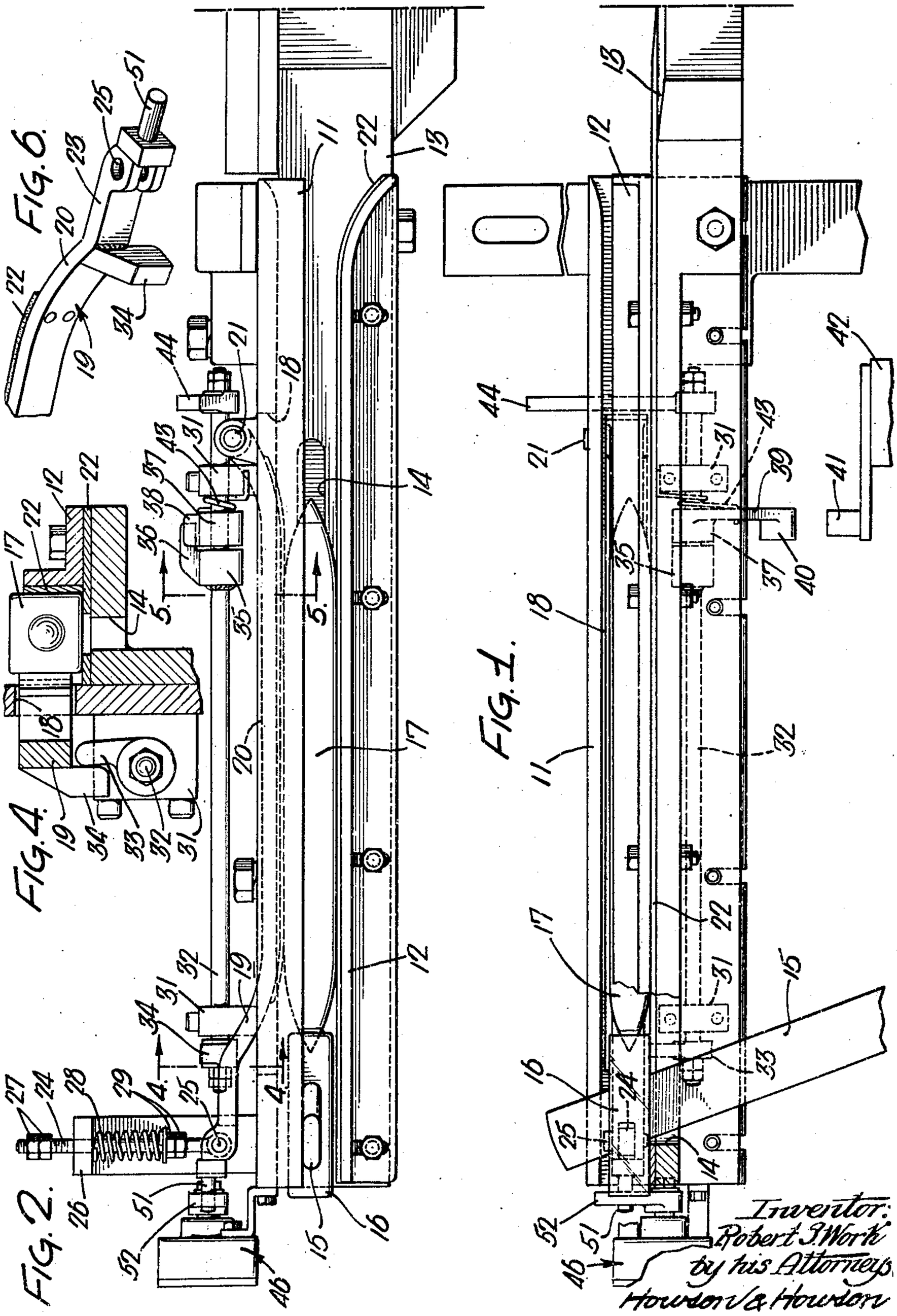
June 7, 1955 R. S. WORK 2,710,030

SHUTTLE BOX CONTROL MECHANISM

Filed Dec. 11, 1952 2 Sheets-Sheet 1



June 7, 1955 R. S. WORK 2,710,030

SHUTTLE BOX CONTROL MECHANISM

Filed Dec. 11, 1952 2 Sheets-Sheet 2

FIG. 5.

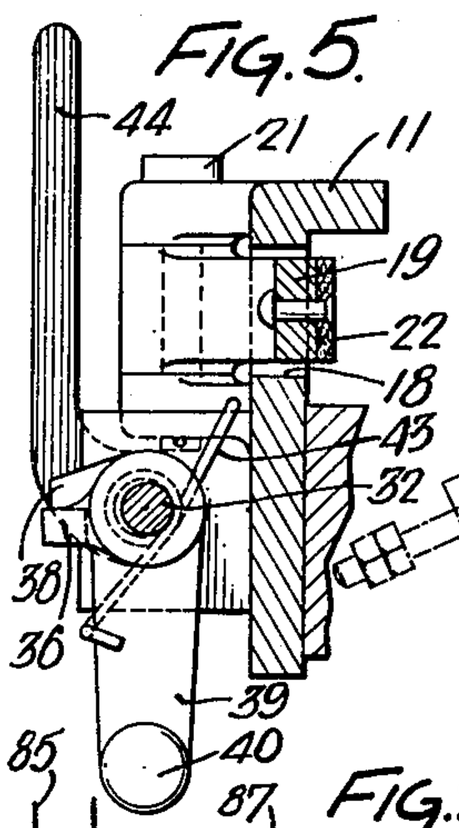


FIG. 3.

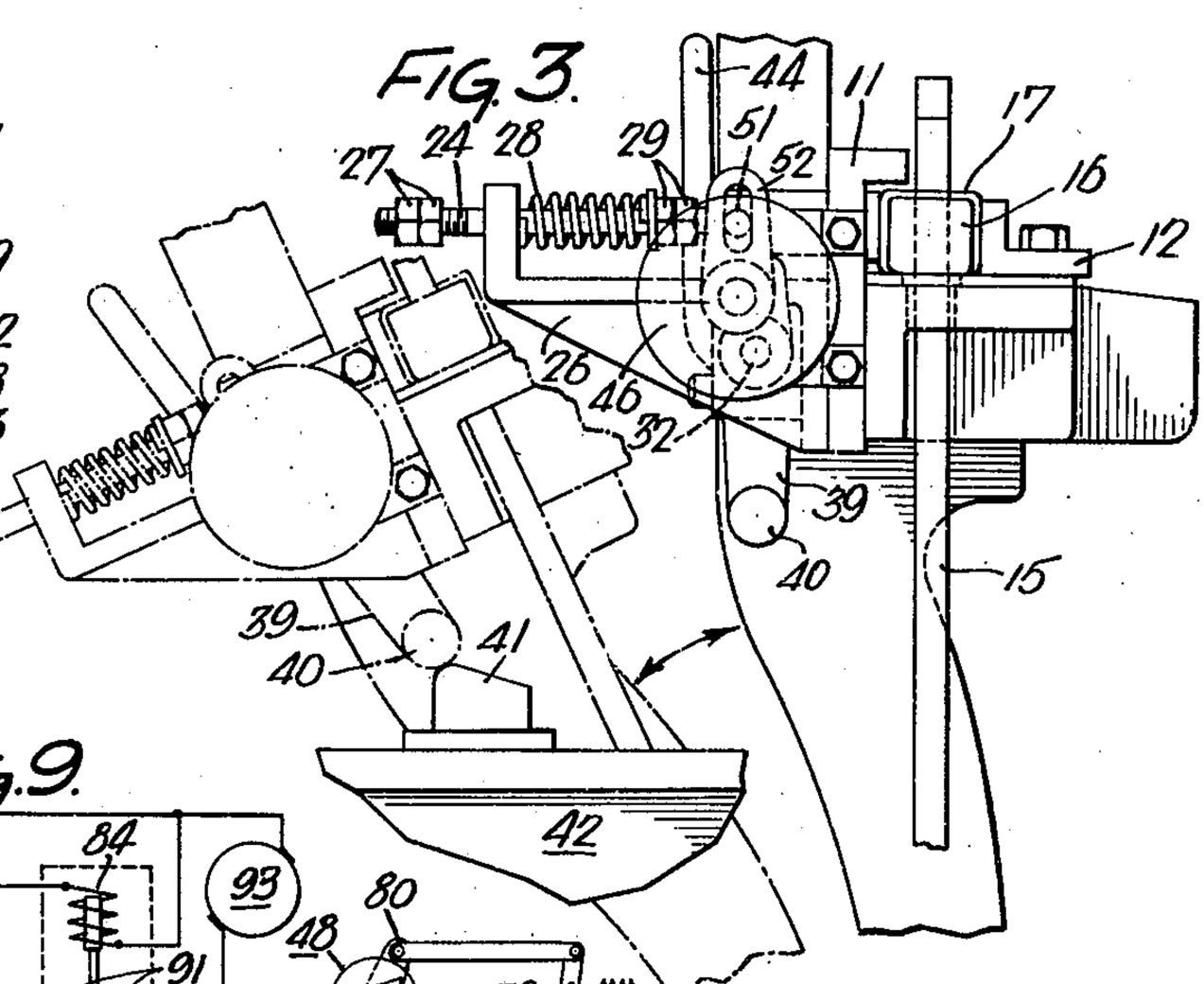


FIG. 9.

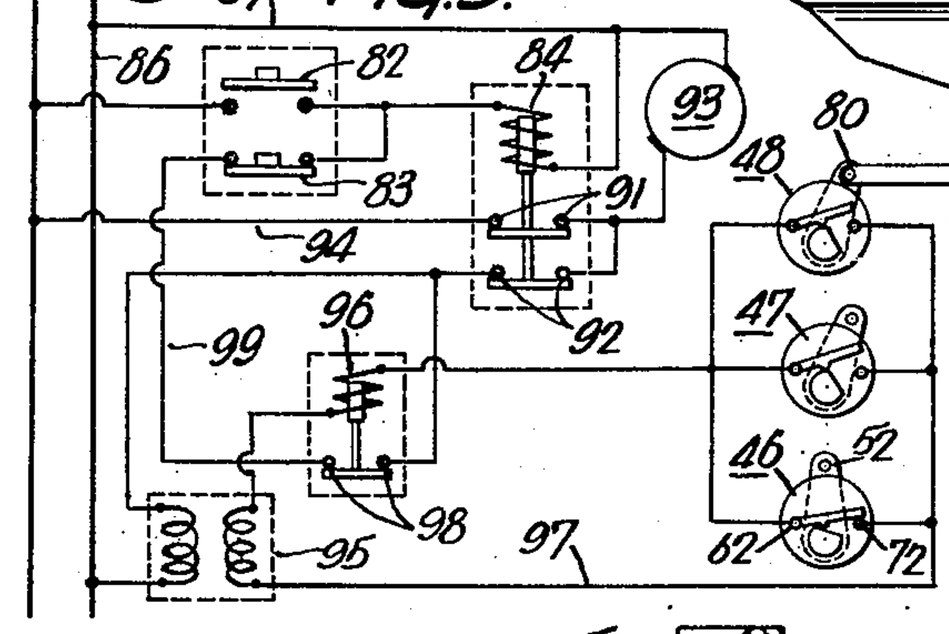


FIG. 8.

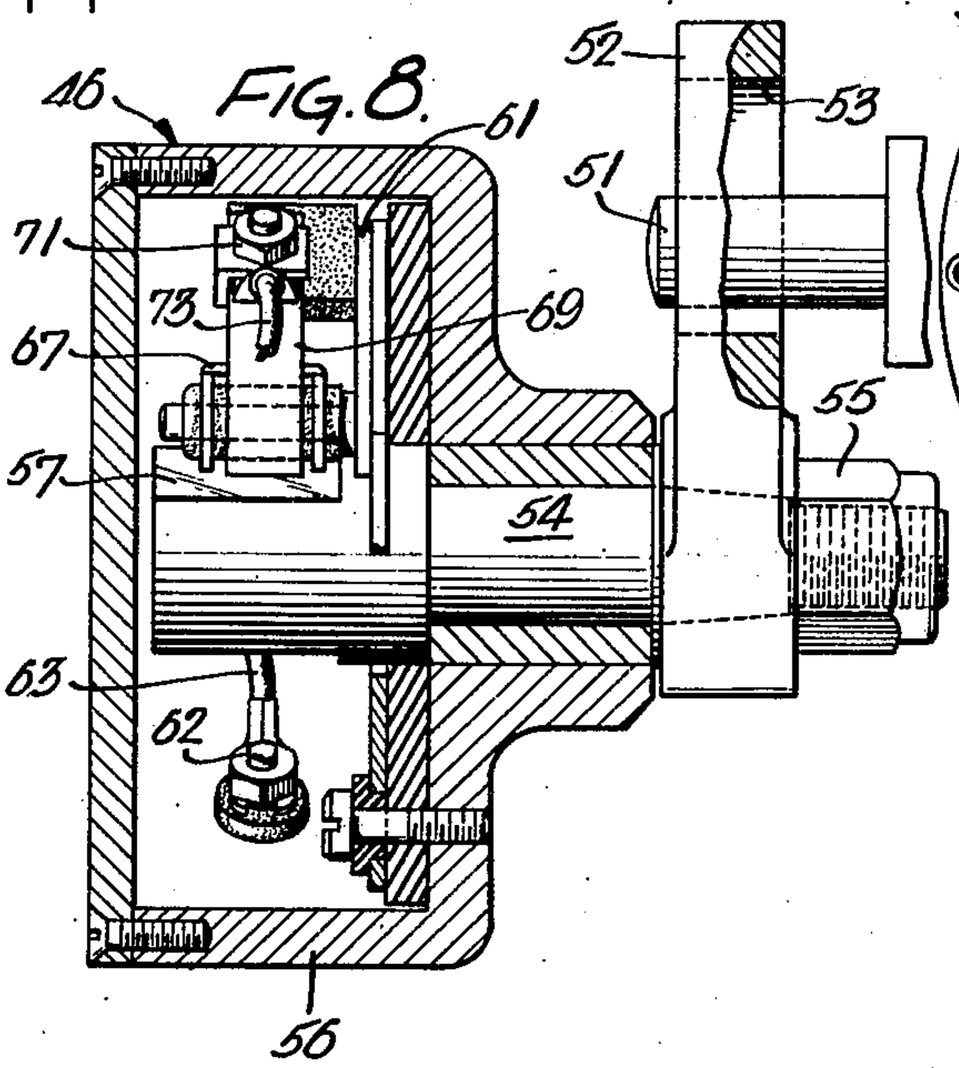
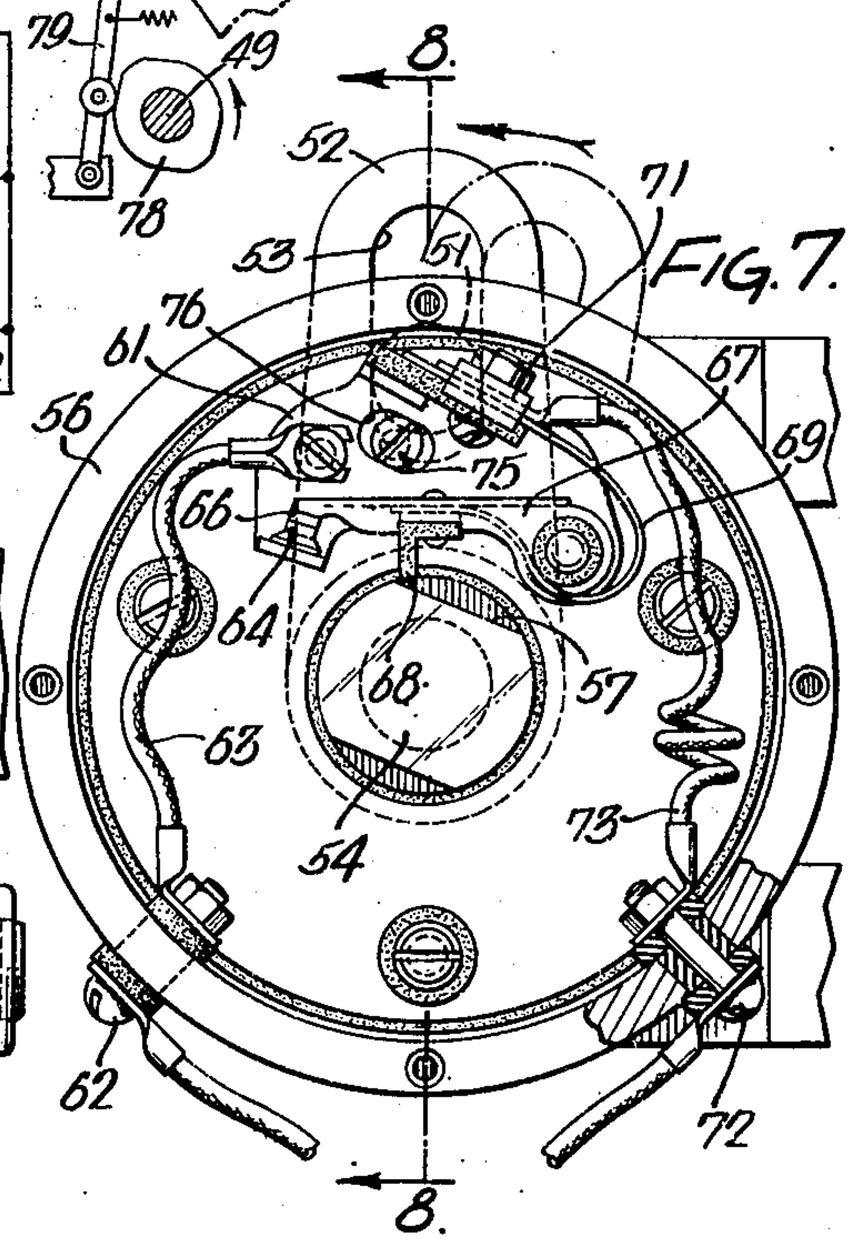


FIG. 7.



Inventor:
Robert S. Work
by his Attorneys
Howson & Howson

United States Patent Office

2,710,030

Patented June 7, 1955

2,710,030

SHUTTLE BOX CONTROL MECHANISM

Robert S. Work, Kennett Square, Pa., assignor to Lansdowne Steel and Iron Company, Morton, Pa., a corporation of Pennsylvania

Application December 11, 1952, Serial No. 325,313

15 Claims. (Cl. 139—187)

The present invention relates to shuttle boxes for looms and has particular application to carpet looms wherein the shuttle is snubbed in the shuttle box by a swell.

In looms having conventional shuttle boxes of this character, the speed of operation must be relatively slow because the retarding action of the swell on the shuttle as the latter is being picked reduces the force available for traversing the shuttle and, consequently, the traverse of the shuttle through the shed is proportionately slowed. In addition, at high speeds, the shuttle is highly susceptible to deflection from its normal path, for example, by the interference by broken or slack ends in the path of the shuttle. The displacement from the normal path causes the shuttle to enter the box at an angle and not infrequently deflects the swell beyond its normal operating range. Looms ordinarily are provided with a limit switch operable by the swell to indicate the presence of the shuttle in the shuttle box. When the shuttle deflects the swell beyond its normal operating range, it frequently occurs that the limit switch is damaged and must be replaced or repaired before the loom can proceed in operation.

With the foregoing in mind, a primary object of the present invention is to provide an improved shuttle box construction which makes possible relatively high speed of operation of the shuttle and consequently of the loom.

More specifically, the invention contemplates a novel swell release mechanism which is operable to eliminate the retarding action of the swell as the shuttle is being picked.

A further important object is to provide a novel switch mechanism which will remain operative and undamaged when the swell is displaced beyond its normal operating range.

These and other objects of the invention and the various features and details of the construction and operation thereof are more fully set forth hereinafter with reference to the accompanying drawings, in which:

Fig. 1 is a front elevational view of an improved shuttle box made in accordance with the present invention as applied to the left hand side of a loom;

Fig. 2 is a top plan view of the shuttle box illustrated in Fig. 1;

Fig. 3 is a side elevational view of the improved shuttle box;

Fig. 4 is an enlarged fragmentary sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is an enlarged fragmentary sectional view taken on the line 5—5 of Fig. 2;

Fig. 6 is a fragmentary rear view in perspective of the outer end of the swell of the improved shuttle box;

Fig. 7 is a face view of an improved switch made in accordance with the present invention with the cover plate removed.

Fig. 8 is a transverse sectional view taken on the line 8—8 of Fig. 7; and

Fig. 9 is a schematic wiring diagram embodied in the present invention.

Referring now to the drawings, the illustrated shuttle box is defined by opposed wall members 11 and 12 which are adjustably secured to the lay cap 13 to insure proper seating of the shuttle on the latter. The lay cap 13 is slotted as indicated at 14 adjacent its left-hand extremity to afford penetration of a conventional picker stick 15. The picker stick 15 extends upwardly through the slot into engagement with a picker 16 which is slidably mounted in the shuttle box so as to close the end thereof. The picker stick and the picker operate in conventional manner to pick the shuttle 17 across the loom on the lay.

The wall member 11 is slotted as indicated at 18 to receive a swell 19 which is offset inwardly along its central portion 20 so as to project into the shuttle box. The swell is pivotally mounted as indicated at 21 on the wall member 11 adjacent the open end of the shuttle box for inward pivotal movement through the slot 18. The swell 19, the front wall 12, and the upper surface of the lay cap 13 are preferably lined as indicated at 22 with a synthetic plastic material such as laminated fabric impregnated with a phenolic resin.

The swell extends longitudinally interiorly of the shuttle box from the pivot 21 at the open end thereof towards the picker in the opposite end, and the outer end of the swell terminates exteriorly the box as indicated at 23. The outer end 23 is resiliently positioned relative to the lay cap 13, by an eye bolt 24 attached to the swell as indicated at 25 and passing through an aperture in a bracket 26 secured to the bed of the lay. Positioning nuts 27 are threaded onto the eye bolt 24 at the outer extremity thereof to provide a limit stop which predetermines the ultimate interior position of the swell 19 in the shuttle box. The swell is resiliently biased to this position by a spring 28 seating at one end against the bracket 26 and at the other end against tensioning nuts 29 which are adjustable on the eye bolt 24 to predetermine the force urging the swell 19 into its ultimate interior position. In this position the interior face of the swell converges rearwardly towards the opposite side wall 12 of the shuttle box.

In the operation of the loom, after the shuttle 17 is picked out of the shuttle box, the swell 19 is pivotally displaced by the spring 28 about the pivot 21 into its ultimate interior position in the shuttle box as determined by the nuts 27 on the eye bolt 24. When the shuttle is returned to the shuttle box from a corresponding box on the right-hand side of the loom, it engages the converging central portion 20 of the swell and forces it outwardly against the bias of the spring 28 as the shuttle comes to rest against the picker 16, thereby snubbing the shuttle and preventing it from bouncing back from the picker at the end of the pick.

It should be noted that by pivoting the swell adjacent the open end of the shuttle box, the shuttle, as it comes to rest against the picker 16, is resiliently biased against the opposite wall 12 of the shuttle box by the spring-loaded swell 19. As stated above, the wall 12 is adjustably secured to the lay cap and it is thereby possible to regulate the initial path by which the shuttle leaves the shuttle box. The snubbing action on the shuttle may be accurately controlled by the positioning nuts 27 and the tensioning nuts 29 which determine respectively the normal position of the swell and the force required to displace the latter as the shuttle enters the shuttle box.

In accordance with the present invention, means is provided to release the spring bias on the swell immediately prior to each pick so that the shuttle is relatively unimpeded at the start of the pick. To this end, a swell release shaft 32 is journalled on the lay cap 13 as indicated at 31, 31 in spaced parallel relation with the shuttle box wall 11. An upwardly projecting finger 33 is secured to the left hand extremity of the shaft 32 and operates to

engage a downwardly depending lug **34** on the swell **19**. The finger **33** normally is loosely engaged against the lug **34**, and upon counterclockwise rotation of the shaft as seen in Fig. 4, the finger forcibly engages the lug to urge the swell **19** outwardly against the bias of the spring **28**.

To effect counterclockwise rotation of the shaft **32** at the start of each pick, a collar **35** is fixed to the shaft **32**, for example, by welding, and is provided with an axially extending arm **36**. A second collar **37** is rotatably mounted on the shaft **32** and is formed with a rearwardly projecting boss **38** which is operable to engage the arm **36**. A torsion spring **43** between the collar **37** and the adjacent journal **31** on the lay cap **13** reduces to a minimum the lost motion between the collar **37** and the arm **36**, the spring normally biasing the boss against the arm **36**. The collar **37** also is provided with an integral leg **39** depending downwardly from the collar and terminating at its lower extremity in a foot **40**.

With reference to Fig. 3, it will be seen that as the lay is rocked back immediately before each pick, the foot **40** engages against a fixed stop **41** on the frame **42** of the loom. The stop **41** acts through the leg **39** to effect counterclockwise rotation of the collar **37** about the shaft **32**. The rotation of the collar forcibly engages the boss **38** against the arm **36** and causes similar counterclockwise rotation of the shaft **32** in its journals **31**, **31**. The rotation of the shaft operates through the finger **33** and the lug **34** to displace the swell outwardly against the bias of the spring **28**, as described above. Thus, it is seen that as the shuttle is being picked, the swell is withdrawn from engagement therewith and does not impede the traverse of the shuttle across the loom. The above-described mechanism is simple in operation and obviates the necessity for daggers or other devices operated from the cam shaft of the loom, and therefore eliminates the previously required adjustment to coordinate the release mechanism with the picking mechanism.

In addition to the automatic release of the swell, means is provided to release the swell manually, for example, when it is desired to change the shuttle on the loom. To this end, a swell release hand lever **44** is fixed to the right-hand end of the swell release shaft **32**. Through the medium of the lever **44**, it is possible to manually rock the shaft **32** counterclockwise so as to displace the swell outwardly against the bias of the spring **28**.

The invention also contemplates means for stopping the operation of the loom if the shuttle fails to seat properly in the box. Since the swell **19** is pivoted adjacent the open end of the shuttle box, its position relative to the opposite wall **12** of the box is determined by the extent of penetration of the shuttle into the box. For example, if the shuttle **17** stops short of the picker **16** or bounces away from it, the outward displacement of the swell **19** will not be as great as when the shuttle is seated properly against the picker. The present invention, therefore, provides an improved switch **46** responsive to a predetermined displacement of the swell **19** for maintaining the loom in operation. The switch is operable as described more fully hereinafter to stop the loom if the shuttle fails to displace the swell the required distance, as when the shuttle is not properly seated against the picker. A similar switch **47** (see Fig. 9) is provided at the right-hand side of the loom for actuation by a corresponding swell when the shuttle is in the right-hand position. A third switch **48** is actuated by the cam shaft **49** of the loom, as described more fully hereinafter during traverse of the shuttle from one side of the loom to the other.

To actuate the switch **46** by the swell **19**, the latter member is provided at its outer end with an outwardly projecting pin **51**. The pin is operatively connected to the switch **46** by a crank **52** which is slotted as indicated at **53** to receive the pin **51**. The crank **53** is fixedly secured to the tapered portion of an operating shaft **54** of the switch **46** as indicated at **55**. The shaft **54** is mounted

for rotation in the switch box **56** and is formed at its interior end with a cam surface **57**, as will be described more fully hereinafter. Interiorly of the box **56**, a switch plate **61** is provided which is connected to one terminal **62** of the box by means of a flexible lead **63**. A switch point or contact **64** is formed integrally with the switch plate **61** and is electrically connected to the terminal **62** through the switch plate **61** and the lead **63**.

A second switch point or contact **66** is operable to engage the contact **64** in response to actuation of the shaft **54**. To this end, the contact **66** is formed integrally with a breaker arm **67** having a downwardly depending finger **68** which rides on the cam surface **57**. The finger **68** is resiliently held against the cam surface **57** by means of a leaf spring **69**. The spring **69** serves not only as a bias for the finger **68** but also constitutes an electrical connection between the contact **66** and an interior terminal **71** mechanically fixed to, and electrically insulated from the switch plate **61**. The terminal **71** is connected to a second outside terminal **72** of the switch box **56** by a flexible lead **73**.

In the operation of the switch, when the shaft **54** is in the illustrated position, the finger **68** registers with the low portion of the cam surface **57** and the breaker arm **67** under the bias of the spring **69** is in its lower limit position so that the switch points **66** and **64** engage and make electrical connection between the terminals **62** and **72**. When the shaft is rotated clockwise, as when the crank **52** assumes the dotted line position of Fig. 7, the high portion of the cam surface **57** engages the finger **68** and breaks contact between the points **64** and **66**. To provide for fine adjustment of the switch mechanism, the switch plate **61** is adjustably mounted in the switch box **56** by a screw **75** which is threaded into the switch box through a slotted opening **76** in the switch plate **61**. To provide for coarse adjustment of the switch mechanism, the angular position of the crank **52** is adjustable relative to the shaft **54** through the medium of the securing means **55**.

It will be seen, therefore, that when the shuttle is properly seated against the picker in the shuttle box as illustrated in Fig. 3, the swell **19** is displaced outwardly a predetermined distance. The outward displacement of the swell through the medium of the pin **51** effects rotation of the crank **52** and the shaft **54**, which in turn causes the switch mechanism to make contact between the switch points **64** and **66** respectively. Should the shuttle **17** fail to seat properly against the picker **16**, the swell will not be displaced outwardly the required distance. The pin, therefore, will not rotate the crank sufficiently to bring the lower portion of the cam under the finger **68** of the breaker arm **67**, and consequently, the switch mechanism will not make contact between the switch points **64** and **66**.

The present construction lends itself to extremely accurate control of the loom by the shuttle, since the pin **51** is at the extreme outermost end of the swell **19** and, therefore, the slightest pivotal displacement of the swell will effect a noticeable displacement of the pin **51**. If the shuttle strikes the swell so as to knock it out of its normal operating range, the crank will be rotated counterclockwise beyond the full line position of Fig. 4, but the switch mechanism will not be damaged.

As stated above, a similar switch **47** is applied to the opposite end of the loom so that when the shuttle is properly seated in the opposite end, the switch **47** makes contact. In accordance with the invention, it is necessary to maintain continuous contact in the circuit described hereinafter in connection with Fig. 9 in order to maintain the loom in operation. To this end, the third switch **48** is connected in the circuit so as to be operated by the cam shaft **49** of the loom. A cam **78** is secured to the cam shaft **49** and operates against a cam follower **79** which is connected to a crank **80** in the switch

48 corresponding to the crank 52 in the switch 46. The cam is formed to close the switch 48 during the period of a normal pick, so that if the loom is operating properly at least one of the switches 46, 47, and 48 will operate to make contact in the circuit. Should the loom operate improperly, however, so that the shuttle does not follow its normal course, the switch 48 will open to stop operation of the loom after the normal picking time has elapsed and if the shuttle is not properly seated against one of the pickers.

The electrical circuit for effecting this result is schematically illustrated in Fig. 9. The loom is provided with the usual start and stop buttons 82 and 83 respectively. The start button 82 is operable to place a motor control relay 84 across the main line which is indicated by the reference numerals 85 and 86 respectively, the circuit passing from the line 86 through the conductor 87 to the relay coil 84, and then through the closed start button 82 to the opposite side of the line 85. Energization of the relay coil 84 closes the contacts 91 and 92 respectively of the relay. The contacts 91 close a circuit to the loom motor 93, said circuit leading from one side 86 of the line, through the conductor 87, the motor 93, and the contacts 91 to the other side 85 of the line by means of a conductor 94. The other contacts 92 of the relay energize a transformer 95. The latter circuit runs from the line 86 through the primary coil of the transformer 95, and the contacts 92 and 91, to the other side 85 of the line through the conductor 94.

Energization of the transformer 95 energizes a second relay 96 when any one of the three switches 46, 47, and 48 is closed. The three switches are connected in parallel so that the closure of any one switch completes a circuit to the relay coil 96 from one side of the secondary coil of the transformer through a conductor 97 through one of the switches 46, 47, or 48, in the present instance the switch 46, through the relay coil 96 to the opposite side of the secondary coil. The transformer 95 is a step-down transformer, so that voltage across the switches 46, 47, and 48, when the latter are open is relatively low, and there is little danger of an arc being generated and starting a fire in the loom.

Energization of the relay coil 96 closes the contacts 98 to complete a holding circuit through the relay coil 84. This circuit runs from one side 86 of the line through the conductor 87, the relay coil 84, the normally closed stop button 83, a conductor 99, the relay contacts 98, the contacts 92 and 91, and the conductor 94 to the opposite side 85 of the line. Thus, it is seen that the start button needs to be depressed only until the loom motor 93 starts operation at which point the button 82 may be released and the relay 96 will maintain the loom in operation through its contacts 98.

If, during the operation, all of the switches 46, 47, and 48 are open simultaneously, the relay 96 will be de-energized to stop operation of the loom. The operator may then adjust the position of the shuttle to make sure that it is properly seated in one of the shuttle boxes. When the shuttle is properly seated against a picker, for example, the picker 16, the switch 46 will be closed and the start button 82 may again be depressed. The loom will continue operation when the button 82 is released, because of the holding circuit through the relay contacts 98 and the normally closed stop button 83. When it is desired to stop the loom, the stop button 83 is depressed to open this latter circuit, thereby de-energizing the relay 84 and causing the loom to stop operation.

While a particular embodiment of the invention has been herein illustrated and described, it is not intended to limit the invention to such disclosure, and changes and modifications may be made therein and thereto within the scope of the following claims.

I claim:

1. In a loom comprising a frame and a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, picking means to pick the shuttle from the shuttle box when said lay bed is in said rearward limit position, a swell pivoted adjacent the open end of said shuttle box having a portion offset inwardly to project into said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, means to render said resilient biasing means substantially ineffective comprising a member actuatable to engage and displace said swell outwardly of the shuttle box against the bias of said resilient means, means operable upon movement of the lay bed to said rearward limit position to actuate said member to displace the swell and thereby relieve snubbing engagement of said swell with the shuttle immediately prior to each operation of the picking means, and switch means to control operation of said picking means actuatable by said swell upon predetermined outward displacement thereof to close said switch and effect operation of the picking means.

2. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in its rearward limit position, drive means for said lay bed and said picking means including an electric circuit therefor, a swell pivoted adjacent the open end of said shuttle box having its central portion offset inwardly to project into said shuttle box and its outer end terminating exteriorly of said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, said swell being displaced outwardly a predetermined distance when the shuttle seats properly in said shuttle box, means to render said resilient biasing means substantially ineffective comprising a member operable to engage and displace said swell outwardly beyond said predetermined displacement against the bias of said resilient means, and means operable upon movement of the lay bed to said rearward limit position to actuate said member and thereby relieve snubbing engagement of said swell with said shuttle immediately prior to each picking operation, switch means to control said electric circuit, and connections between the swell and the switch operable upon outward displacement of said swell to close said switch and maintain the same closed during displacement of said swell outwardly beyond said predetermined displacement.

3. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in its rearward limit position, drive means for said lay bed and said picking means including an electric circuit therefor, a swell pivoted adjacent the open end of said shuttle box having its central portion offset inwardly to project into said shuttle box, and having its outer end terminating exteriorly of said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, said swell being displaced outwardly a predetermined distance when the shuttle seats properly in said shuttle box, means to render said resilient biasing means substantially ineffective comprising a member operable to engage and displace said swell outwardly beyond said predetermined displacement against the bias of said resilient means, and means operable upon movement of the lay bed to said rearward limit position to actuate said member and thereby relieve the snubbing engagement of said swell with said shuttle immediately prior to each pick, switch means to control said electric circuit, and connections between the swell and said switch operable upon outward displacement of said swell to close said switch and maintain the same closed during displacement of said swell beyond said pre-

determined displacement, said switch means comprising a rotary shaft operable through said connections to be rotated upon displacement of said swell, a cam surface on said shaft, and a switch arm operable by said cam surface upon predetermined displacement of said swell to close said electric circuit.

4. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in its rearward limit position, drive means for said lay bed and said picking means including an electric circuit therefor, a swell pivoted adjacent the open end of said shuttle box having its central portion offset inwardly to project into said shuttle box, and having its outer end terminating exteriorly of said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, said swell being displaced outwardly a predetermined distance when the shuttle seats properly in said shuttle box, means to render said resilient biasing means substantially ineffective comprising a member operable to engage and displace said swell outwardly beyond said predetermined displacement against the bias of said resilient means, and means operable upon movement of the lay bed to said rearward limit position to actuate said member and thereby relieve snubbing engagement of said swell with said shuttle immediately prior to each pick, switch means to control said electric circuit, connections between the swell and said switch operable upon outward displacement of said swell to close said switch and maintain the same closed during displacement of said swell beyond said predetermined displacement, said switch means comprising a rotary shaft operable through said connections to be rotated upon displacement of said swell, a cam surface on said shaft having adjoining high and low portions, and a switch arm operable by said cam surface, said switch arm being positioned to engage said cam surface, the point of engagement of said switch arm and said cam surface coinciding with the juncture of said high and low portions upon the said predetermined displacement of said swell to close said electric circuit.

5. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in its rearward limit position, drive means for said lay bed and said picking means including an electric circuit therefor, a swell pivoted adjacent the open end of said shuttle box having its central portion offset inwardly to project into said shuttle box, and having its outer end terminating exteriorly of said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, said swell being displaced outwardly a predetermined distance when the shuttle seats properly in said shuttle box, means to render said resilient biasing means substantially ineffective comprising a member operable to engage and displace said swell outwardly beyond said predetermined displacement against the bias of said resilient means, and means operable upon movement of the lay bed to said rearward limit position to actuate said member and thereby relieve snubbing engagement of said swell with said shuttle immediately prior to each pick, switch means to control said electric circuit, connections between the swell and said switch operable upon outward displacement of said swell to close said switch and maintain the same closed during displacement of said swell beyond said predetermined displacement, said switch means comprising a rotary shaft operable through said connections to be rotated upon displacement of said swell, a cylindrical cam surface on said shaft having adjointing high and low portions, and a switch arm engaged by said cam surface and operable by the low portion thereof to close said electric circuit, the said low portion engaging said switch arm upon said predetermined displacement of the swell and during displacement of said swell outwardly beyond said predetermined displacement.

6. In a loom comprising a frame and a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, picking means to pick the shuttle from the shuttle box when said lay bed is in said rearward limit position, a swell pivoted adjacent the open end of said shuttle box having a portion offset inwardly to project into said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, means to render said resilient biasing means substantially ineffective comprising a member actuatable to engage and displace said swell outwardly of the shuttle box against the bias of said resilient means, and means operable upon movement of the lay bed to said rearward limit position to actuate said member to displace the swell and thereby relieve snubbing engagement of said swell with the shuttle immediately prior to each operation of the picking means.

7. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in said rearward limit position, a swell pivoted adjacent the open end of said shuttle box having a portion offset inwardly to project into said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion of the shuttle, means to render said resilient biasing means substantially ineffective comprising a member actuatable to engage and displace said swell outwardly of the shuttle box against the bias of said resilient means, an element pivotally connected to said member and operable to engage and actuate the latter, said element having a depending portion positioned to engage said frame upon movement of the lay bed to said rearward limit position and to be actuated thereby so as to actuate said member and displace the swell outwardly of the shuttle box and relieve snubbing engagement of said swell with said shuttle immediately prior to each operation of the picking means.

8. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in said rearward limit position, a swell pivoted adjacent the open end of said shuttle box having a portion offset inwardly to project into said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion of the shuttle, means to render said resilient biasing means substantially ineffective comprising a rotary member, finger means on said member actuatable to engage and displace said swell outwardly of the shuttle box against the bias of said resilient means, an element pivotally connected to said member and operable to engage the latter and effect rotation thereof, said element having a depending portion positioned to engage said frame upon movement of the lay bed to said rearward limit position and to be actuated thereby to rotate said member to thereby displace the swell outwardly of the shuttle box and relieve snubbing engagement of said swell with said shuttle immediately prior to each operation of the picking means.

9. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in said rearward limit position, a swell pivoted adjacent the open

end of said shuttle box having a portion offset inwardly to project into said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion of the shuttle, means to render said resilient biasing means substantially ineffective comprising a shaft mounted for rotation about an axis paralleling the shuttle box, finger means fixed on said shaft actuatable to engage and displace said swell outwardly of the shuttle box against the bias of said resilient means, a member rotatable on said shaft operable to engage and to effect rotation thereof, said member having a depending portion positioned to engage said frame upon movement of the lay bed to said rearward limit position and to be actuated thereby to rotate said shaft and to displace the swell outwardly of the shuttle box and relieve snubbing engagement of said swell with said shuttle immediately prior to each operation of the picking means.

10. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in said rearward limit position, a swell pivoted adjacent the open end of said shuttle box having a portion offset inwardly to project into said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion of the shuttle, means to render said resilient biasing means ineffective comprising a shaft mounted for rotation about an axis parallel to the path of travel of the shuttle in the shuttle box, finger means fixed on said shaft actuatable to engage and displace said swell outwardly of the shuttle box against the bias of said resilient means, and means operable to engage the latter and effect rotation thereof upon movement of the lay bed to said rearward limit position to rotate said shaft and displace the swell outwardly of the shuttle box to relieve snubbing engagement of said swell with said shuttle immediately prior to each operation of the picking means.

11. In a loom comprising a frame, a lay bed rockably mounted thereon for movement between forward and rearward limit positions, a shuttle box open at its inner end to receive and discharge a shuttle, means to pick the shuttle from the shuttle box when said lay bed is in said rearward limit position, a swell pivoted adjacent the open end of said shuttle box having a portion offset inwardly to project into said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion of the shuttle, means to render said resilient biasing means substantially ineffective comprising a shaft mounted for rotation about an axis paralleling the shuttle box, finger means fixed on said shaft actuatable to engage and displace said swell outwardly of the shuttle box against the bias of said resilient means, a member rotatable on said shaft operable to engage and to effect rotation thereof, said member having a depending portion positioned to engage said frame upon movement of the lay bed to said rearward limit position and to be actuated thereby to rotate said shaft and to displace the swell outwardly of the shuttle box and relieve snubbing engagement of said swell with said shuttle immediately prior to each operation of the picking means, and a second member fixed to said shaft and actuatable manually to rotate the same and thereby relieve snubbing engagement of the swell with the shuttle.

12. In a loom comprising drive means, electric circuit means operable to effect and maintain operation of said drive means, and a shuttle box open at its inner end to receive and discharge a shuttle, a swell pivoted to said shuttle box adjacent the open end of said shuttle box, having its central portion offset inwardly to project into said shuttle box, and having its outer end terminating exteriorly of said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, said swell being displaced outwardly a predetermined distance when the shuttle seats properly in said shuttle box, switch means operable upon said predetermined outward displacement of the swell to close said circuit and maintain operation of said drive means, said switch means comprising a rotary shaft, connections between said shaft and said swell operable to rotate said shaft upon displacement of said swell, a cam surface on said shaft, and a switch arm actuated by said cam surface upon said predetermined displacement of said swell to close said electric circuit.

13. In a loom comprising drive means, electric circuit means operable to effect and maintain operation of said drive means, and a shuttle box open at its inner end to receive and discharge a shuttle, a swell pivoted to said shuttle box adjacent the open end of said shuttle box, having its central portion offset inwardly to project into said shuttle box, and having its outer end terminating exteriorly of said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, said swell being displaced outwardly a predetermined distance when the shuttle seats properly in said shuttle box, switch means operable upon said predetermined outward displacement of the swell to close said switch and maintain operation of said drive means, said switch means comprising a rotary shaft, a crank adjustably secured to said shaft, connections between said crank and said swell operable to rotate said shaft upon displacement of said swell, a cam surface on said shaft having adjoining high and low portions, a switch arm in engagement with said cam surface, said switch arm operable to be displaced to close said electric circuit when the arm engages the low portion of said cam surface, the said low portion registering with said switch arm upon said predetermined displacement of the swell.

14. In a loom comprising drive means, electric circuit means operable to effect and maintain operation of said drive means, and a shuttle box open at its inner end to receive and discharge a shuttle, a swell pivoted to said shuttle box adjacent the open end of said shuttle box, having its central portion offset inwardly to project into said shuttle box, and having its outer end terminating exteriorly of said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, said swell being displaced outwardly a predetermined distance when the shuttle seats properly in said shuttle box, switch means operable upon said predetermined outward displacement of the swell to close said circuit and maintain operation of said drive means, said switch means comprising a rotary shaft, a crank secured to said shaft, connections between said crank and said swell operable to rotate said shaft upon displacement of said swell, a cam surface on said shaft having adjoining high and low portions, a switch arm registering with said cam surface, means to bias said switch arm into engagement with said cam surface, said biasing means operable to displace said switch arm when the latter registers with the low portion of said cam surface to thereby close said electric circuit, the said low portion registering with said switch arm upon said predetermined displacement of the swell.

15. In a loom comprising drive means, electric circuit means operable to effect and maintain operation of said drive means, shuttle boxes at opposite sides of said loom, and means actuated by said drive means to traverse a shuttle from one said shuttle box to the other, each said shuttle box being open at its inner end to receive and discharge the shuttle and having a swell, the central portion of said swell being offset inwardly to project into said shuttle box, and the outer end of said swell terminating exteriorly of said shuttle box, resilient means normally biasing said swell inwardly of said shuttle box for snubbing engagement of the offset portion with the shuttle, said swell being displaced outwardly a predetermined distance when the shuttle seats properly in the shuttle box, switch means associated with each said shuttle box to control said electric circuit, each said switch means comprising a

rotary shaft, connections between said swell and said shaft operable upon displacement of said swell to rotate said shaft, a cam surface on said shaft, and a switch arm actuated by said cam surface upon said predetermined displacement of said swell to close said electric circuit, and separate switch means operable by said drive means to close said electric circuit during the normal traverse of said shuttle from one shuttle box to the other.

References Cited in the file of this patent

UNITED STATES PATENTS

905,131	Bacon	Dec. 1, 1908
962,495	Cole	June 28, 1910
2,045,967	Santon	June 30, 1936
2,090,040	Gordon	Aug. 17, 1937
2,600,667	Mason	June 17, 1952
2,625,183	Dufourd	Jan. 13, 1953