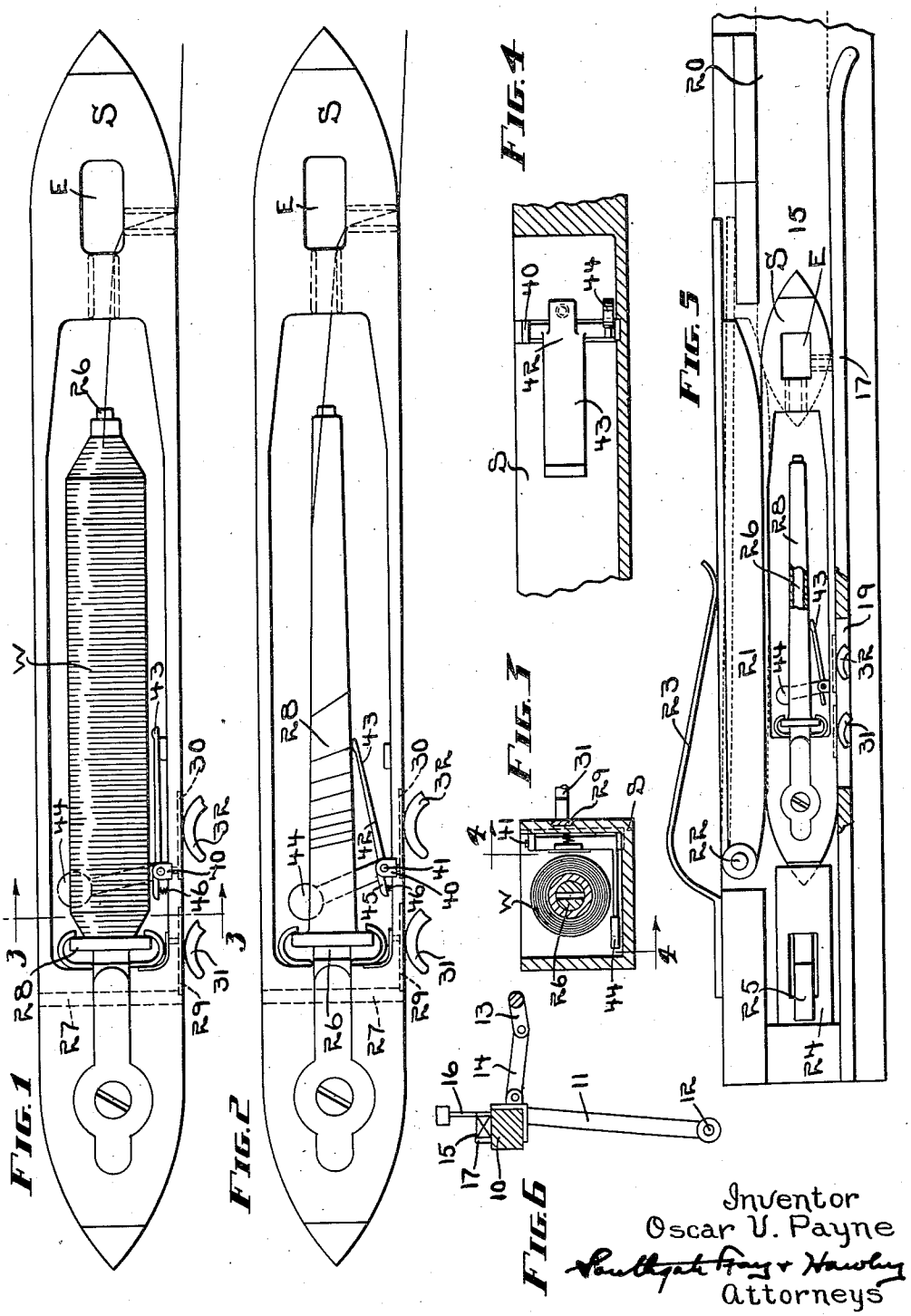
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INERTIA ACTUATED WEFT DETECTOR

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INERTIA ACTUATED WEFT DETECTOR

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This invention relates to improvements in weft detectors for looms and it is the general object of the invention to provide a detector of this type which shall be rendered operative by the momentum of a weighted part.

In the ordinary fly shuttle loom the shuttle moves back and forth across the lay and comes to rest after each flight through the shed of warp threads. The stopping is usually abrupt and it is another object of my invention to make use of this fact by providing a detector having a weight which tends to continue moving after the shuttle stops and at weft exhaustion to bring about closure of an electric circuit within the shuttle.

The lay of the usual loom moves forwardly after or during the boxing of the shuttle and comes to rest at front center when the filling is beaten into the fell of the cloth. A mass suspended to move freely with respect to the lay will tend to move forwardly as the lay reaches front center, and it is a further object of my invention to provide a detector which will make use of this tendency to continue or maintain closure of the circuit which is made when the shuttle is boxed. In this way ample time is afforded for the action of electro-magnetic devices which control the loom. As shown herein I provide a weighted mass which is disposed diagonally with respect to its pivot, so that it may tend to move by momentum along a curved line having components of which at any point within the range of movement of the weighted mass will be parallel to and also transverse of the lay. In this way a single weighted mass can be made to respond to both the shuttle and lay induced tendencies to continue motion already described.

It is another object of the invention to provide an inertia actuated detector having an indicator to initiate loom change and then return automatically to normal non-indicating position. In this way, the weaver is relieved of any necessity for resetting the indicator when replenishing the weft.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth in the claims.

In the accompanying drawing, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a top plan view of a shuttle made according to my present invention with a full supply of weft shown therein,

Fig. 2 is a view similar to Fig. 1 but with the weft depleted and the detector moved to indicating position,

Fig. 3 is a vertical transverse section on line 3—3 of Fig. 1,

Fig. 4 is a detailed vertical longitudinal section on line 4—4 of Fig. 3,

Fig. 5 is a top plan view of a shuttle box and lay and assembly showing the relation of my shuttle and detector to these parts, and

Fig. 6 is a diagrammatic view showing the lay and drive therefor.

Referring to Fig. 6, I have shown a lay 10 mounted on lay swords 11 which move about an axis 12 at the bottom of the loom. A crank shaft 13 may rotate once for each pick of the loom and is attached to crank connectors 14 the forward ends of which are pivoted to the lay 10. The lay supports a shuttle box 15, reed 16, and a box front 17. As the shaft rotates the lay will be swung back and forth, moving about axis 12 as a pivot. Uniform rotation of the shaft 13 will cause the lay to move most rapidly when it is at an intermediate point between its extreme back and forth positions. For this reason the momentum is at a maximum before the lay reaches front position, the lay retarding after reaching this maximum momentum.

Fig. 5 shows in greater detail the box 15 which has a box front 17 secured to the lay beam and provided with a feeler slot 19. The box mouth 20 is located adjacent the inner end of the box, while the binder 21 is pivoted, as at 22, adjacent the other end of the box. The binder spring 23 secured to the lay bears against the binder and serves to push the same against the shuttle S. The picker 24 may be actuated in the usual manner by picker stick 25.

The shuttle may have any form of eye E and preferably has a spindle 26 pivoted thereto about a pivot pin 27. This spindle has mounted thereon a metallic cop or quill 28 having a mass of weft W. The shuttle may have two spaced electric contact plates 29 and 30, respectively, which are positioned for engagement with resilient brushes 31 and 32, respectively. These brushes may be connected to an external circuit not shown which when closed brings about a change in the operation of the loom, such for instance, as stoppage or replenishment.

The matter thus far described forms no part of my present invention and may be made in the usual manner.

In carrying my invention into effect I provide a small bracket 40 having a vertical pivot pin 41 on which is mounted a detector lever 42. The lever has a long, thin and light yarn engaging arm 43, and has a second much heavier and weighted arm 44. The latter extends transversely of the shuttle, substantially as indicated in Figs. 1 and 2. A finger 45 on the lever is pressed by a light compression spring 46 sufficiently delicate to be overcome readily by the weighted arm 44 when the latter tends to move because of its momentum.

The bracket 40 is in electrical connection with the contact plate 30, while the other contact plate

is in electrical connection with the spindle 26. Electric connection between the quill 28 and the metallic lever 42 will therefore result in closure of the aforesaid circuit, not shown herein, to effect a change in the operation of the loom.

In operation, as the shuttle is boxed on that side of the loom where the brushes or contacts are located it will strike the binder 21 and have its speed slackened. When in the position shown in dotted lines in Fig. 5, for instance, the shuttle will be travelling with no resistance offered by the binder, but as it enters the box its speed will be slackened and the weighted arm 44 will tend to move ahead by reason of its momentum, that is, it will tend to turn in a counter-clockwise or left hand direction as viewed in Fig. 2. The light arm 43 will therefore be forced against the weft and if sufficient of the latter be present the lever will not be permitted to have contact with the quill 28. As substantial exhaustion approaches, however, enough of the surface of the quill will be uncovered so that the arm 43 can have contact therewith as the shuttle is boxed. The plates 29 and 30 will therefore be electrically connected, and current can flow from brush 32, through plate 30, bracket 40, pin 41, arm 43, quill 28, spindle 26 to the other plate 29 and brush 31. The electrical connection of the two brushes will result in a change in the operation of the loom as indicated hereinbefore.

It is to be understood that the shuttle is boxed while the lay is moving forwardly with the crank connectors 14 in a relatively low position, and this is the time in the cycle of the loom when the lay is moving faster. Continued forward movement of the lay is accompanied by a retardation the effect of which is to tend to hold the arm 43 against the weft or the quill because of the momentum of the weighted arm 44. An inspection of Fig. 2 will show that the diagonal disposition of the weighted arm 44 with respect to the pivot pin 41 will make the lever 42 responsive to inertia effects due to the slackening of the speed of the shuttle along the path parallel to its length and also to a slackening of the forward movement of the shuttle due to retardation of the lay. The detector is therefore held against the yarn or the quill during a portion of the forward movement of the lay sufficiently long to give the electro-magnetic devices time to be properly set.

It is to be understood that the shuttle will not be boxed instantly but will require an appreciable length of time to travel along the binder, and the tendency of the weighted arm 44 to compress the light spring therefore continues throughout the boxing of the shuttle. The previously described circuit through the shuttle can therefore be closed while the shuttle is moving along the binder, thus giving sufficient time for the operation of devices as already described. The plates on the shuttle may be of any desired length to permit establishment of the circuit while the shuttle is moving in the box.

From the foregoing it will be seen that I have provided a simple form of detector which closes an electric contact by a force derived from the momentum of a part mounted movably with respect to the shuttle. The circuit may be closed during the movement of the shuttle into the box due to momentum derived from the shuttle, and may be maintained closed during subsequent forward movement of the lay due to momentum resulting from the deceleration of the lay. It will also be seen that the detector arm 43 which gives the indication of weft exhaustion returns to normal non-indicating position automatically by the action of spring 46, after the shuttle comes to rest. The weaver need not have the care, therefore, of resetting the detector when replenishing the weft.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In weft detecting mechanism for a loom, a shuttle movable back and forth in the loom and coming to rest abruptly at the end of each flight, a metallic weft carrier having a mass of non-conducting weft thereon, an electric detector, and a weighted mass operatively connected to the detector and movable by reason of the momentum thereof when the shuttle is brought to rest to move the detector toward the weft and carrier, electric engagement of the detector effective to cause a change in loom operation by a current flowing through the metallic weft carrier.

2. In weft detecting mechanism for a loom having a lay movable back and forth therein and along which a shuttle moves and is brought to rest abruptly, a weft detector to engage a surface to be detected within the shuttle, and a weighted mass operatively connected to the detector and effective by reason of the position and momentum thereof when the shuttle is boxed and due also to slackening motion of the lay as the latter approaches its forward position to move and maintain the detector against the surface to be detected.

3. In weft detecting mechanism for a loom having a lay movable back and forth therein and along which a shuttle moves and is brought abruptly to rest, a weft detector supported by and movable with respect to the shuttle and responsive to a force exerted by the momentum of said detector when the shuttle is boxed and responsive also to a force exerted due to slackening motion of the lay as the latter approaches its forward position to move and maintain said detector in detecting position.

4. In weft detecting mechanism for a loom having a lay movable back and forth therein and along which a shuttle moves and is brought abruptly to rest, a detector element pivoted to the shuttle and having a detector arm and a weighted arm oblique with respect to the axis of the shuttle, the weighted arm due to the momentum thereof as the shuttle is boxed and the lay motion is slackened tending to move and maintain the detector arm in detecting position during forward motion of the lay.

5. In weft detecting mechanism for a loom having a lay movable back and forth therein and along which a shuttle moves and is brought abruptly to rest, a detector member pivoted to the shuttle and having a detector arm and a weighted arm extending obliquely with respect to the axis of the shuttle, said weighted arm being effective due to momentum thereof when the shuttle speed is slackened to move the detector arm to detecting position, and said weighted arm due to its oblique position and momentum because of slackening speed of the lay tending to maintain the detector arm in detecting position.

OSCAR V. PAYNE.