March 25, 1941. W. V. BOYD 2,236,486

WARP BEAMING MACHINE

Original Filed April 6, 1939 2 Sheets-Sheet 1

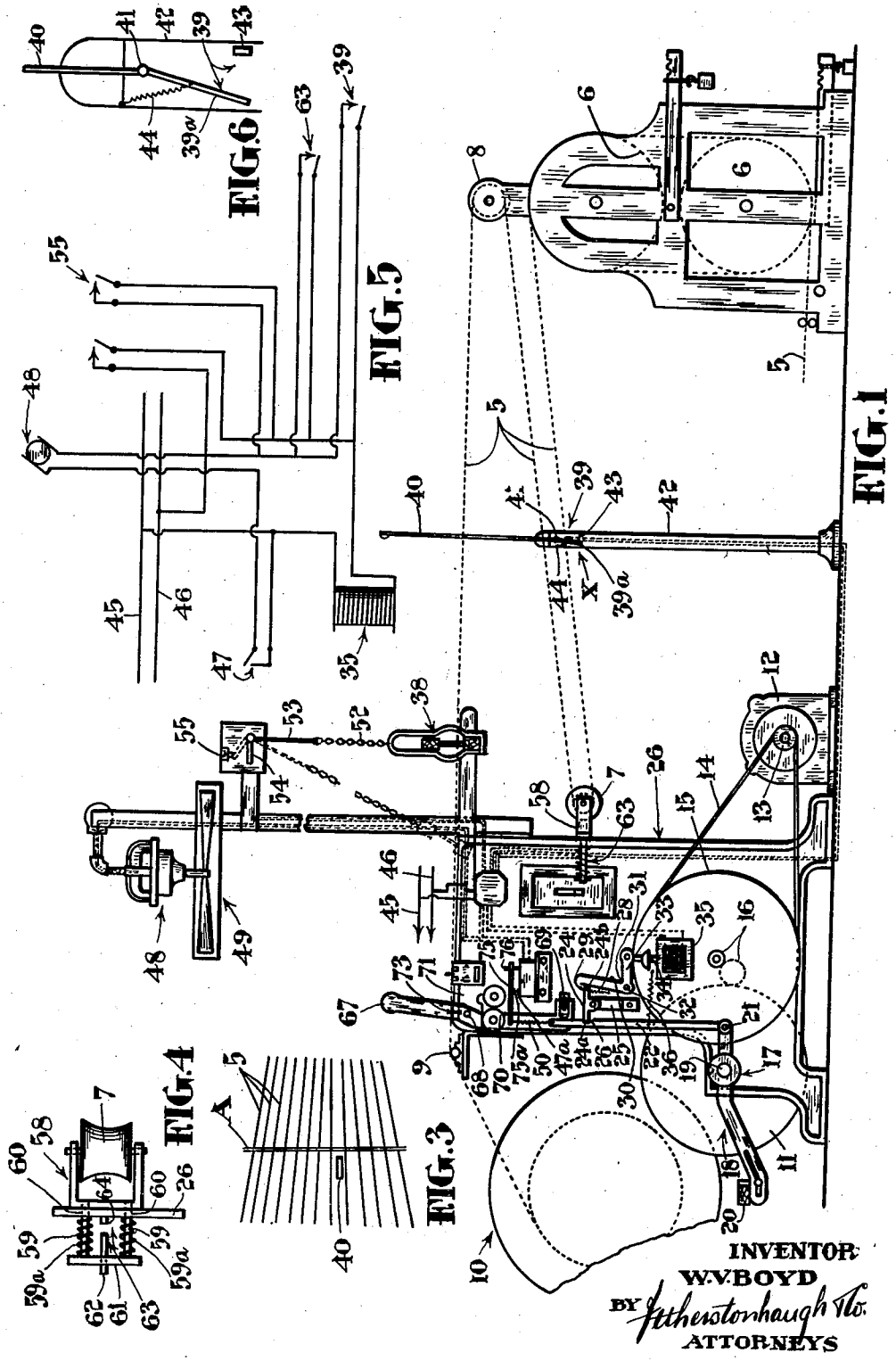


FIG.1

FIG.3

FIG.4

FIG.5

FIG.6

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WARP BEAMING MACHINE

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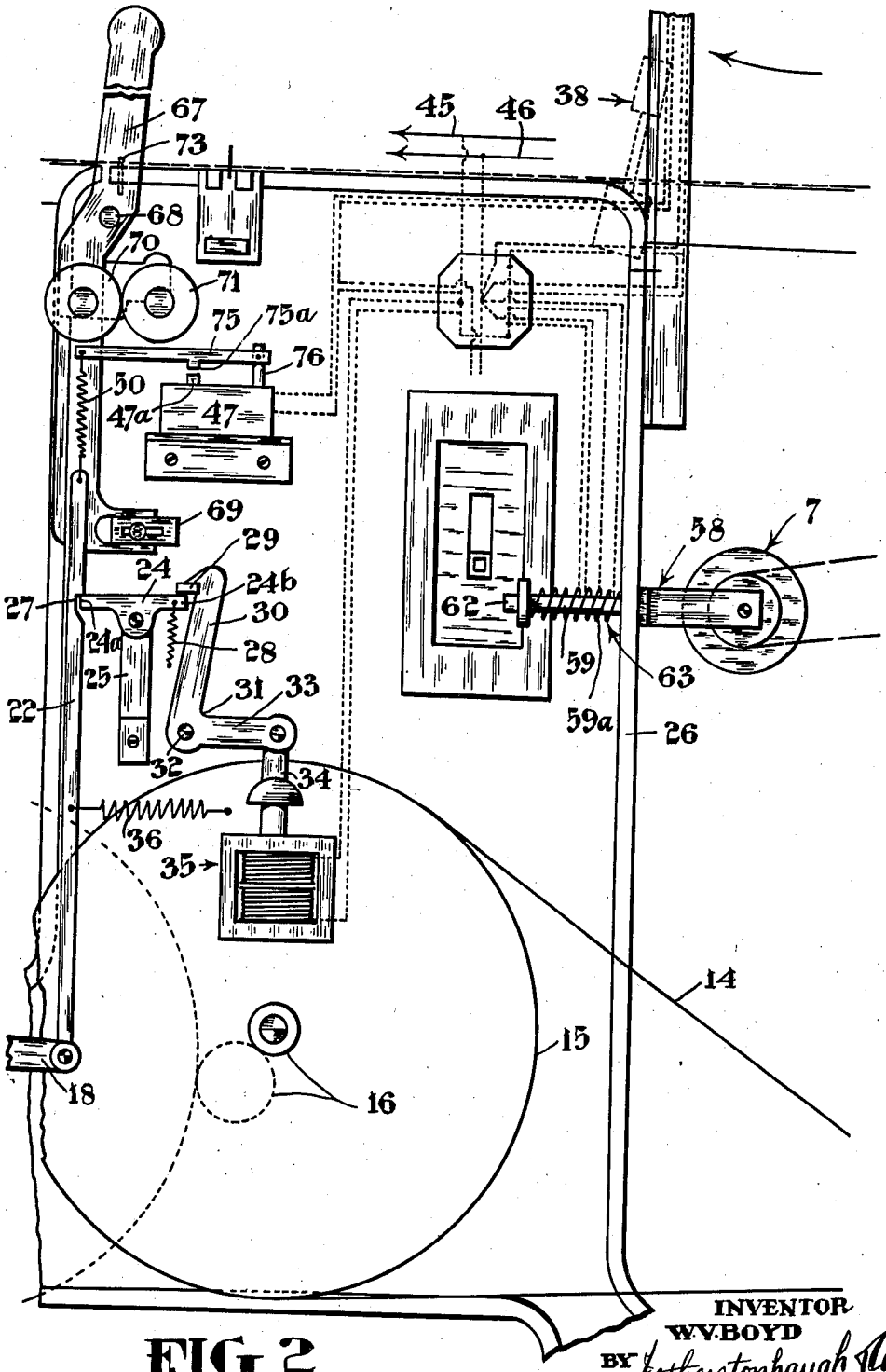


FIG. 2

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WARP BEAMING MACHINE

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Original application April 6, 1939, Serial No. 266,431. Divided and this application May 24, 1940, Serial No. 337,040

3 Claims. (Cl. 28—51)

This invention relates to improvements in warp beaming machines and has for its object to reduce the labor costs incident to operation of such machines.

The conventional warp beaming machine requires the constant attention of an operator who must watch the warp closely and be prepared to stop the machine whenever necessary to remove leases or to remedy imperfections in the warp such as broken ends or snarls which, if permitted to pass unnoticed, give rise to various difficulties and delays which materially increase the cost of operation.

The present invention provides a warp beaming machine equipped with automatic controls for stopping the machine whenever a lease, broken end or snarl reaches a predetermined point in the travel of the warp from the tensioning rolls to the beam. This eliminates the necessity of keeping a constant watch on the warp and enables a single operator to take care of several machines.

The present application is a division of my co-pending application Serial No. 266,431, filed April 6, 1939.

Proceeding now to a more detailed description reference will be had to the accompanying drawings, in which—

Fig. 1 is a side elevation of a warp beaming machine equipped with the automatic controls forming the subject matter of this invention.

Fig. 2 is an enlarged side elevation of a portion of the assembly appearing in Fig. 1.

Fig. 3 is a plan view of the warp showing one of the conventional leases employed to assist in maintaining the warp ends in their correct relationship. This view also shows a feeler element extending upwardly between adjacent warp ends so as to be engaged and operated by the lease.

Fig. 4 is a detail view.

Fig. 5 is a wiring diagram.

Fig. 6 is a large detail of a feeler switch.

As shown in these drawings, the warp **5** is passed around tensioning rolls **6** and then over guide rolls **7**, **8** and **9** to the beam **10**. The beam is rotated by contact with driving drum **11** which, in turn, is driven from motor **12** through the agency of a conventional drive connection comprising pulley **13**, belt **14**, pulley **15**, reduction gearing **16** and friction clutch **17**. The starting and stopping of driving drum **11** is effected through the agency of the clutch operating lever **18** which carries part of clutch **17** and is intermediately pivoted to swing about the pivotal axis **19**. One end of lever **18** carries the starting treadle **20**. The other end of lever **18** is pivoted at **21** to the lower end of a vertically extending clutch releasing rod **22**. When rod **22** is latched in the elevated position shown in Figs. 1 and 2, clutch **17** is engaged to complete the drive connection between motor **12** and beam driving drum **11**. When the latch mechanism holding rod **22** in its elevated position is released, said rod drops to a lower position and permits lever **18** to release said clutch **17** thereby stopping drum **11** and beam **10**.

In the present instance rod **22** is shown latched in its elevated position by a latch mechanism comprising a rocker **24** intermediately pivoted to a bracket **25** mounted on the machine frame **26**. One end **24a** of rocker **24** is engaged in a notch **27** provided in rod **22**. The other end **24b** of the rocker is connected to frame **26** by a spring **28**. When the machine is in operation rocker **24** is held in a horizontal position by reason of the fact that the end **24b** is engaged beneath a projection **29** carried by the arm **30** of a bell crank lever **31**. This lever **31** is pivoted to the machine frame at **32** and has its other arm **33** pivoted to the armature **34** of a solenoid **35**. A spring **36**, connected between rod **22** and the machine frame **26** serves to pull said rod inwardly toward the engaging end of rocker **24**. When solenoid **35** is energized armature **34** is pulled down and swings lever **31** in a clockwise direction so that projection **29** of said lever is swung clear of the adjacent end of the rocker. This frees the rocker for swinging movement in a counterclockwise direction about its pivot and permits rod **22** to drop to its clutch releasing position.

According to one feature of the present invention solenoid **35** is energized to permit rod **22** to drop to its clutch releasing position whenever one of the leases A (Fig. 3) carried by warp **5** reaches a predetermined point in the travel of the warp from the guide roll **8** to the warp rattle **38**. This is accomplished by the provision of an automatic feeler switch generally indicated at **39** in Figs. 1 and 5. The movable contact **39a** of this switch is formed by the lower end of a feeler **40** which is intermediately pivoted at **41** to a suitable support **42**. The upper portion of feeler **40** extends upwardly between adjacent ends of the warp as shown in Fig. 3 so that it lies in the path of travel of the leases. Each time a lease is moved against the upper portion of the feeler the latter swings about the pivot **41** so that the lower contact end **39a** engages the cooperating stationary switch contact **43** from

which it is normally spaced by means of spring 44. The closing of switch 39 energizes solenoid 35 so that armature 34 is pulled down to release the latch holding the clutch releasing rod 22 in its elevated or clutch engaging position.

As shown in the wiring diagram (Fig. 5) the normally open switch 39 is connected to the line wires 45 and 46 in series with solenoid 35.

When rod 22 drops to its clutch releasing position it serves to open a normally closed switch 47 which is connected across the line wires 45 and 46 in series with the motor 48 of a fan 49. The opening of switch 47 is accomplished through the agency of a switch operating lever 75 having one end pivoted to a bracket 76 and the other end connected, by supporting spring 50, to the upper end of rod 22. When lever 75 is pulled downwardly by rod 22 the lever projection 75a acts against the switch member 47a to open switch 47 against the resistance of a suitable switch closing spring (not shown) contained in the switch casing.

From the foregoing it will be apparent that whenever a lease carried by the warp presses against the feeler 40 the beam 10 and fan 49 are brought to rest. The operator, after removing the lease in the usual manner, depresses the pedal 20 to swing the clutch lever 18 back to its cutch engaging position. During this movement of lever 18 rod 22 moves upwardly and is again secured in its elevated position by reengagement of the end 24a of rocker 24 in notch 27. During this resetting of rod 22 spring 50 is raised to return the switch opening lever 75 to its original position and thus permits reclosing of switch 47.

The beam rattle 38 is suspended from a bracket 51 by means of the chain 52 and bell crank lever 53. The beam rattle and its supporting bell crank lever 53 normally occupy the position shown in full lines in Fig. 1. In this position of the parts it will be noted that arm 54 of the bell crank lies below a normally open switch 55 mounted on bracket 51. If there are any snarls in the warp as it approaches the beam rattle 38 these snarls will engage and force the beam rattle from the full to the dotted line position shown in Figs. 1 and 2. This movement of the beam rattle causes the supporting bell crank 53 to assume the inclined position shown by dotted lines in Fig. 1 with the result that the shorter arm 54 of the bell crank is moved against and closes switch 55. Since switch 55 is connected in series with solenoid 35 as shown in Fig. 5 it follows that the closure of this switch will energize the solenoid to release the rod 22 and stop the machine whenever the beam rattle is displaced to its dotted line position. When the operator has remedied the condition resulting in this stoppage of the machine the beam rattle 38 and its supporting bell crank 53 will resume their normal positions and permit reopening of switch 55.

It is also desirable to stop the machine when the warp is subjected to excessive tension caused by knotting or catching of the warp strands at some point in advance of the guide roll 7. To this end the roll 7 is journalled in a slidably mounted frame 58 equipped with guide pins 59 working in guide openings 60 provided in the machine frame 26. The ends of the pins remote from frame 58 are connected by a cross bar 61 which carries the movable contact 62 of a normally open switch 63. Springs 59a encircle the guide pins 59 and bear against cross bar 61 to normally hold the contact 62 separated from a cooperating stationary contact 64. When the tension on the warp exceeds a predetermined value, the roll 7 and frame 58 are pulled to the right against the resistance of springs 59a so that switch 63 is closed by engagement of the movable contact 62 with the stationary contact 64. Since switch 63 is connected in series with solenoid 35 as shown in Fig. 5 it will be evident that the closure of this switch energizes the solenoid to permit the clutch releasing rod 22 to drop to its clutch releasing position.

When it is desired to stop the machine independently of the automatic controls this is accomplished through the agency of a hand lever 67. This lever is intermediately pivoted at 68 and is provided at its lower end with an adjustable abutment 69. When the upper end of lever 67 is swung to the right from the position shown in Figs. 1 and 2 the abutment 69 engages and forces rod 22 to the left so that said rod is moved clear of the rocker 24 and drops to its clutch releasing position.

A roller 70 secured to lever 67 below the pivot 68 is normally disposed in contact with a stationary roller 71 journalled in the machine frame 26. These rollers form part of a conventional hair pin stop motion the function of which is to release the rod 22 through the agency of lever 67 whenever one of the conventional warp riding pins 73 is permitted to drop between the rollers 70 and 71 by breakage of one of the warp ends. Since this type of hair pin stop motion is well known further description thereof is not considered necessary to an understanding of the present invention.

While I have described what I now consider to be the preferred embodiment of this invention it will be understood that various modifications may be resorted to within the scope and spirit of the invention as defined by the appended claims.

Having thus described my invention, what I claim is:

1. In combination, a warp beaming machine, a motor for driving said machine, a drive connection between said machine and motor, including a clutch and a normally elevated axially movable clutch releasing rod, the latter normally tending to drop to a clutch releasing position, a releasable latch device normally holding said clutch releasing rod in its elevated clutch releasing position, a latch releasing solenoid adapted, when energized, to release said latch device to permit said rod to drop to its clutch releasing position, a normally open switch connected in series with said solenoid and a source of current so that the solenoid is energized by closure of said switch, and means actuated by the beam rattle of the warping machine for closing said switch whenever said rattle is displaced to a predetermined abnormal position by snarls in the warp passing therethrough.

2. In combination, a warp beaming machine, a motor for driving said machine, a drive connection between said machine and motor comprising a clutch, a pivoted clutch actuating lever operatively connected to said clutch, a vertically disposed axially movable clutch releasing rod having its lower end secured to said lever, means for normally holding said rod in an elevated clutch engaging position, said means comprising an intermediately pivoted rocker member having one end fitted in a notch provided in said rod, a solenoid operated latch normally disposed in

restraining engagement with the opposite end of the rocker member and normally serving to hold said rocker member in a rod supporting position, a normally open switch connected in series with the operating solenoid of said latch member and with a source of current so that the solenoid is energized by closure of said switch to hold the latch member in restraining engagement with said rocker member, and means actuated by the beam rattle of the warping machine for closing said switch whenever said rattle is displaced to a predetermined abnormal position by snarls in the warp passing therethrough, the arrangement being such that the closure of said switch energizes the solenoid to withdraw the latch from holding engagement with said rocker member so that the latter is free to swing to a rod releasing position permitting the clutch releasing rod to drop down from its normally elevated position to a clutch releasing position.

3. In combination, a warp beaming machine, a motor for driving said machine, a drive connection between said machine and motor comprising a clutch, a pivoted clutch actuating lever operatively connected to said clutch, a vertically disposed axially movable clutch releasing rod having its lower end secured to said lever, means for normally holding said rod in an elevated clutch engaging position, said means comprising an intermediately pivoted rocker member having one end fitted in a notch provided in said rod, a solenoid operated latch normally disposed in restraining engagement with the opposite end of the rocker member and normally serving to hold said rocker member in a rod supporting position, a normally open switch connected in series with the operating solenoid of said latch member and with a source of current so that the solenoid is energized by closure of said switch to hold the latch member in restraining engagement with said rocker member, and means actuated by the warp for closing said switch when certain predetermined conditions are established in the operation of the machine, the arrangement being such that the closure of said switch energizes the solenoid to withdraw the latch from holding engagement with said rocker member so that the latter is free to swing to a rod releasing position permitting the clutch releasing rod to drop down from its normally elevated position to a clutch releasing position.

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