Oct. 31, 1950 H. MEIER 2,527,755

APPARATUS FOR MOUNTING WARP-STOP DETECTORS IN LOOMS

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Fig. 1

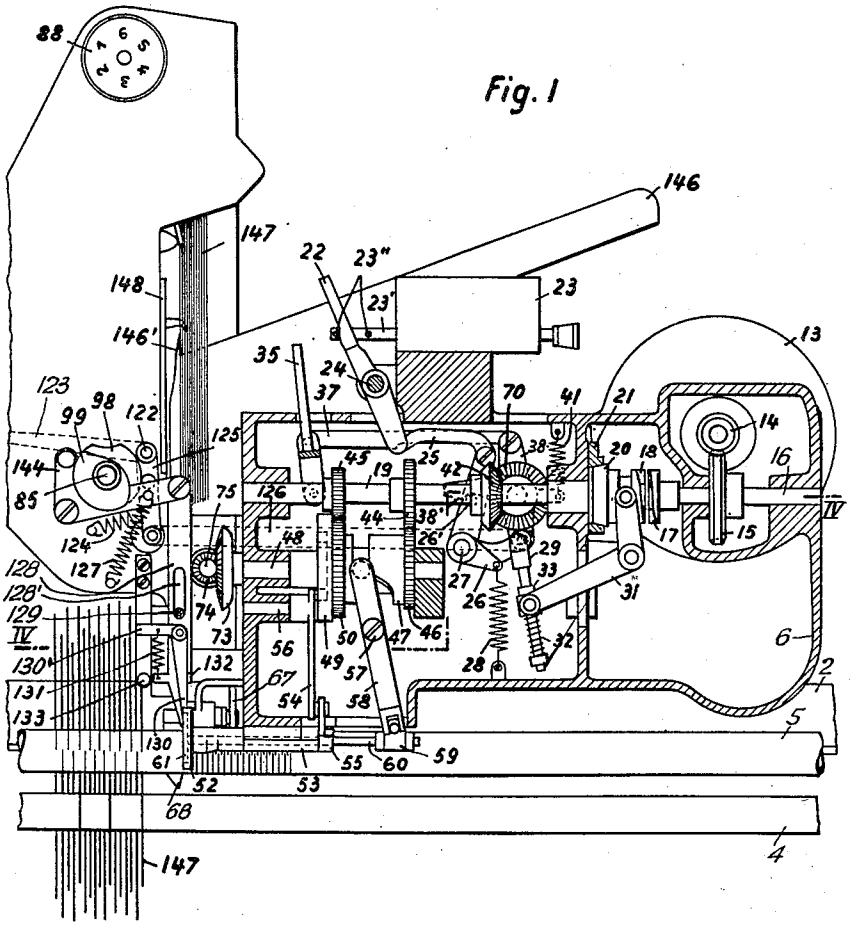


Fig. 5

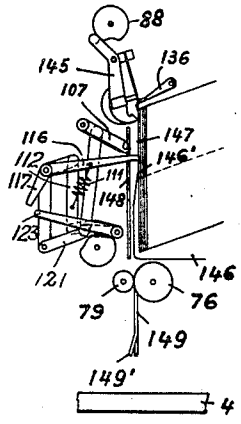


Fig. 6

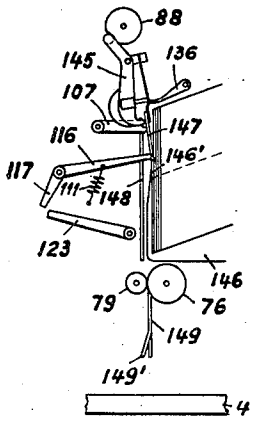
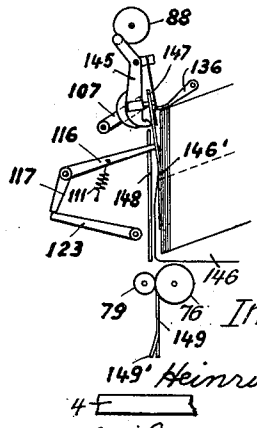


Fig. 7



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APPARATUS FOR MOUNTING WARP-STOP DETECTORS IN LOOMS

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Fig. 2

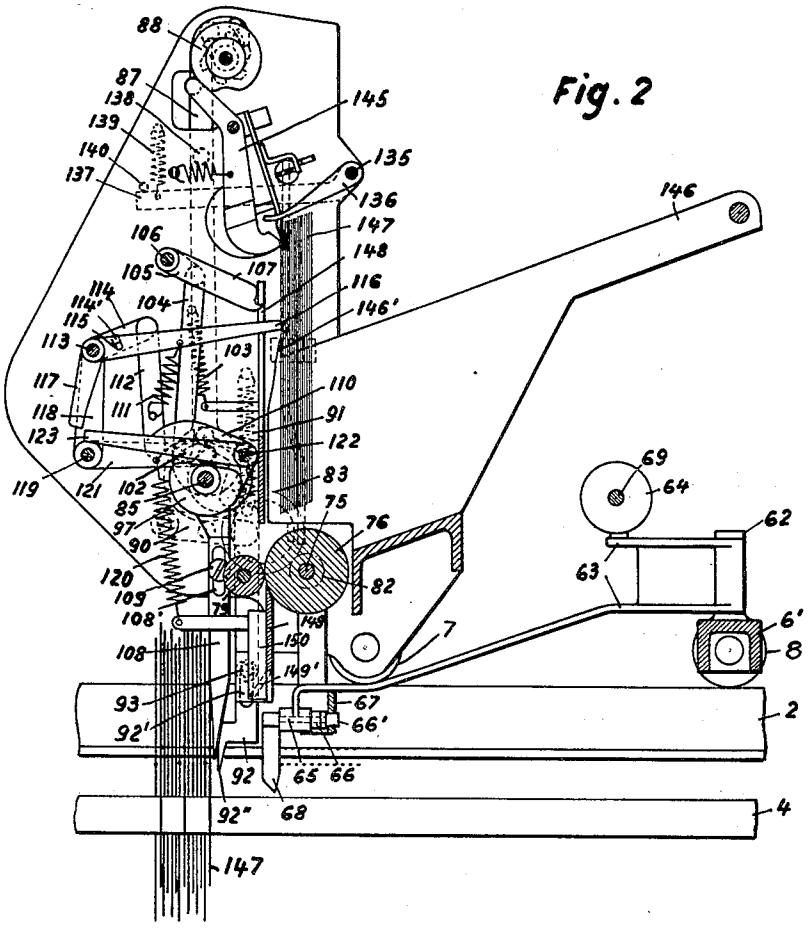


Fig. 8

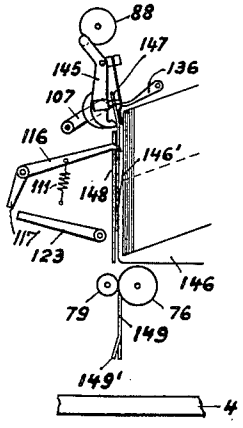


Fig. 9

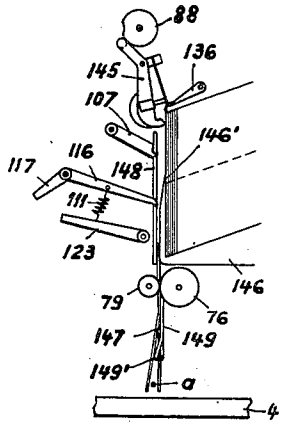
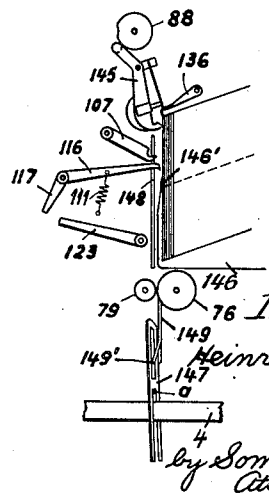


Fig. 10



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APPARATUS FOR MOUNTING WARP-STOP DETECTORS IN LOOMS

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Fig. 3

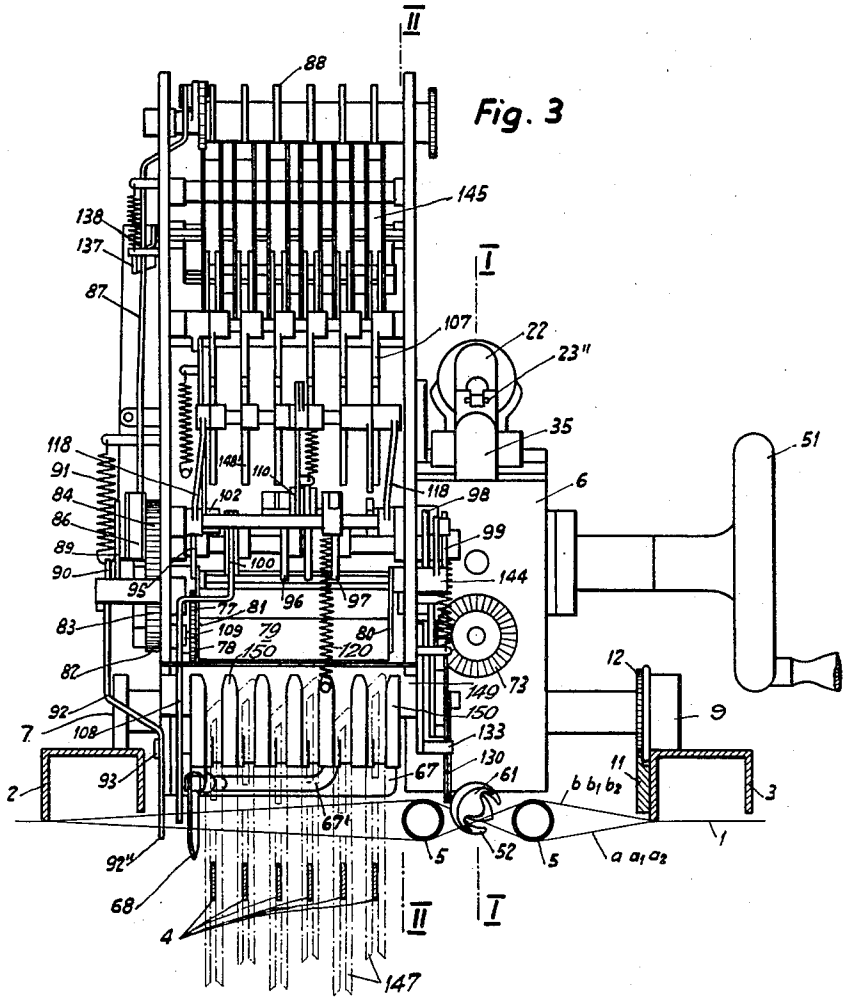


Fig. 11

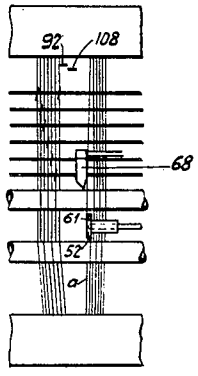


Fig. 12

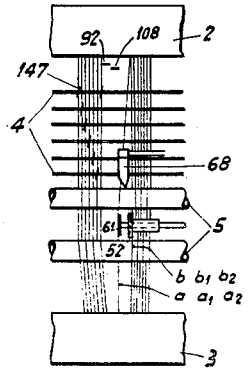
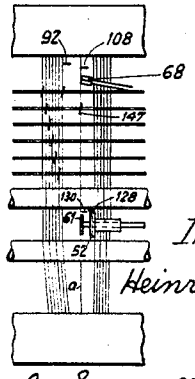


Fig. 13



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APPARATUS FOR MOUNTING WARP-STOP DETECTORS IN LOOMS

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Fig. 4

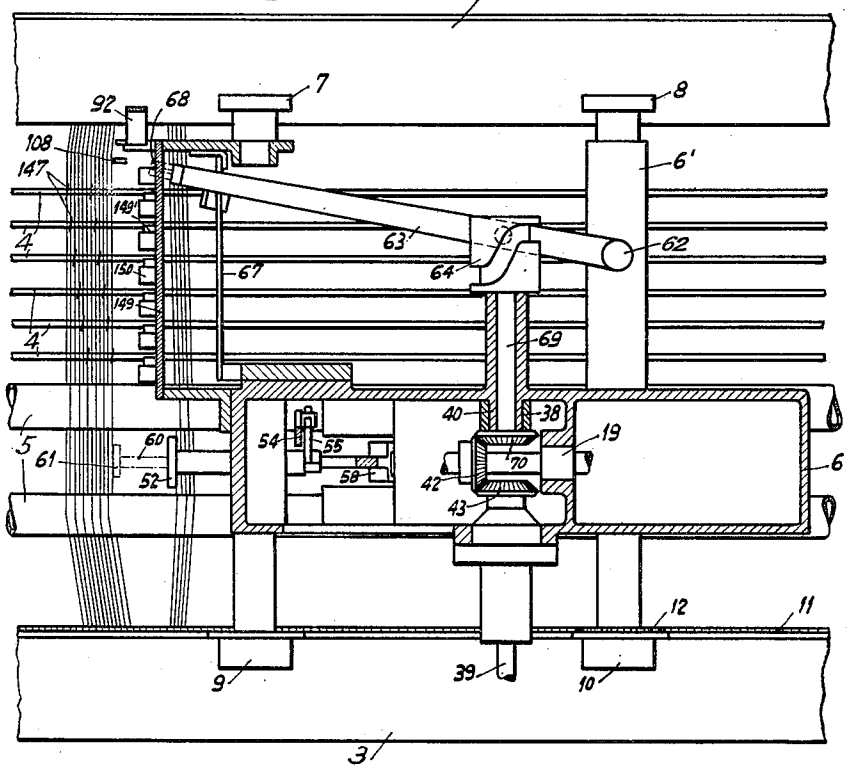


Fig. 14

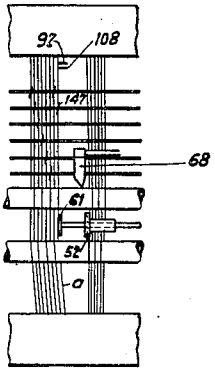


Fig. 15

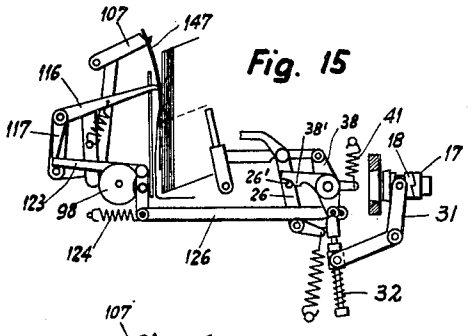
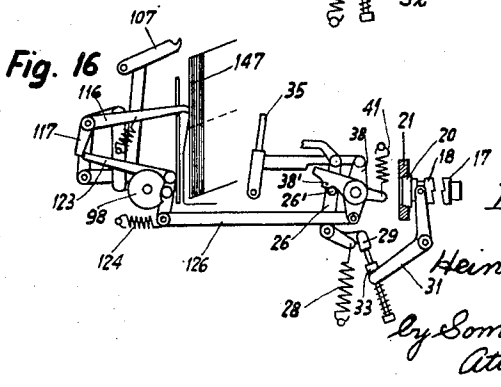


Fig. 16



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Patented Oct. 31, 1950 2,527,755

UNITED STATES PATENT OFFICE

2,527,755

APPARATUS FOR MOUNTING WARP-STOP DETECTORS IN LOOMS

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Application April 30, 1947, Serial No. 744,851
In Switzerland May 3, 1946

11 Claims. (Cl. 28—41)

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My present invention relates to improvements in apparatus for mounting stacked open-ended detectors on warp threads in looms.

Detector-mounting arrangements are known in the art, in which the divided detectors are caught in chutes from which they slide onto the warp thread brought or positioned underneath the chute outlet. Such gravity arrangements do not operate positively, as the detectors are not positively mounted onto the warp threads. The capacity and thus the efficiency of gravity arrangements, further, is limited insofar as the mounting rate depends on the time of drop required by each detector, which time is constant.

In other prior-art arrangements of this class, the warp threads divided from the warp are not positively separated, over the entire width of mounting, from the remaining threads. The divided thread, therefore, is not positively located, in particular not in case of crossed threads and/or a great number of detector rows, thus giving rise to the possibility that the detector to be mounted drop onto the appurtenant guide-rod, and not onto the divided warp thread. Such missing detectors have to be remounted by hand, whereby the efficiency of the arrangement is impaired or jeopardized.

The outstanding object of my improvements is to afford an apparatus which eliminates the said deficiencies, by means of which the detectors are positively located or mounted onto the divided and properly positioned warp threads, whereby errors of mounting are eliminated.

One form of invention is shown, by way of example, in the accompanying drawings, in which

Fig. 1 shows a side view and a section on line I—I of Fig. 3,

Fig. 2 is a side view and a section on line II—II of Fig. 3,

Fig. 3 is an elevation, partly in section,

Fig. 4 is a plan view and section on line IV—IV of Fig. 1,

Figs. 5–10 illustrate the movement of the divided detector up to the point of being mounted on the warp thread,

Figs. 11—14 illustrate the movement of a warp thread which has been divided or side-tracked from the warp, inclusive of mounting the detector and carrying, onward the warp thread, and

Figs. 15 and 16, show a loom step-motion when the detectors have been properly divided or, respectively, when the detector to be divided is missing.

Two beams or rails 2, 3 are mounted above and transversely of the warp 1 which is stretched

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across the frame of the loom in the same position as for weaving and are interconnected at their ends to form a frame. A group of guide rods 4, forming a constituent part of the warp-stop motion appurtenant to the loom, are disposed below the warp 1. The warp threads *a*, *a1*, *a2* . . . . are separated, as known in the art, from the warp threads *b*, *b1*, *b2* . . . . by means of two lease rods 5 so as to cros thread *a* by the adjacent threads *b*, and so on. Wheels 7—10 (Figs. 2, 3 and 4) are journaled to the case 6. Wheels 9 and 10 are provided with rim flanges which are engaged in a guide groove formed by rail 3 and a rack 11 secured to the latter, and thus guard the carriage against lateral displacement. A pinion 12 meshes with rack 11, and is connected with a feeler by means of levers and pawls so as to move the carriage stepwise, as known in the art, (such as is described for example in the U. S. patent to Magnano, No. 1,512,704) along rails 2 and 3 in accord with the presence or non-presence of warp threads.

The electric motor 13 (Fig. 1), flange-connected to the case 6, drives the worm-wheel 15 over a worm 14 and thus, the worm wheel axle 16. A clutch portion 17 is fastly secured to the free end of the latter. The other clutch portion 18 is axially displaceable on the shaft 19, and is provided with a neck and a brake cone 20 which is engageable with the brake ring 21 fastly secured to case 6.

The motor 13 is turned on, and shaft 19 simultaneously coupled to worm shaft 16 in the following manner:

The switch handle 22 is swung on its pin 24 toward the control contactor 23. When hitting the right-hand dog 23'', the axle 23' is axially displaced, thus establishing a circuit between contactor 23 and motor 13, and rotating clutch portion 17. When operating handle 22, clutch portion 18 is brought up to clutch portion 17 by means of link 25, bell-crank lever 26, push rod 29 and bell-crank lever 31 which is engaged in the neck of clutch portion 18 with the aid of pressure spring 32. When rocking bell-crank lever 26, which is loaded by spring 28, and pin 26' secured thereto, on pivot 27, the four-arm lever 38 is pivoted on the pin 40 against the action of a spring 41. Pin 26' (Fig. 16) then abuts against a notch 38' of lever 38, thus preventing clutch portion 18 from sliding back when the operating pressure on handle 22 ceases and keeping the two clutch portions in engagement. By swinging the trip handle 35 toward contactor 23, lever 38 is rocked by means of the link 37 which

is pivoted at one end to trip handle 35 and at the other end to a lever 38. Notch 38' then releases pin 26' and the abutment 33 fixed to push rod 29 is brought to bear against the one arm of bell-crank-lever 31 under the action of spring 28, and clutch 17, 18 is disengaged. Brake cone 20 thus is urged into engagement with brake ring 21, biased by spring 28, and the mechanism stopped. At the same time the contactor handle 22 is swung back into its initial position, also biased by spring 28, abutting against the left-hand dog 23'', thus displacing the axle 23' to the left and breaking the motor circuit.

A bevel wheel 42 and a pair of spur wheels 44, 45 are pinned to shaft 19. Bevel wheel 42 meshes with a corresponding wheel 43 which is pinned to the axle 39 (Fig. 4) and permits of starting the mechanism by means of a hand wheel 51 (Fig. 3) fixed on shaft 39, when the said mechanism is disengaged. Spur wheel 44 transmits its rotation, over the spur wheel 46 and the cylindrical cam 47 secured thereto, onto the shaft 48. A cam disc 49 and a spur wheel 50 connected therewith, are pivoted on shaft 48, and wheel 50 meshes with spur wheel 45. Shafts 19 and 48 rotate at the same speed, whereas cam disc 49 and spur wheel 50 are geared at a ratio of 1:2.

The thread divider 52, known per se in the art, is secured to the case 6 by its bearing 53 above the crossing point of warp threads, *a*, *a*1, *a*2 and *b*, *b*1, *b*2. Divider 52 is oscillated by a curved track on cam disc 49, in which the roller link 54 is engaged. The latter at its opposite end is engaged in the slot of a forked lever 55 which is pinned to the hollow shaft of the thread-dividing element 52. Roller link 54 is mounted on the pivot 56. A cam lever 58 is pinned to the pivot 57 secured to case 6, and at one end co-acts with a curved track of the said cam 47, while its other end is forked to engage the knuckle joint 59. The latter is pivoted on an axle 60 which is longitudinally displaceable in a central bore of the divider 52. A sickle-shaped plate 61 is mounted on axle 60 and may be moved into a recess provided on the free face of divider 52. Plate 61, when the apparatus according to my present invention is in operation, also is oscillated besides being axially displaced, which oscillation is transmitted by divider 52.

A control lever 63 (Figs. 2, 4) is mounted on the pivot 62 secured to the arm 6' of case 6. One arm of lever 63 is engaged in the curved track provided on the cylindrical cam 64, and a second arm—disposed underneath the said first arm—is adapted as bearing for a pivot 65 on which an auxiliary lever 66 (Fig. 2) is mounted. The free end 66' of the latter is engaged in a control slot 67' (Fig. 3) provided on a plate 67. The other end of pivot 65 is provided with a lug 68. The cylindrical cam 64, which is pinned to the pivot 69, is driven, as shown in Figs. 4 and 1, by the bevel wheel 70 meshing with bevel wheel 42 which has the same number of teeth. When cam 64 rotates control lever 63 is intermittently oscillated. Since the auxiliary lever 66 attached to pivot 65 is guided with its free end 66' in the control slot 67' of plate 67 the pivot 65 has an intermittent rotational movement imparted to it and thus imparts to the lug 68 a movement out of the vertical into the horizontal and back.

A bevel wheel 73 is pinned on the end of shaft 48 projecting from case 6 (Fig. 1), and drives, over a bevel wheel 74, the axle 75 onto which a roller 76 (Fig. 2) is pinned. The latter serves for moving the divided detector arriving from above. A pressure roller 79, co-operating with roller 76, is driven by a spur wheel 77 (Fig. 3) meshing with a spur wheel 78, and is pivoted on the straps 80, 81. Roller 79 is made of elastic material, to be capable of yielding by the thickness of the drop detector when taking up and advancing the latter. The peripheral speeds of rollers 76 and 79 are identical, i. e. correspond to the speed of the detector at the moment of its delivery to the conveyer and pressure rollers for further advance. Axle 75 drives a cam shaft 85, as shown in Figs. 2 and 3, by means of the spur wheels 82, 83 and 84. The gearing ratio of wheels 82 and 84 is such as to bring the number of revolutions of cam shaft 85 into accord with that of shafts 48 and 19.

The eccentric strap 86 mounted on axle 85 drives, in a manner known, the master drum 88 (known per se) by means of eccentric rod 87 (Fig. 3), lever, and ratchet. Further, cam 89 is mounted on axle 85 and co-acts with the supporting lever 90 which is biased by a tension spring 91. A retainer 92 is pivoted to the free end of lever 90, and a fixed stud 93 (Fig. 2) is engaged in the slot 92' thereof. The tip 92'' of retainer 92 undergoes a timed vertical reciprocation when the apparatus is in operation. The cams 95—96 and the eccentric 100 (Fig. 3) also are pinned to axle 85.

The cam 95 (Fig. 3) imparts an oscillation to the lever 102 (Fig. 2) journaled on shaft 122. This oscillatory movement is transmitted through agency of connecting member 104 to the arm 105 which is rigidly connected with shaft 106. The movement of shaft 106 imparts to lever 107, whose free end has the shape of a hook, an oscillatory motion. The spring 103 serves always to urge the lever 102 against the cam 95. The eccentric 100 (Fig. 3) actuates the eccentric rod 108, which oscillates on the stationary pivot 109 in slot 108'. The tip at the foot end of rod 108 thus describes a curve for the purpose of gripping the divided warp thread and bringing same up to the retainer 92. The swing lever 114, pivoted on an axle 113, undergoes an oscillating movement, brought about by the co-operation of curved disc 96 with the lever 110 (Fig. 3) and the link 112 which is loaded by the tension spring 111 (Fig. 2). Swing lever 114 is provided with a slot 114' for receiving a stud 115 which is secured to a gripper arm 116 fastly mounted on axle 113. The said oscillating movement of swing lever 114, is transferred by way of axle 113, onto the gripper arm 116, through the intermediary of the tension spring 111 which is connected with its second end to arm 116, the bottom edge of slot 114' serving as abutment for stud 115. Gripper arm 116, when required, thus may perform an additional oscillation of greater amplitude (as defined by the length of slot 114') by virtue of an upward force biasing arm 116.

The stop lever 117 is fastly secured to axle 113, i. e. it forms a bell-crank lever together with gripper arm 116. Axle 113 is borne for rotation on the standards 118. The control lever 121 (Figs. 2, 5), fastly secured to the axle 119 and biased by the tension spring 120, imparts a translatory movement (besides the said oscillation) to the gripper arm 116, in co-operation with curved disc 97.

The feeler arm 123 and the link 125 which is biased by tension spring 124, are fastly secured to the shaft 122 (Fig. 1) which is journaled in case 6, viz. in such manner as to make feeler arm 123 coact with stop lever 117, and link 125 with the

curved disc 98. Link 125 is connected to the four-arm lever 38 by the connecting rod 126.

A link 128 is pivotally connected to a bell-crank lever 144 (Fig. 1) which is biased by the tension spring 127 and co-acts with the curved disc 99. Link 128 terminates in a tip and is guided on a pin 129 by means of a slot 129'. The blade 130 provided with a cross-arm 130', is pivoted on link 128 (Fig. 1), and normally abuts against the stop 132 under the action of spring 131. When the apparatus is in operation, link 128 and blade 130 are vertically reciprocated. As soon as the tips of link 128 and blade 130 have passed beyond the threads *b*, *b1*, *b2*, blade 130 is rocked by virtue of cross-arm 130' abutting against a stationary stop 133.

A pawl 136 (Fig. 2 and Figs. 5–10) fastly mounted on the shaft 135, is moved, by way of an arm 137, by the stud 138 secured to eccentric rod 87. Arm 137, biased by the tension spring 139, is limited in its upward rocking movement by a stud 140 acting as stop. Six parallel detector rails 146 are fixedly connected to case 6, and receive a stack of warp-stop detectors each, presenting an inclined slide face to the latter. The detectors 147 sit, with the web separating the open-ended slot from the closed slot, astride on the rails 146. The foremost detector 147 of the respective stack contacts, with its head-end portion, the dividing device 145 which is known per se and thus not further described here. The said foremost detector abuts against an abutment 146' integral with rail 146, and the entire stack thus is prevented from sliding down the incline, when the foremost detector is removed from its stack, as will be described below. A guide plate 148 is disposed transversely of the detector rails 146, and its slots 148' receive the dogs 107 and 116 provided within the range of the individual detector-rails 146. The divided detectors 147 are fed to the roller pair 76, 79 along the guide plate 148. From the rollers, the detectors are mounted onto the divided warp threads and onto the guide rods 4, intermediate of the guide elements 150 secured to a spreader 149. Leaves 149' are provided on the lower portion of spreader plate 149, disposed in the path of the detectors 147 and splayed from the plane of the spreader so that one leg of detector 147 slides over the spreader in its natural position, while the other detector leg is spread by the splayed leaf 149', thus permitting a positive mounting of the detector onto the thread.

The arrangement described operates as follows:

The thread divider 52 separates, in known manner, the foremost thread *a* from the warp, and moves same in front of the face of divider 52 and thus into contact with the sickle-shaped plate 61. Lug 68 on the free end of pivot 65 then is horizontal above the threads *a*, *a1*, *a2* in order to clear the path for the thread *a* to be divided. The retainer or check 92 prevents the threads which already have been provided with detectors 147, from sliding back into the path of lug 68. The eccentric rod 108 now is in an intermediate position (Fig. 11). The rail 128 with blade 130 is at rest in its upper-terminal position shown in Fig. 1.

Plate 61 is axially displaced into the position shown in Fig. 12, by means of the cylindrical cam 47 and by way of the intermediate lever 58, knuckle joint 59 and axle 60, and thereby moves the thread *a* on lease rods 5 into an intermediate position, in which plate 61 remains until thread *a* has been provided with a detector 147. Retainer 92 and lug 68 remain in the position shown in Fig. 11, while the eccentric rod 108 has been moved into another intermediate position. Immediately after plate 61 has reached its intermediate position according to Fig. 12, rail 128 is moved vertically by cam 99 and by way of bell-crank lever 144; and the tips of rail 128 and blade 130 drop between the threads *a* and *b*. As soon as the said tips have been moved past the threads *b*, *b1*, *b2*, blade 130 is rocked and thread *a* is brought in front of the tip of lug 68. The latter first is rocked into vertical position, its tip pointing downward, and swung into the terminal position shown in Fig. 13. Retainer 92 has not changed its position, while the tip of eccentric rod 108 has moved over thread *a* into a position rearward thereof. Thread *a* thus has been singled out over the entire width of detector-mounting and accurately located, and remains in such position until a detector 147 has been mounted thereon. The eccentric rod 108, having arrived to the rear of thread *a*, then moves thread *a* and the detector 147 mounted thereon in front of retainer 92 which, for the purpose of clearing the thread path, has been moved upwardly. As soon as the thread is positioned in front of retainer 92, the latter again drops back into its lower terminal position, thus preventing the thread from snapping back (Fig. 14).

The head end of the frontmost detector 147 is separated from its respective stack on rail 146 by virtue of control drum 88 co-operating with detector-divider 145, which motion is known in the art. According to Fig. 5 the gripper arms 107, 116 are in their initial position, while pawl 136 is in its upper terminal position, wherein it releases the detectors 147 at their upper end. According to Fig. 6, gripper arm 107 starts to oscillate and engages the top rim of the closed slot of the frontmost detector 147 which to such end has been separated from its stack by means of divider 145. Gripper arm 116 has undergone a translatory movement and, therefore, engages —above lug 146' of detector rail 146—the bottom rim of the said closed detector slot. The respective detector 147, now, has been located on the two co-acting arms 107 and 116. Pawl 136 is in its upper terminal position.

The detector divider 145 remains in its position according to Fig. 6. Gripper arm 107 is swung further upward and pulls detector 147 upward, until the centre-rib of the detector (or the top rim of its open-ended bottom slot) has been lifted over lug 146' of rail 146. Gripper arm 116 then is swung upward by detector 147, in co-action with gripper arm 107 and against the action of spring 111, the detector 147 being positively held fast by arms 107 and 116 during such lifting operation. In order to prevent the next-following detector in the head of the stack from being taken along by the detached detector in its upward movement, pawl 136 is automatically swung back into its bottom terminal position, thus pushing back any detectors in the head of the stack which might have been partly dragged forward (Fig. 7).

Gripper arm 116, now, undergoes a translatory movement, drawing detector 147 toward the guide plate 148, i. e. forward over lug 146' of rail 146 (Fig. 8). Gripper arms 116 and 107 are turned clockwise through such angle as to let the detector 147 still held thereby be engaged by the roller pair 76, 79. Since the lever 107 continues its movement until it engages in the slot of the

guide plate 148 (Fig. 2), the detector 147 will be released by it as soon as the pair of rollers 76, 79 has properly engaged the detector. The latter then feed the detector 147 downward over the spreader plate 149. On the latter, detector 147 is biased by virtue of the splayed leaves or ears 149' and temporarily splayed in the manner provided for its positive mounting onto the thread *a* held in readiness therefor (Fig. 9).

The detector then is fully ejected from the roller pair 76, 79. Pawl 136 remains in its initial position, while gripper arms 107 and 116 return into the initial position (Fig. 10).

In order to assure that a detector actually is mounted onto each warp thread, means are provided for stopping the mechanism when the detector-separator has not divided a detector. When the frontmost detector of the stack is being regularly detached and lifted by gripper arm 107, the abutment arm 117 is turned through such angle by the gripper arm 116 moved along with arm 107 that feeler arm 123, in spite of being biased by spring 124, is prevented from falling into the recess on the curved disc 98, as arm 123 then abuts against arm 117. The two coupling portions 17, 18 (Fig. 15), therefore, remain engaged and the apparatus remains in operation.

When, however, no detector has been separated (Fig. 16) gripper arm 107 will still oscillate. Owing to the missing detector (which otherwise serves as connecting link) gripper arm 116 is not taken along by gripper arm 107. Arm 116 thus is not rocked, and link 125 therefore falls into the peripheral recess of curved disc 98 by virtue of spring 124. Such engagement will rock the four-arm lever 38 by way of link 126 (which now acts as tension rod), tripping stop 26' of bell-crank lever 26, and also rocking bell-crank lever 31 by way of push bar 29, owing to the action of spring 28. The two coupling portions 17, 18 thus are disengaged, and friction cone 20 is pushed into brake ring 21, thus immediately stopping the machine. By actuating handle 22 accordingly, coupling 17, 18 is engaged again, and the operative stage shown in Fig. 15 is re-established. Rails 146 are of such slope that the detectors stacked astride thereon have the tendency to slide down against lug 146'. From such reason, the entire detector stack starts sliding, when the separator of the detector dividing-motion has detached the foremost detector.

In the example shown, the arrangement comprises six detector stacks. By exchanging the control drum 88, it becomes possible to operate with a lesser number of stacks, if desired with one only.

The stopping of the apparatus when a warp thread is missing, as well as the stepwise feed of the apparatus transversely of the warp are, as known in the art, not further described and shown.

What I claim and desire to secure by Letters Patent is:

1. An apparatus for individually and positively mounting open-ended warp-stop detectors from a plurality of stacked detector columns onto the threads divided from the warp, comprising, in combination with a warp-dividing motion, a guide plate, abutments adjacent said guide plate a detector-separating motion, and an electric-motor driving arrangement including starting and stopping means and clutch throw-out and throw-in means, said detectors each being provided with a closed slot, a detector-gripping motion associated with each said column and adapted for engagement in the closed detector slot to temporarily hold and lift the detector over an abutment into contact with a guide plate and then release same, a roller pair associated with each said column and disposed below the said guide plate and adapted to receive and feed the detector downwardly, and a spreader plate disposed below the said roller pairs and provided with a plurality of splayed ears, one for each column of stacked detectors, and adapted to deflect one of the detector legs so as to mount the deflector astride of the divided warp thread and to loosely engage the appurtenant warp-stop rail by its two legs.

2. In a detector-gripping motion set forth in claim 1, a pair of gripper arms or dogs oscillatable on a pivot each and adapted to engage the detector in its closed slot for lifting the frontmost detector of the stack, which has been separated therefrom by the known detector separating motion, vertically upward so as to clear the said stack-column abutment, one of the said gripper arms additionally being adapted to perform also a translatory movement to draw the detector forward into contact with the said guide plate.

3. In a detector-gripping motion set forth in claim 1, a pair of gripper arms oscillatable on a pivot each for the purpose described, one of the said arms being adapted, further to perform a translatory movement for the purpose of drawing the detector forward into contact with the said guide plate, and also to perform an additional oscillation subsequent to the first oscillation and the said translation and spring means for resiliently biasing the said motions.

4. In a detector-gripping motion set forth in claim 1, a pair of gripper arms oscillatable on a pivot each for the purpose described, one of the said arms being adapted to also perform a secondary oscillation, besides a primary oscillation and a translatory movement, and means co-operating with the said electric-motor driving arrangement for the purpose of stopping the entire apparatus in case when no detector has been separated from the appurtenant stack.

5. In a detector-gripping motion set forth in claim 1, a pair of gripper arms oscillatable on a pivot each, one of said arms being further adapted to perform a translatory movement and an additional oscillation subsequent to the first oscillation for the purpose described, spring means for resiliently biasing the said motions, and a curved disc-and-lever gear adapted to stop the entire apparatus when the detector-separating motion has missed in detaching a detector from a stack.

6. In a detector-gripping motion according to claim 1, and in combination with the appurtenant detector-separating motion, a controlled pawl adapted to restore any stacked detectors which might have been carried along by the detector to be separated from the stack, into their initial position.

7. In an apparatus for mounting warp-stop detectors from stacked detector columns onto the divided warp threads, set forth in claim 1, a supporting rail for each said column, and a lug integral with each said rail and adapted to hold back the detectors until they are engaged by the said detector-gripping motion, thereby at the same time properly locating them with respect to a detector-separating motion of known construction; the said rails being sloped so as to let the stacked detector column slide forward by gravity until stopped by the said lug whenever the foremost detector is separated from the stack.

8. In a detector-gripping motion defined in claim 1, a pair of rollers co-operating to feed the detector, after having been released from the said gripper arms, downwardly onto the said spreader plate.

9. In an apparatus for mounting warp-stop detectors of the class described and in combination with a detector-gripping motion set forth in claim 1, a spreader plate having leaves splayed from the plane of the plate for the purpose of spreading the open-end legs of the detectors.

10. In an apparatus for mounting warp-stop detectors of the class described and in combination with a detector-gripping motion set forth in claim 1, a warp-separating motion comprising a lug adapted to be swung lengthwise of the warp threads, intermediate of the separated and the non-separated threads, and simultaneously to be oscillated from a horizontal into a vertical position and vice-versa, for the purpose of defining the operative location of the separated thread, to be provided with a detector, with respect to the said spreader plate.

11. In an apparatus for mounting warp-stop detectors of the class described and in combination with a detector-gripping motion set forth in claim 1, a warp-separating motion comprising a reciprocable rail, and a spring-loaded blade pivoted on the said rail, the said blade being moved into the open position, after the tips of both rail and blade in their downward stroke have passed underneath the non-divided warp threads, to move the thread into the proper position for being caught by an oscillating and rockable lug, which will divide the thread from the warp over the entire width of the detector-mounting field.

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