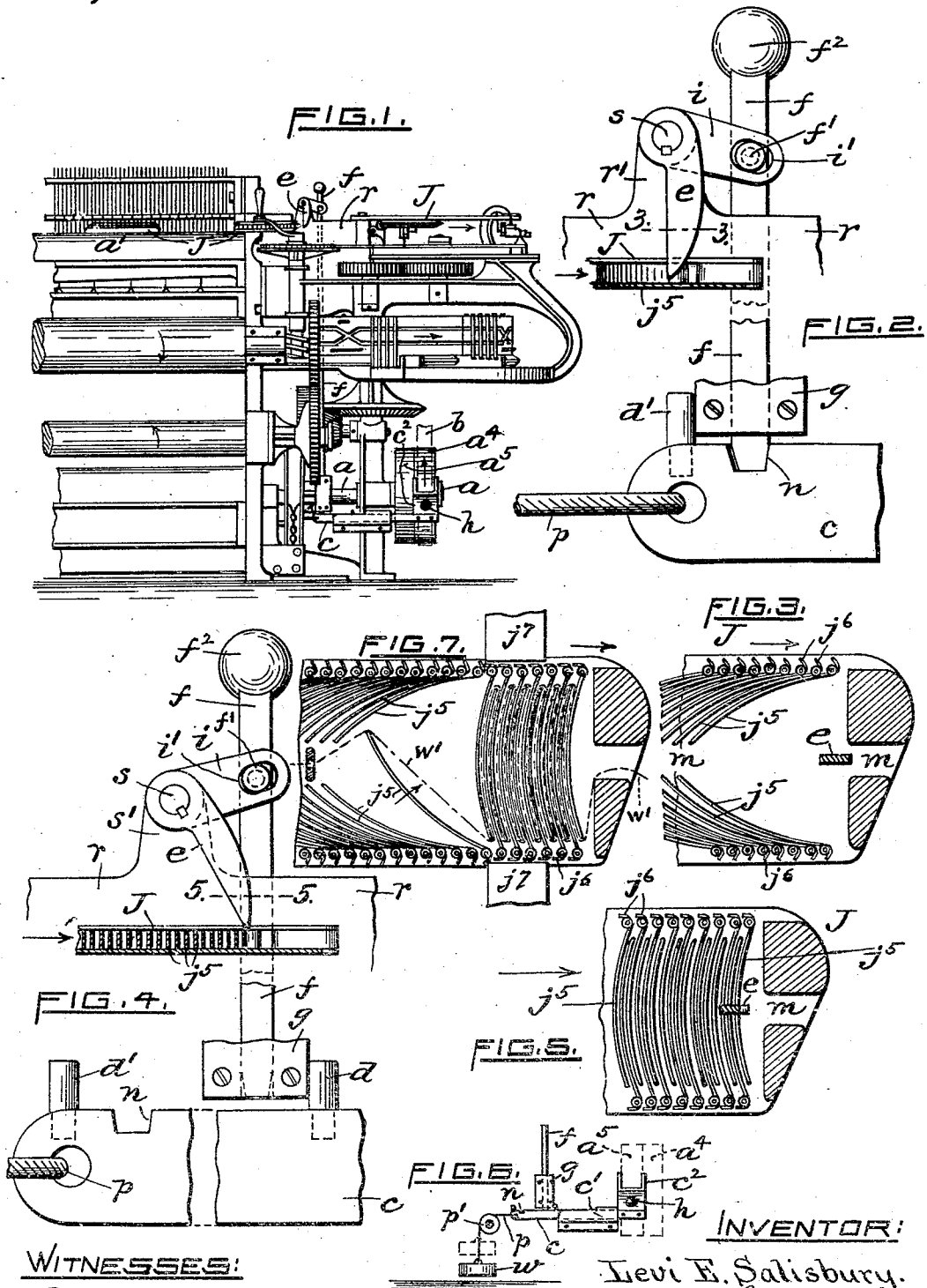


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WEFT STOP MOTION MEANS FOR LOOMS.
APPLICATION FILED MAY 10, 1909.

955,212.

Patented Apr. 19, 1910.



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WEFT-STOP-MOTION MEANS FOR LOOMS.

955,212.

Specification of Letters Patent. Patented Apr. 19, 1910.

Application filed May 10, 1909. Serial No. 495,108.

To all whom it may concern:

Be it known that I, LEVI E. SALISBURY, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Weft-Stop-Motion Means for Looms, of which the following is a specification.

The invention forming the subject of this application for Letters Patent relates to an improved automatic weft-stop-motion, so-called, for looms, and is more particularly devised and adapted to be employed in connection with the shuttle and loom patented in the United States, February 10, 1903; No. 720,181. One of the unique or novel features embodied in said patented loom is the shuttle itself; the same being so constructed and adapted that while in action it is capable of being automatically charged with a predetermined length of mechanically selected weft-yarn which is then delivered from the shuttle and beaten up into the web while the shuttle is passing between the shedded warp-yarns. It may be added that the piece of thus delivered weft-yarn constitutes one pick, the shuttle being re-charged with weft-yarn before it again enters the warps. The shuttle is positively propelled, its movements being continuous and in one direction only, therefore it is non-reciprocating.

In the present invention the stop-motion device is operatively controlled by the moving shuttle itself. That is to say, the driving-belt, or other driving means employed for actuating the loom, is rendered temporarily inoperative, thereby automatically stopping the loom in case the shuttle is working abnormally. As for example, in the event that its charge of weft-yarn becomes broken or severed before it is fully drawn off from the shuttle in the normal way, or in case the weft-yarn should be improperly charged in the shuttle or even though the weft-yarn be wholly absent from the shuttle the latter will in either instance then automatically and positively cooperate with the stop-motion device employed and stop the loom. The loom is adapted to be re-started in the usual way by simply shifting the driving-belt, in case a belt be used, from the idler or loose pulley onto the fast or driving-pulley.

In the accompanying sheet of drawings, Figure 1 represents a front side elevation

illustrating a portion of the patented loom before referred to, and also showing a weft-stop-motion device connected therewith adapted to be actuated or released by the shuttles, the several parts being shown in the normally working position. Fig. 2 is a side elevation, in enlarged scale, showing the shuttle-controlled device detached, the parts being in the normal position, corresponding with Fig. 1. Fig. 3 represents a horizontal sectional view of the front portion of the shuttle when normally working and its relation to the tripping member or dog, the latter being sectionally cut on line 3 3 of Fig. 2. Fig. 4 is a side elevation, similar to Fig. 2, the stop-motion-device, however, being shown in the tripped or released position. Fig. 5 is a horizontal sectional view of the shuttle, corresponding with Fig. 4, the tripping member itself being sectionally cut on line 5 5. Fig. 6 is a partial side elevation, in reduced scale, showing the position of the belt-shifter when the loom is stopped, and corresponding say with Fig. 4, and Fig. 7 is a horizontal plan and sectional view of the forward portion of the shuttle showing the manner of charging it with the weft-yarn.

I would state here that the loom in its entirety as well as in detail, and including the manner of operation of its several devices, except as to the present invention, are fully set forth in my said Patent No. 720,181, and to which latter reference may be made if deemed necessary. In the said patented loom the shuttles J are spaced apart at fixed intervals and are positively propelled by an endless chain driven continuously in one direction, means being provided for automatically charging the shuttles in a successive manner with a length of mechanically selected weft-yarn drawn from conveniently located large stationary spools or cops. The piece of weft-yarn, w^1 , with which the traveling shuttle is charged constitutes one pick and is infolded by and between a plurality of yarn-engaging arms or pivoted levers j^5 adapted to be closed in an alternate manner by means of the engagement of the tail portions j^6 of said levers with positioned stationary cams j^7 . See Fig. 7.

The harnesses are constructed, timed and actuated to shed the warp-yarns in a processional manner concurrently with the movement of the immediately following

shuttle. When the shuttle enters the warps the free trailing end of the weft-yarn is secured therein. While the weft is being delivered or drawn from the shuttle the reed members or dents beat up the thus-laid weft into the fabric progressively in a wave-like manner. When the loom is normally working the shuttles successively emerge from the warps empty, the said arms meanwhile having been swung rearwardly or opened solely by the action of the delivered weft, thereby producing an open unobstructed free central passage throughout the length of the shuttle on top. While in this condition the shuttle is recharged with a length of weft-yarn which in turn is interwoven into the fabric as just stated.

While various devices or mechanisms may be effectively employed in coöperation with and adapted to be operatively controlled by my improved shuttle upon its engagement with an element of the said devices or mechanism for automatically stopping the loom, I have produced the device illustrated herewith as typifying means well adapted for the purpose, and I therefore do not desire to limit the invention to the particular construction and arrangement shown.

The following is a more detailed description of the shuttle and the stop-motion means controlled by it: It may be added in advance, however, that the stop-motion device is represented in Fig. 1 as being located at the driving end of the loom and comparatively near the end of the breast-beam a^1 , thereby permitting the shuttle to deliver its yarn or pick in a normal manner before it arrives at the point where the stop-action takes place.

The shuttles J are suitably supported and adapted to be propelled, as before stated. The arms j^5 of the shuttle when properly charged with the piece of weft-yarn and before the shuttle passes from the warps appear substantially as represented in Fig. 5, wherein they are shown closed or infolded in an alternate manner, the yarn itself, however, is omitted from said figure. In normal action the yarn is completely discharged or drawn from the shuttle when it leaves the corresponding marginal or end warps, the position of its arms then being open or swung rearwardly and forming a clear longitudinal passage m between the adjacent inner ends, substantially as indicated in Fig. 3. In case the shuttle fails to become charged with the weft-yarn while its arms are being closed in the normal way, or in case it becomes charged and the yarn therein breaks before it is wholly drawn from the shuttle, or even if the yarn breaks while the shuttle is being charged, the shuttle then passes from the warps with more or less of its arms swung inwardly thereby preventing the formation of the open passage m .

When the arms are closed it is impossible to open them from the front end of the shuttle, although they freely swing backward alternately from side to side in a successive order from its rear end by means of the slight tension given to the yarn by the traveling shuttle thus producing the open way m .

As drawn, the main driving-shaft a of the loom is provided with fixed and loose pulleys, a^4 , a^5 , respectively. A forked shipper-arm c^2 is secured to a horizontal bar c (Fig. 6) mounted to slide endwise in a bearing c^1 , the degree of movement obviously being such that will permit the driving-belt b to be shifted from the driving end onto the idler pulley. To the opposite end of the bar is attached a flexible connection p which passes over a guide-roll p^1 and carries a suitable weight w at its lower end. Stop-pins, d d^1 , may be fixed in the bar for limiting the latter's movement.

A portion r of the end frame of the loom has an upward extension or bracket r^1 adapted to form a bearing for the shaft s , the latter having a lever i secured to its rear end provided with an elongated opening i^1 at its outer end. The shaft s has a short downwardly extending tripping-arm or dog e secured to its front end, as clearly shown. The arm is located and positioned in the path of the shuttle and centrally of the space m , its lower end normally extending nearly to the bottom of the shuttle, as shown in Fig. 2. A comparatively long vertically movable light rod f is located at the rear of the lever i and is connected to the latter by means of the forwardly projecting stud or pin f^1 mounted in the opening i^1 . The lower end of said rod is adapted to freely enter the notch n formed in the upper edge of the bar c thereby locking the parts together. A bearing g supports and guides this portion of the rod; the sides of the bearing may serve in connection with said stop-pins to limit the bar's movements. See Figs. 2 and 4. In order to insure the locking together of its members f and c when the notch of the latter registers with the end of the rod after the shuttle has been advanced beyond the rod its upper end may be provided with a weight or ball f^2 , the same also serving as a handle when the device is actuated manually.

It may be added that Fig. 2 shows the position of the members when the loom is working normally, the shuttles then traveling in succession past the vertical dog e . Said figure also shows the rear stop d^1 bearing against the adjacent side of the bearing g . In the event that some or all of the arms of the traveling shuttle are in an abnormal or closed position the latter upon engaging the dog e causes it to swing upward, see Fig. 4, thereby also moving the lever i a corresponding angular distance and through the medium of the pin f^1 of rod f elevating the

latter and withdrawing it from the notch *n* of the shipper-bar, at which instant the weight attached to the thus freed bar operates in falling to forcibly retract the latter and its arm *c*² to shift the belt from the driving onto the loose pulley and stop the loom. In order to restart the loom the attendant simply forces the bar outward to the position shown in Figs. 1 and 2 until the rod drops into its notch. A handle *h*, indicated in Fig. 6, may be secured to the bar and employed to facilitate the belt-shipping operation.

With the construction above described it will be seen that whenever the shuttle has not been fully discharged of its length of weft-yarn when it passes out of the shed, and so that the yarn-engaging arms or pivoted levers have not all been fully opened by the delivery of the weft-yarn from the shuttle, the stop-motion will be automatically operated to stop the loom. This latter action is very desirable, not only because if the weft-yarn has not been properly and fully discharged there will be produced an imperfection in the woven fabric which should be corrected, but also because, if the pivoted arms of the shuttle have not thus all been fully opened by the delivery of the entire length of weft-yarn, said arms cannot be otherwise opened while the loom is running. In case said pivoted arms are not thus opened there is danger that as the shuttle travels around either the shuttle itself or some part of the mechanism which operates in connection therewith will be damaged. Moreover, in such case the shuttle in its travel when next approaching its charging point, would fail to be charged with another length of weft-yarn. It will be further understood that as the pivoted arms of the shuttle are positively closed by the action of cams, *j*⁷, as the shuttle travels along, said arms will be closed as the shuttle passes said cams irrespective of whether any weft-yarn is engaged thereby or not. Consequently if the stop-motion mechanism were not present to prevent it, there would be the same liability of injury to the shuttle or to the loom mechanism which coöperates therewith when no weft-yarn is engaged by the shuttle as when said shuttle is either improperly charged or improperly discharged.

As the pull of the yarn upon the pivoted arms, as the weft-yarn is being delivered from the shuttle, is the only thing which serves to open said arms it will be understood that if no weft-yarn is taken up by the shuttle the pivoted arms will not be opened as the shuttle travels through the shed. So also if the weft-yarn becomes broken either during the operation of charging the shuttle or during the operation of being discharged from the shuttle, the shuttle will in either case fail to become discharged of such

portion of the weft-yarn as may remain therein, and so that the corresponding portion of the pivoted arms will likewise fail to be opened.

What I claim as my invention and desire to secure by United States Letters Patent is:—

1. In a loom provided with means for driving the same, a traveling shuttle capable of being charged with a length of weft-yarn while the shuttle is in motion, and a device operatively controlled by the shuttle to stop the loom in case the shuttle fails to become charged or is imperfectly charged with the weft-yarn, or in case the yarn is imperfectly discharged from the shuttle.

2. In a loom having suitable main driving means and stop-motion mechanism connected therewith, a shuttle capable of being charged while in motion with a predetermined length of weft-yarn and adapted to engage an element of the stop-motion mechanism for stopping the loom if the shuttle is imperfectly charged.

3. In a loom having main driving means and a device for stopping the loom, the combination therewith of a traveling shuttle constructed and arranged to be charged while in action with a length of weft-yarn for producing a single pick, and having the shuttle adapted to engage and actuate an element of the stop-motion device and stop the loom in case the shuttle is working abnormally.

4. In a loom, the combination, with a shuttle capable of being charged with a length of weft-yarn, of a device operatively controlled by said shuttle to stop the loom in case the weft-yarn with which the shuttle is charged is not properly delivered therefrom.

5. In a loom, the combination, with a shuttle capable of being charged with a length of weft-yarn, of a device operatively controlled by said shuttle to stop the loom in case the weft-yarn with which the shuttle is charged is not fully delivered therefrom when the shuttle has passed through the shed.

6. In a loom, the combination, with a shuttle capable of being charged with a length of weft-yarn, of a device operatively controlled by said shuttle to stop the loom in case the shuttle fails to become charged with such weft-yarn.

7. In a loom, the combination of a shuttle provided with devices adapted to be moved to engage a length of weft-yarn and also adapted to be moved to release said weft-yarn by the pull of said weft-yarn thereon, and a device adapted to be operated by said yarn-engaging devices to stop the loom in case said yarn-engaging devices have not been moved to releasing position.

8. In a loom, the combination of a shuttle provided with devices adapted to engage a length of weft-yarn, cams arranged to operate said devices to engage said weft-yarn, said yarn-engaging devices being adapted to be released by the pull of the weft-yarn thereon, and a device adapted to be operated by said yarn-engaging devices to stop the loom in case said yarn-engaging devices have not been moved to releasing position.

9. In a loom provided with a stop-motion device, the combination therewith of a shuttle having a plurality of pivoted arms adapted when some or all of the arms are closed to actuate an element of said stop-

motion device to stop the loom, and means for causing the shuttle to travel.

10. In a loom, the combination of a shuttle having a plurality of pivoted arms, means for moving the shuttle, and a stop-motion device having a member thereof located in the path of said shuttle to be engaged and actuated by said arms to stop the loom in case the arms are closed.

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

LEVI E. SALISBURY.

Witnesses:

GEO. H. REMINGTON,

EDWARD E. FITZ.