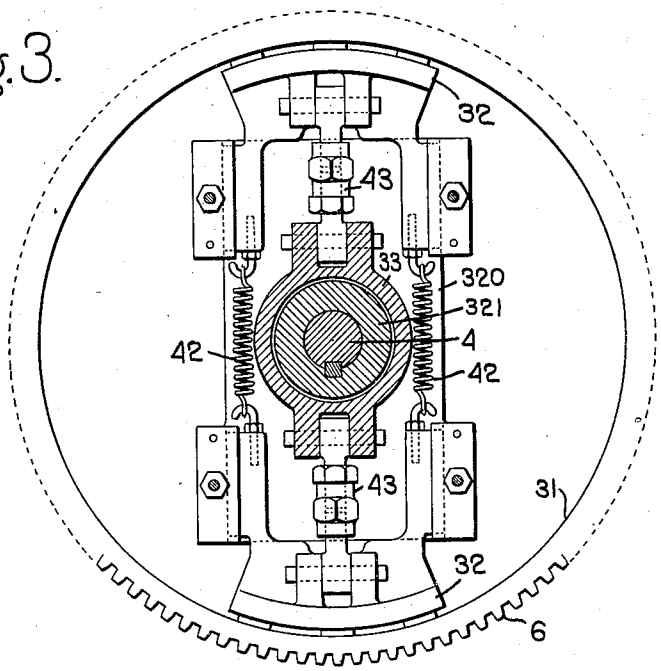
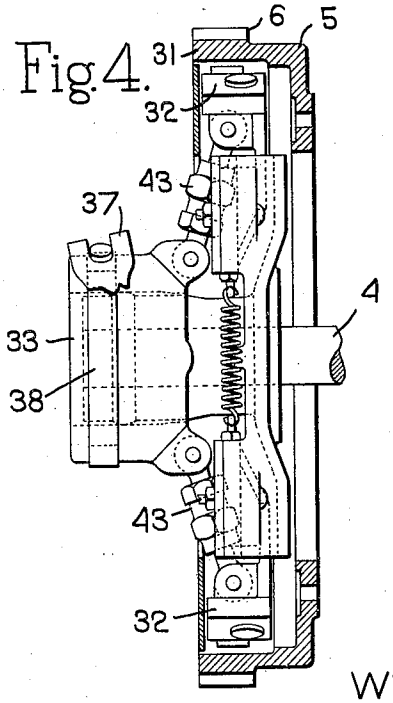


Fig.4.



Inventor.
William Seville
by Heard Smith & Tennant.
Attys.

Patented Dec. 1, 1931 1,834,352

UNITED STATES PATENT OFFICE

WILLIAM SEVILLE, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER CORPORATION, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE

LOOM STOPPING AND STARTING MECHANISM

Application filed December 3, 1930. Serial No. 499,704.

This invention relates to means for stopping and starting the operation of a loom adapted for manual operation and also operated automatically to stop the loom upon the occurrence of failure of filling, or of failure of warp, or of failure of the shuttle to box properly.

The object of the invention is to provide a simple and efficient type of mechanism which shall act quickly and powerfully and which shall require a minimum amount of force to effect its operation.

The object of the invention is further to provide such a mechanism so arranged and positioned as to be readily, easily and conveniently operated manually by an operator standing at the front of the loom.

The object of the invention is further to provide a single knock-off device controlled by mechanism operating when the filling fails, or by mechanism operating when the warp fails, or by mechanism operating when the shuttle fails to box properly.

The object of the invention is further to provide in such a mechanism for the initiation of the braking action before the power is disconnected when the loom is to be stopped as the result of the failure of the shuttle to box properly.

The object of the invention is further to provide means, preferably actuated by the movement of the frog before completion of its movement, to cushion the stopping movement of the lay and thus relieve the jar on the loom when it is finally stopped.

The object of the invention is further to insure against end thrust in the clutching mechanism when the loom is running and also to prevent unclutching due to vibration.

The object of the invention is further to provide for a direct connection between the shipper controlling lever and the clutch or means for disconnecting power from and connecting it to the loom.

These and other objects and features of the invention will appear more fully from the accompanying description and drawings and will be particularly pointed out in the claims.

A preferred form of the invention is shown in the drawings applied to a plain loom of a familiar type and for convenience to the left-hand side of the loom. Since the general construction and operation of such a loom and of various mechanisms embodied therein, such as warp stop motions, filling stop motions, brake and protector mechanism and clutch mechanism, are all well known and familiar to those skilled in the art, it is only necessary here to illustrate and describe those parts with which the preferred embodiment of the invention illustrated is particularly concerned.

In the drawings:

Fig. 1 is a left-hand side elevation of a portion of the loom.

Fig. 2 is a front elevation thereof.

Fig. 3 is an end elevation partially in vertical section of the type of radial clutch illustrated.

Fig. 4 is a view in side elevation and partially in cross section of the construction shown in Fig. 3.

The loom comprises the usual frame having the side members 1 connected by the breast beam 2 and cross girts 3. Power is applied to the main shaft 4 of the loom by a driven element 5 herein shown as including a gear 6 and forming one member of a clutch mechanism. The lay 7 is carried by the lay swords 8 from the usual lay rocker shaft 9 and operated in the usual manner from the shaft 4.

Three mechanisms are employed for effecting the stopping of the loom and each of these may be of any suitable construction. One mechanism acts upon the failure of the filling, that is, whenever the filling is broken or exhausted, the second mechanism acts upon failure of the warp, that is, whenever a warp thread breaks, and the third mechanism acts upon failure of the shuttle to box properly. Suitable mechanisms for this purpose are all well known and familiar and there is therefore illustrated only so much of each of such mechanisms as is necessary to a disclosure of the present invention.

The first mechanism which acts upon failure of filling may be of the usual filling fork type including a fork slide 10, see Fig. 2, which, upon failure of filling, is given a forward movement on the breast beam.

The second mechanism which acts upon failure of warp may be of the type illustrated in the patent to Davis, No. 1,538,625, May 19, 1925. In this type of mechanism a transmitter rod 11 is secured to a member 12 mounted at 13 upon a rocking link 14 pivotally supported at 15 on one arm 16 of a supporting bracket secured to a stub shaft 17 projecting from the loom frame. A dog 18 having a notched end is also mounted for rocking movement on the pivot 13 so as to be swung into position to be struck by the bunter 19 upon backward movement of the lay. This dog is held in normal position by a spring, not shown, and is moved into position to engage the bunter 19 when the warp breaks by the core 20 of a Bowden wire, the sheath 21 of which is secured to the member 12.

The third mechanism which acts upon the failure of the shuttle to box properly is of a familiar type. A frog 22 is mounted to slide on the loom frame and normally held retracted. If the shuttle is properly boxed, the dagger 23 pivoted on the lay passes above the frog, but if the shuttle fails to box properly, the dagger is not thus raised and upon the beat-up engages the frog and gives it a forward movement.

The shipper mechanism for connecting and disconnecting the power to the loom involves novel features which render it efficient. The shipper lever is mounted to swing on an axis extending transversely of the shaft and thus to swing parallel with the breast beam, it is so positioned and controlled that when it movement toward stopping position is initiated, that movement will be quickly completed, it is easily grasped and operated by the operator standing in front of the loom, and its movement in either direction is transmitted most directly to the clutch or means for connecting and disconnecting the power to the loom. This shipper lever 24 having the handle 25 is fulcrumed on the stud 26 extending transversely to the main shaft and supported by the bracket 27 from the loom frame. When in starting or running position, it stands nearly vertical and resting against a projection on the bracket 28 and, when it stands in stopping position, it rests against a projection 29 on the bracket 30. Thus it will be seen that it is readily swung after its movement toward stopping position is initiated and that an operator grasping the handle 25 may readily and easily swing it between starting and stopping positions when standing at the front of the loom. The means illustrated for connecting and disconnecting the power to the loom is a clutch of a well-known type. The driven element 5 already referred to constitutes one member of this clutch and is driven by the power. This element is an annular member having an annular peripheral rim 31. The other element of the clutch consists of clutch shoes 32 movable radially into and out of engagement with the rim 31. These clutch shoes slide radially in a supporting structure 320 having a hub 321 rotatable with and keyed to the shaft 4. They are moved radially in and out by a toggle connection with a clutch hub 33 sliding upon the hub 321. When the hub 33 is moved to the right, the clutch members are connected, and, when moved to the left, they are disconnected. One advantage of this type of clutch is that when the clutch is locked in running position, there is no end thrust because the clutch shoes act radially in their engagement with the rim.

The clutching and unclutching action by movement of the hub 33 is secured by a direct connection between the shipper lever 24 and the hub 33. For this purpose a single lever is fulcrumed on the loom frame having one arm engaging the shipper lever and the other arm engaging the clutch hub, and this lever preferably has an adjustable universal fulcrum connection with the loom frame. In the construction illustrated, an inwardly projecting stud 34 is mounted on the auxiliary portion 35 of the loom frame and provided at its inner end with a ball 36 and the adjustment of the fulcrum is provided by extending the threaded end of the stud 34 through the frame and providing threaded nuts 340 located at each face of the frame, thus enabling the ball end 36 to be set at the required distance from the frame. The lever is of somewhat Z-shape because the clutch hub is in a plane widely separated from the shipper lever. One arm 37 of the lever is bifurcated and provided with a follower 38 fitting in a groove in the clutch hub 33. This arm has formed therein a fulcrum socket fitting over the ball 36. The other arm of the lever is made in two parts rigidly and adjustably secured together by the bolts 39 and the extreme end 40 of this arm fits in an opening formed in the lower end of the shipper lever 24. A bracket 41 secured to the stud shaft 17 projects beneath the latter arm of the lever, thus taking the weight of the lever off from the shipper lever and easing the action of the shipper lever. The adjustment of the fulcrum stud 34, as by means of the nuts 340, and the adjustment of the two parts of the arm, as by the bolts 39, enables the positions of the ends of the Z-shaped lever with respect to the clutch hub and the lever 24 to be determined with great accuracy.

It will thus be seen that the shipper lever is directly connected through a single intermediate lever to the clutch hub and that consequently movement of the shipper lever in either direction is transmitted directly to the clutch hub to effect the connection or disconnection of the clutch members.

Powerful springs 42 connect the clutch shoes acting to draw them together and release the shoes from the rim of the other

clutch member. When the clutch hub 33 is in its inner position with the clutch connected, the action of these springs is opposed by the toggle arms 43 connecting the clutch hub and the clutch shoes. But immediately the disconnecting action of the clutch is initiated by a slight outward movement of the clutch hub, these springs act to boost the disconnecting movement of the clutch. Consequently, when the shipper lever is moved slightly to the left of its running position, shown in Fig. 2, and this initiates the unclutching movement of the clutch hub 33, these springs act immediately to free the clutch shoes and complete the disconnecting movement and also to swing the shipper itself to stopping position. These springs therefore further act to hold the shipper lever steady. The ball and socket joint provided between the intermediate lever at its fulcrum point and the loom frame takes care of any lost motion and renders the mechanism self-adjusting. The springs 42 also act when the clutch is in connected position to hold the toggles in the connected position and prevent unclutching due to vibration when the loom is running. It will also be noted that when the loom is running, there is no end thrust on the loom shaft because the clutch is of the radial thrust type with the clutch shoes acting radially against the rim.

The loom is stopped by a brake mechanism, For this purpose a brake wheel 44 is secured to the shaft 4 and is partially encircled by a brake band 45, shown with its rear end secured at 46 to a bracket 47 on the loom frame and its forward end secured at 48 to a device which is movable to apply and release the brake band. This device is shown as a lever 49 fulcrumed at 50 on the loom frame. A spring 51 connects this lever to the loom frame and acts to swing the lever 49 rearward and release the brake band from the brake wheel. The brake is applied by swinging the lower end of the lever 49 forward.

A brake controlling lever 52 is fulcrumed to swing alongside of the shipper lever, preferably being fulcrumed on the same stud 26 and with its handle 53 extending adjacent the upper end of the shipper lever. This brake controlling lever swings between stop surfaces on the same brackets 28 and 30 as the shipper lever. A bell crank lever 54 is fulcrumed at 55 on a bracket 56 supported on the loom frame and at the end of its upper arm is provided with a slot engaging a pin 57 on the lower end of the lever 49. The forward end of the lower arm of this bell crank lever is guided vertically in a slotted bracket 58 secured to the loom frame and is normally drawn downward by a powerful spring 59. A brake controlling lever 52 is connected to and operates the bell crank lever 54 through the link 60 by a mechanism similar to that shown in the patent to Seville, No. 1,631,067, May 31, 1927. This construction is such that no strain is placed upon the brake lever 52 to hold the bell crank lever 54 against the tension of the spring 59 with the brake released and is so arranged that only a small amount of force is required due to the principle of leverage ratios employed to place the parts in locked position and only a small force is required to unlock the device and permit the application of the brake, all as fully explained in the aforesaid Patent No. 1,631,067.

As in constructions of this general type, means are interposed between the shipper lever and brake lever so arranged that when both are in the same position and the shipper lever is swung in either direction, the brake lever will swing with it, and so arranged that when the shipper lever is in running position and the brake lever in releasing position and the brake lever is then swung to applying position, the shipper lever will swing with it to stopping position, and further so arranged that when the shipper lever is in stopping position and the brake lever is in applying position and the brake lever is then swung to releasing position, the shipper lever may then be swung independently between stopping and running positions. This is particularly useful in enabling the loom to be turned over by power after it is stopped. For this purpose the lower arm 61 of the brake lever is extended laterally behind a set screw 62 adjustably mounted in the lower arm of the shipper lever while a latch 63 is pivoted on the upper arm of the shipper lever and engages a lug 64 on the brake lever, the latch being disengaged from the stud by engagement of its tail with an arm 65 on the bracket 27 when the shipper lever is swung to stopping position.

When the brake lever stands in running position, as shown in the drawings, the bell crank lever 54 is held up against the tension of the spring 59 and the spring 51 has swung the lever 49 rearward, holding the brake band 45 released from the brake wheel 44. When the brake lever is swung to the left to stopping position, the bell crank lever 54 is released by the link 60 and the spring 59 acts to rock the bell crank lever and draw the lower end of the lever 49 forward and thus the brake band 45 against the brake wheel 44 to apply the brake and stop the loom.

The operation of disconnecting the power from the loom or of disconnecting the driven element from the loom shaft by disengaging the clutch elements and of stopping the loom by the application of the brake is performed in this invention by a single knock-off device and this knock-off device is moved to effect this operation by

failure either of filling, or failure of warp, or failure of the shuttle to box properly. The knock-off device is here shown as a lever 66 fulcrumed at 67 on the loom frame adjacent the breast beam. The fulcrum axis of this lever, as shown, extends parallel with the main shaft. The lower arm of this lever is extended forward at 68 and rests directly beneath a cam-shaped projection 69 extending laterally from the shipper lever when the shipper lever is in running position and is so arranged that whenever the knock-off lever is swung counter-clockwise, it will cam the shipper lever sufficiently to the left to initiate the disengagement of the clutch members, whereupon the springs 42 will act to complete the movement of the shipper lever to stopping position. As the brake lever is connected to the shipper lever at this time, it will also swing therewith to the brake applying position.

This rocking movement of the knock-off lever is given by failure of the filling, or failure of the warp, or failure of the shuttle to box properly. The first of these results is secured because the upper arm 70 of the knock-off lever extends directly behind the arm 71 of a transmitting lever fulcrumed at 72 on the breast beam and having its other arm 73 located directly in front of the filling fork slide 10. Consequently when the filling fork slide is moved forward upon failure of filling, the knock-off lever is actuated as required. The second of these results is secured by pivotally connecting the transmitter 11 already described of the warp stop motion at its forward end at 74 to the upper end of the knock-off lever. Consequently when a warp fails and the dog 18 is raised and is caught by the bunter 19 upon backward movement of the lay, the transmitter is carried back to give the required rocking movement to the knock-off lever. The third result is secured by providing the frog 22 with an adjustable bunter in the form of a set screw 75, the head of which is located directly behind the lower arm of the knock-off lever. Consequently when the shuttle fails to box properly, the dagger 23 engages the frog 22 on the beat-up and moves the frog forward, imparting the required rocking movement to the knock-off lever. The knock-off lever is preferably held against rattling and lost motion by a light torsional spring 670 mounted on its fulcrum and acting to press the arm 70 lightly against the arm 71.

When the loom is stopped upon failure of the shuttle to box properly or upon "bang-off", as it is usually termed, it is desirable that the operation of the brake mechanism be initiated in advance of the operation of the knock-off mechanism. For this purpose a connection, preferably yielding, is provided from the frog 22 to the lever 49 which directly applies the brake. This connection is shown in the form of a rod 76 pivoted at its rear end to the lever 49 and at its forward end extending through a lug 77 on the frog and with a spring 78 on the rod between the lug 77 and nuts 79 threaded on the forward end of the rod. This connection is so adjusted that as the dagger 23 starts to move the frog forward, the lever 49 is rocked to initiate the application of the brake band 45 to the brake wheel 44 before the frog rocks the knock-off lever sufficiently to throw the shipper lever. The lost motion connection provided by the pin 57 and slot in the bell crank lever 54 enables this initiation of the application of the brake to take place before the brake lever is thrown to effect the application of the brake through the bell crank lever as before.

When, as is preferable, the spring 78 is employed, a further advantage is secured in that this spring acts to cushion the "bang-off" when the loom is stopped. The spring acts upon the initiation of the movement of the frog and before the completion of its movement partially to stop the loom both through its own resiliency and through the action of the brake and thus relieves the jar on the loom when the stopping of the loom is completed.

There is thus presented a simple and efficient mechanism for starting and stopping the loom which is readily, easily, and conveniently operated manually by an operator standing at the front of the loom, which is automatically operated to stop the loom through a single knock-off device actuated independently by the failure of filling, or by the failure of warp, or by the failure of the shuttle to box properly, in which the connection from the shipper controlling lever to the clutching mechanism is direct and positive, and in which the entire mechanism operates promptly and powerfully but with an expenditure of a small amount of energy either on the part of the operator or on the part of the automatic mechanisms employed.

Having thus described the invention, what is claimed as new, and desired to be secured by Letters Patent, is:

1. A loom comprising shipper mechanism for connecting and disconnecting power to the loom, brake mechanism for stopping the loom, a knock-off device movable to operate the shipper and brake mechanisms to disconnect the power and stop the loom, and separate means for thus moving the knock-off device actuated upon failure of filling, or failure of warp or failure of the shuttle to box properly.

2. A loom comprising the construction defined in claim 1, together with means for initiating the operation of the brake mechanism in advance of a movement of the knock-off device occasioned by the failure of the shuttle to box properly.

3. A loom comprising shipper mechanism

for connecting and disconnecting power to the loom, brake mechanism for stopping the loom, a knock-off device movable to operate the shipper and brake mechanisms to disconnect the power and stop the loom, a frog moved upon the failure of the shuttle to box properly, a device moved upon failure of filling, and a device moved upon failure of warp, any one of said last three elements acting when thus moved to move the knock-off device to stop the loom.

4. A loom comprising the construction defined in claim 3, together with a connection from the frog to the brake mechanism acting to initiate the operation of the brake mechanism through a movement of the frog prior to its movement of the knock-off device.

5. A loom comprising the construction defined in claim 3, together with a yielding cushioning connection from the frog to the brake mechanism acting to initiate the operation of the brake mechanism through a movement of the frog prior to its movement of the knock-off device and to relieve the jar upon bang-off.

6. A loom comprising shipper mechanism for connecting and disconnecting power to the loom, brake mechanism for stopping the loom, brake controlling and shipper controlling levers fulcrumed at the front of the loom frame, means for causing the shipper lever when swung to stopping position to swing the brake lever to stopping position, a knock-off lever fulcrumed on the loom frame and acting when rocked in one direction to swing the shipper lever to stopping position, and means for thus rocking the knock-off lever actuated by failure of filling, or failure of warp or failure of the shuttle to box properly.

7. A loom comprising the construction defined in claim 6, together with means for initiating the operation of the brake mechanism in advance of a rocking movement of the knock-off lever occasioned by the failure of the shuttle to box properly.

8. A loom comprising shipper mechanism for connecting and disconnecting power to the loom, brake mechanism for stopping the loom, brake controlling and shipper controlling levers fulcrumed at the front of the loom frame to swing parallel with the breast beam, means for causing the shipper lever when swung to stopping position to swing the brake lever to stopping position, a knock-off lever fulcrumed on the loom frame and acting when rocked in one direction to swing the shipper lever to stopping position, and means for thus rocking the knock-off lever actuated by failure or filling, or failure of warp or failure of the shuttle to box properly.

9. A loom comprising a shaft, a driven element, a clutch for connecting and disconnecting the driven element and shaft, a shipper lever, a lever directly connecting the shipper lever and clutch whereby the movement of the shipper lever is directly transmitted to the clutch to effect its connecting and disconnecting movements, and means independent of the fulcrum of the said connecting lever for supporting the weight of the said connecting lever thus to release the shipper lever of said weight.

10. A loom comprising a shaft, a driven element, a clutch for connecting and disconnecting the driven element and shaft, a shipper lever, a lever directly connecting the shipper lever and clutch whereby the movement of the shipper lever is directly transmitted to the clutch to effect its connecting and disconnecting movements, a bracket on the loom frame extending beneath and supporting one arm of said connecting lever to relieve the shipper lever of the weight thereof.

11. A loom comprising shipper mechanism for connecting and disconnecting power to the loom, brake mechanism for stopping the loom and a knock-off device actuated upon failure of filling, or failure of warp or failure of the shuttle to box properly and acting when thus actuated to operate the shipper and brake mechanisms to disconnect the power and stop the loom.

In testimony whereof, I have signed my name to this specification.

WILLIAM SEVILLE.