June 18, 1963 H. E. PECK 3,094,368

FLAW RECORDER

Filed Sept. 15, 1960 3 Sheets-Sheet 1

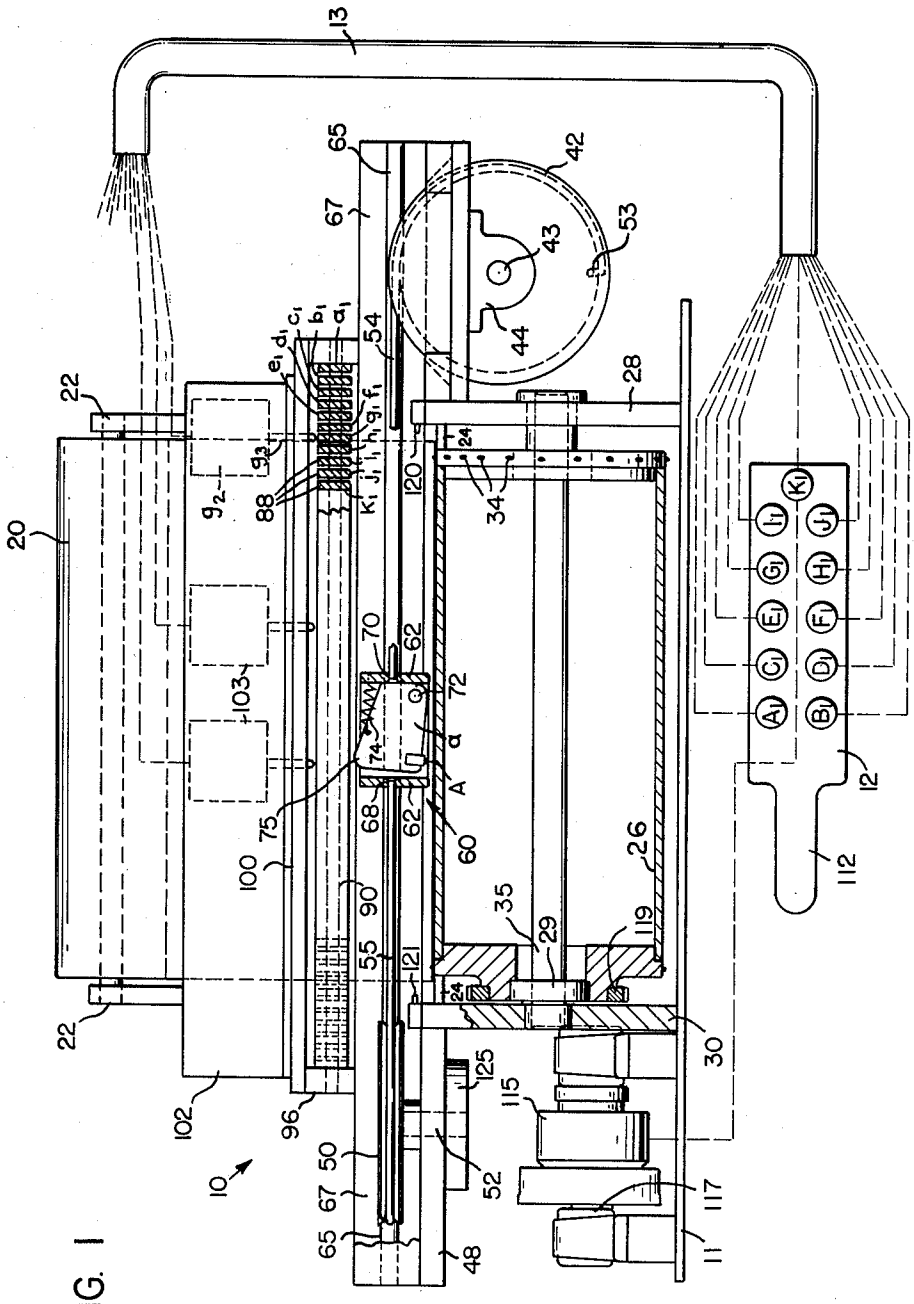


FIG. 1

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FLAW RECORDER

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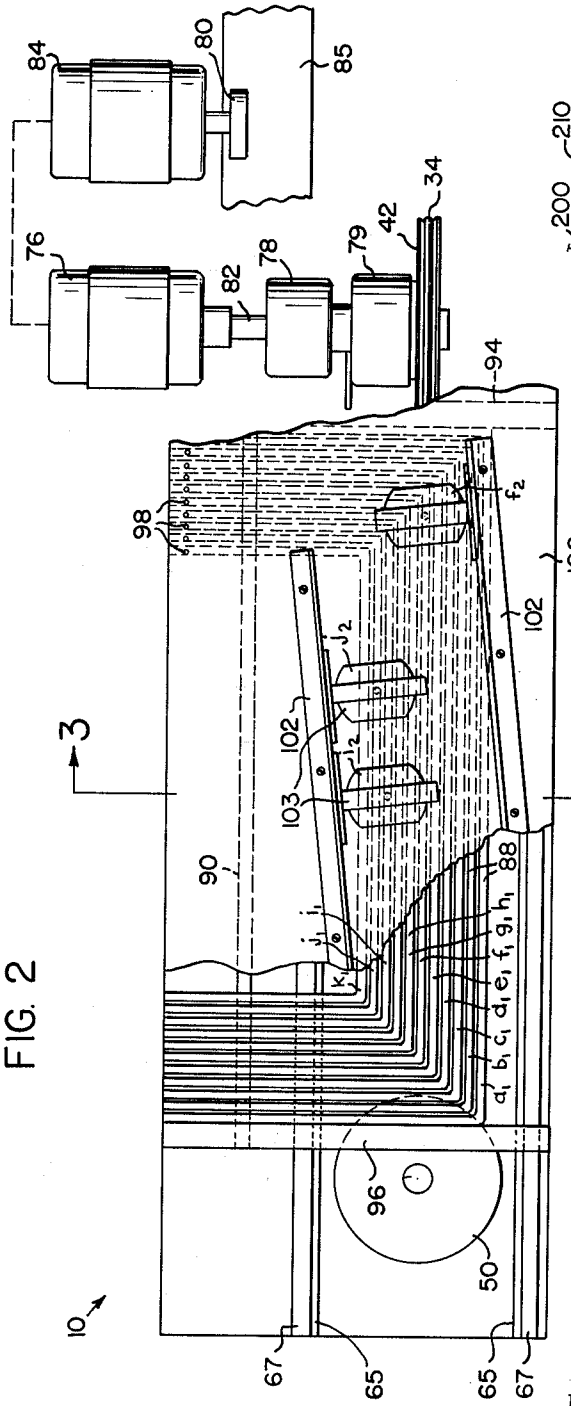


FIG. 2

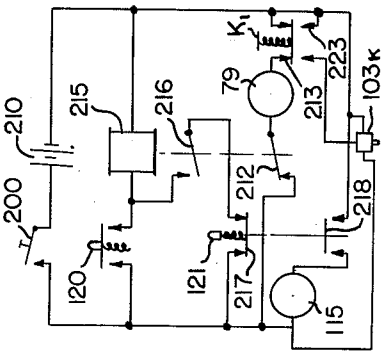


FIG. 5

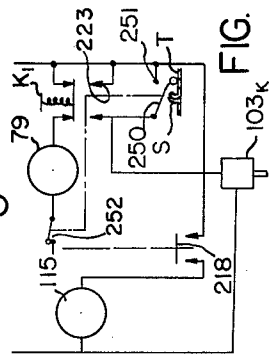


FIG. 6

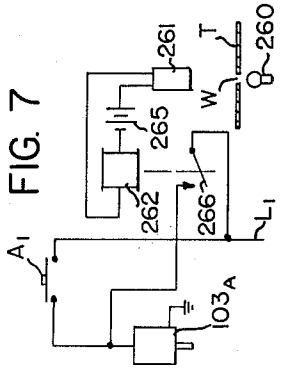


FIG. 7

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FIG. 3

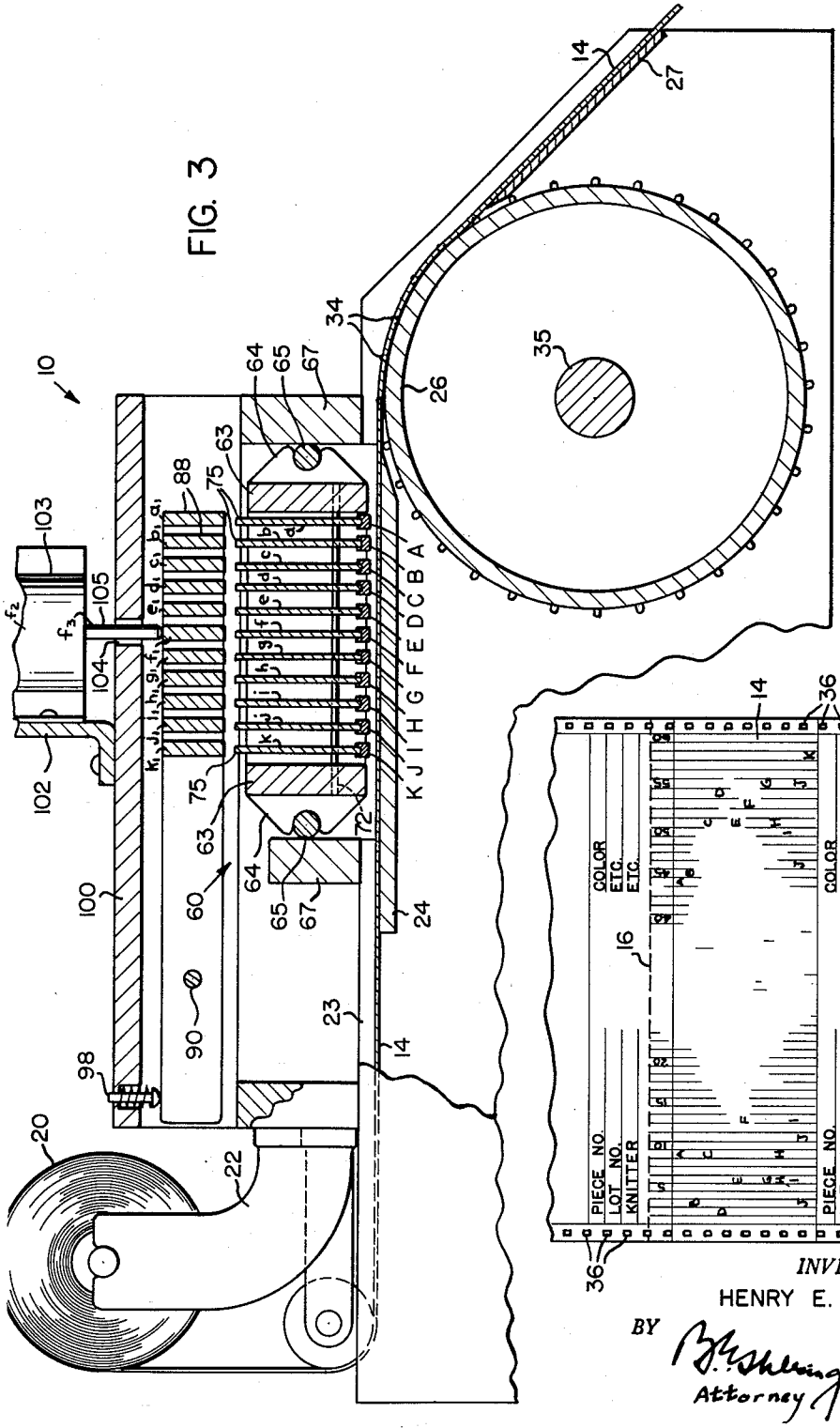


FIG. 4

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United States Patent Office 3,094,368 Patented June 18, 1963

3,094,368

FLAW RECORDER

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Filed Sept. 15, 1960, Ser. No. 56,295
7 Claims. (Cl. 346—33)

The present invention relates to a recording apparatus and more particularly to an apparatus for recording flaws and defects in a piece of fabric after it has been dyed and while, for instance, it is being conveyed by a tenter frame through, for instance, a fabric drier, and before it is rolled into a bolt.

After dyeing, fabric is usually attached to a tenter frame to carry it through a drier. The fabric may come in different lengths; but a single length of fabric may be ninety or more yards long, and may be as much as ten feet wide. In drying it may travel as fast as sixty yards per minute. After it leaves the dryer, the fabric is automatically detached from the tenter frame and rolled up into a bolt. Throughout the length of the fabric, however, there may be various types of flaws, such as holes, tears, chaff marks, knots, damaged ends, and the like. To grade the fabric properly, therefore, it is customary to try to detect and record the various types of faults and their location along the length of fabric before the fabric is rolled into a bolt.

Heretofore, an inspector stationed alongside the tenter frame has written down the various types of faults in the moving fabric as he has noticed them, noting down also as well as he could approximate or guess the particular locations of these faults along the length of fabric. This method of detection and notation is burdensome and tiresome, and at its best it is inaccurate. If the inspector looks away momentarily to make a note of a defect, he may fail to notice another possible fault in the running fabric. Moreover, the noted locations of the flaws, which he does notice and write down, are at best a rough approximation.

One object of the present invention is to provide an apparatus which will permit an inspector accurately to make a record of the flaws in a length of fabric while it is traveling at relatively high rate of speed, of the particular types of these flaws, and of their location.

In another embodiment of the invention one object of the invention is to provide apparatus which will automatically record the positions of the flaws along the length of the running fabric as it travels past one or more flaw detectors.

A further object of this invention is to provide apparatus of the character described which will automatically record the locations of the flaws regardless of the rate of travel or variation in the rate of travel of the moving length of fabric.

Another object of this invention is to provide apparatus of the character described which is so constructed that the flaws, their types, and locations, are recorded in compact form as, for instance, on a small sheet of paper, which is convenient to handle and may be attached readily to the bolt of fabric.

A still further object of the invention is to provide apparatus of the character described which will permit of recording the passage past an inspection point of the end of a piece of fabric, and which will therefore bring into operative position a record sheet for recording the flaws on the next following piece of fabric.

Still another object of the invention is to provide means which is automatically actuated to record passage past the inspection point of the end of the fabric and which is thereupon automatically operative to bring a new record sheet into position for recording the flaws in the next following piece of fabric.

Other objects of this invention will become apparent hereinafter from the description and the appended claims, particularly when read in conjunction with the accompanying drawings.

In the drawings:

FIG. 1 is a side elevation, partly in section and partly diagrammatic, of apparatus constructed according to one embodiment of this invention;

FIG. 2 is a fragmentary part plan view, part section, of this apparatus and showing diagrammatically its connection to a tenter frame conveyor;

FIG. 3 is a fragmentary section on an enlarged scale taken on line 3—3 of FIG. 2 and looking in the direction of the arrows;

FIG. 4 is a fragmentary plan view on a greatly enlarged scale of a typical permanent record, which may be made with the apparatus, showing printed thereon a typical indication of defects in a length of fabric;

FIG. 5 is a diagrammatic view of the electrical circuitry for effecting certain operations of the illustrated apparatus;

FIG. 6 is a fragmentary electrical diagram showing how the apparatus may be wired to record automatically when the end of a piece of fabric, which is being inspected, is reached; and

FIG. 7 is a fragmentary electrical diagram showing how the apparatus may be wired to record automatically the flaws in the fabric being inspected.

The recording apparatus illustrated in the drawings comprises a small compact recorder and a portable keyboard. The keyboard may be held by the person inspecting the fabric; and the recorder may be connected to the keyboard by a flexible cable. On the keyboard are a plurality of pushbuttons which are to be operated to record, respectively, different types of flaws which may occur in a length of fabric, such as tears, chaff marks, knots, etc. For recording the different flaws that may be found in the fabric specially designed paper forms are provided. A roll of these forms is mounted on the recorder; and separate forms are detachably connected together by perforations.

Each form has space for identifying the particular length of cloth that is being inspected, such as by color, type and the like, and is marked off laterally into columns of equal width. Each column represents a yard of the fabric, the column on the left hand side of the form representing the first yard in the length of fabric, the next column representing the second yard, and so on, the column at the right hand side of the form representing say the sixtieth yard of the fabric, for example.

The recorder includes a laterally-movable carriage, which carries a plurality of separate characters, such as letters of the alphabet, operable by the separate keys of the keyboard, respectively. These characters which designate, respectively, different types of flaws in the fabric are arranged in a column; and the sheet of forms is fed into the recorder beneath the carriage so that its columns extend parallel to the column of keyboard-operated characters. The carriage is connected to the tenter frame conveyor so that the carriage moves laterally across the form at a speed which is in direct proportion to the speed of the travel of the material being inspected, thereby to align the column of characters on the carriage successively with successive laterally-spaced columns of the form.

At the start of inspection of a length of fabric, the column of characters on the recorder is in registry with the left hand column of the form. When the operator sees a fault in the moving fabric he presses that pushbutton of the keyboard which corresponds to the particular type of flaw detected, thereby recording on the form the type of flaw in that column of the form which corresponds to the yard of fabric in which the flaw oc-

curs. A pushbutton is provided also on the keyboard to record the end of a length of fabric, and when this pushbutton is pressed the carriage is caused to move to starting position and a new form is indexed into position beneath the carriage. The apparatus also has means for automatically returning the carriage to starting position and indexing a new form beneath the carriage after the carriage has reached the left hand limit of its travel. This latter feature is important when an extra long length of fabric is being inspected, and more than one form is required for recording the flows of such a length of fabric.

The appartus may also be wired to indicate automatically when the end of a length of fabric has been reached. Furthermore, instead of requiring an inspector to push a button manually to designate a flaw in the fabric, the apparatus can be wired so that it will record this flaw automatically.

Referring now to the drawings by numerals of reference, the recorder is generally denoted at **10**. It is mounted on a base **11**; and the portable keyboard **12** is electrically connected to it by an elongate flexible cable **13**. The forms used in the recorder are paper forms, such as **14** (FIG. 4), supplied in a roll **20** that is scored at uniformly spaced intervals along its length to permit individual forms **14** to be separated from one another so that they can be attached to the particular bolts of fabric whose flaws they record, respectively. In FIG. 4, the score lines **16** and **18** denote opposite ends of the form **14** shown in detail in this figure.

Each form **14** has a plurality of parallel, laterally-spaced lines printed thereon to define columns that are numbered successively. Each represents a single yard of fabric. In the illustrated embodiment every fifth column only is numbered, being designated at their tops, 5, 10, 15, etc.

The roll **20** (FIG. 1) of forms **14** is rotatably mounted at the top of the recorder **10** between spaced frame members **22**. The lead end of the roll is threaded from the roll beneath a guide member **23**, over a bed **24** (FIG. 3), over a drum **26**, and a ledge **27** to the discharge end of the recorder. The guide plate **23** and bed plate **24** are mounted to extend between opposite sides of the recorder; and the drum **26** is journaled by means of anti-friction bearings **29** on a shaft **35** which is secured at opposite ends in spaced frame members **28** and **30** (FIG. 1) which project upwardly from the base **11** of the recorder. The drum **26** is provided adjacent opposite ends with a plurality of peripherally-arranged, angularly-spaced pins **34** which project radially to engage in the spaced perforations **36** (FIG. 4) provided adjacent opposite marginal edges of the forms **14**, thereby to feed the forms forward positively upon rotation of roller **26**.

A grooved, spring-loaded reel **42** (FIG. 1) is rotatably mounted by means of a shaft **43** on a bracket **44** that is rigidly attached beneath guide plates **67** (FIGS. 1 and 3) which extend outwardly from opposite sides of the recorder. A similar grooved reel **50** is rotatably journaled by means of shaft **52** in a plate **48** which is also secured beneath the guide plates **67** but at the opposite ends thereor. The reel **50** is mounted to rotate on a vertical axis while the reel **42** is mounted to rotate on a horizontal axis. Secured at one end to the reel **42** as indicated at **53** is a ladder chain or non-stretchable cable **54**, the opposite end of which is attached at **70** to one side plate **62** of a carriage denoted as a whole at **60**. Secured to the opposite side plate **62** of the carriage **60** at **68** is one end of a second non-stretchable ladder chain or cable **55**, the opposite end of which is secured to the reel **50**.

The carriage **60** is mounted to travel above bed **24** (FIG. 3) in a direction perpendicular to the plane of FIG. 3; and it has front and rear end plates **63** which are formed with grooved projections **64** that engage and slide on rods **65** that are welded or otherwise secured to the guide plates **67**. Pivotally mounted on a shaft **72** which is mounted between the front and rear end plates **63** of the carriage **60** are a plurality of spaced plates designated consecutively and in alphabetical order at *a* through *k* (FIG. 3). These plates *a* through *k* are constantly urged, independently of one another, in a clockwise direction, as viewed in FIG. 1, about the axis of shaft **72** by a plurality of springs **74**, one of which is connected between the upper edge of each one of the plates and the right hand side member **62** of the carriage. Each plate *a* through *k* is constantly urged by its spring **74** to have a portion **75** protruding above the body portion of the carriage **60** as shown in FIG. 1. Each plate *a* through *k* has mounted on it and extending downwardly from its bottom a distinctive type character. The plate *a* carries type character A, plate *b* bears type character B and so on in alphabetical order up to and including plate *k* which carries the type character K. The springs **74** normally hold the plates *a* through *k*, as shown in FIG. 1, in such position that their respective type characters are spaced slightly above the form **14** lying on the bed plate **24**.

Each distinct type character represents a particular kind of flaw. For example, character A may represent a chaff mark, B may represent a tear, C may represent a hole, etc. The character K, however, represents the end of a length of fabric.

The reel **42** is driven in a clockwise direction, as viewed in FIG. 1, in time with the tenter frame of the drier, to move the carriage **60** from left to right in FIG. 1 to shift the column of type characters A through K into registry successively with the different columns of the form **14** that is at the time on bed plate **24**. The reel **42** is driven by a receiver selsyn motor **76** (FIG. 2) whose armature shaft **82** is connected through a suitable gear reduction unit **78** and a magnetic clutch **79** with the shaft **43** on which the reel **42** is mounted. The motor **76** is driven by and connected in a well-known manner to a transmitter selsyn motor **84** so that rotation of the motor **84** causes a proportionate rotation or displacement of the motor **76**. The rate of rotation of motor **84** may be controlled by a gear **80** which is operatively connected to the conveyor or tenter frame, illustrated diagrammatically in FIG. 2 at **85**, on which the fabric is carried through the drier. This insures that the motor **84** and the motor **76** will rotate at a rate of speed proportional to the rate of travel of the tenter frame conveyor. The gear **80** may be driven by the conveyor motor or in any other suitable manner. In one embodiment of the invention the gear reduction unit **78** is so designed that the reel **42** is rotated to move the carriage **60** from left to right, as viewed in FIG. 1, laterally across a form **14** on the bed **24** a distance of 8½ inches for 60 yards travel of the fabric. This ratio has been found practical even when the fabric is moving past a given point at the rate of 1 yard per second, although in actual practice the speed of the moving fabric may be somewhat slower.

Pivotally mounted above the carriage **60** are a plurality of U-shaped bail bars **88** designated in alphabetical order at a_1 through k_1. These bail bars a_1 through k_1 are mounted to pivot independently or one another on a shaft **90** which is attached at opposite ends to frame members **94** and **96** (FIGS. 1 and 2). The bail bars a_1 through k_1, are nested together and are so positioned that the bight portion of each bail bar is slightly spaced directly above and in registry with that one of the plates *a* through *k* which it is intended to operate. The bight portion of bail bar a_1 is above plate *a*, bar b_1 is above plate *b* and so on through bail bar k_1 which is above plate *k*. The pivotal axis of the bail bars is at right angles to the pivotal axis of the plates *a* to *k*; and the spacing of the bight portions of the bail bars from one another is the same as the spacing of the plates *a* to *k* from one another. The bight portion of each bail bar is long enough so that regardless of the lateral position of the carriage **60** in its travel, the bail bar can strike, when rocked, the portion **75** of the plate *a* through *k* associated therewith.

Each bail bar is constantly urged yieldingly away from

its associated plate *a* through *k* by a spring-pressed plunger **98** (FIG. 3). These plungers are mounted in the top plate **100** of the recorder and engage the tail portions of the bail bars. Mounted on the plate **100** and rigidly attached thereto are two angle iron bars **102** to which are attached solenoids **103** for rocking the bail bars about their pivot shaft **90** against the resistance of the spring-pressed plungers **98**, thereby to strike the plates *a* to *k*, respectively, associated with the several bail bars, respectively. There is one solenoid for each bail bar. Three of the solenoids are denoted at g_2, i_2 and j_2 in FIGS. 1 and 2. Some of the solenoids are mounted on one bar **102**; and others are mounted on the other bar. This is just a matter of convenience in mounting. Each of the solenoids has a reciprocable armature or shaft **105**. Two of these are designated f_3 (FIG. 3) and g_3 (FIG. 1). Each extends downwardly through an opening **104** provided therefor in plate **100**. The solenoids are so positioned that their armatures operatively engage the associated bail bars. When a solenoid is deenergized, its armature is in its retracted position to rest lightly against the associated bail bar, and when a solenoid is energized its armature pushes the associated bail bar downwardly so that the bight portion thereof engages the associated plate *a* through *k* to cause the type character A through K carried by the plate to strike the form **14** on the bed **24**, thereby denoting the flaw.

An inked ribbon (not shown) may be positioned below the type characters A through K to print on the form **14**, or these charcaters may have cutting surfaces to punch the form in a distinctive manner.

The portable keyboard **12**, which is used when the recording mechanism is to be manually operated, has a handle portion **112** for holding it. Mounted on this keyboard is a plurality of manually operable push buttons designated at A_1 through K_1, respectively. Each of these is electrically connected through a wire in cable **13** to one of the solenoids **103** so that when it is pushed it closes a circuit momentarily for energizing the associated solenoid. The pushing of button K_1 in addition to energizing its associated solenoid also actuates a conventional one revolution clutch **115** (FIGS. 1 and 5), operatively connected between the armature shaft of a motor **117** and a gear **119**. Gear **119** is secured to drum **26**. When the clutch **115** is engaged then, the drum **26** is rotated through a predetermined angle to cause the drum **26** to advance to the delivery ledge **27** of the recorder the form **14** corresponding to the length of fabric, which has just been inspected, and to index a new form **14** into recording position on the bed **24**.

A micro-switch **120** (FIGS. 1 and 5) is positioned or mounted on the frame member **28** to be engaged by the carriage **60** when the carriage reaches the right hand limit of its travel to open the magnetic clutch **79** (FIGS. 2 and 5), and a microswitch **121** is mounted on the frame member **30** to be engaged by the carriage **60** when it is at the left hand limit of its travel as viewed in FIG. 1, to energize the magnetic clutch **79** again. The pulley **50** is spring-loaded by means of coil-spring **125** to return the carriage **60** to the left hand limit of its travel quickly, when the circuit to the magnetic clutch **79** is broken.

The micro-switches **120** and **121**, the magnetic clutch **79**, the one revolution clutch **115**, and the button K_1 are connected electrically in a circuit, such as is diagrammatically illustrated in FIG. 5 which will be described in detail in connection with the operation of the apparatus.

In setting up the apparatus for use, a roll **20** of forms **14** is mounted on the recorder and unrolled far enough for a form **14** to be in recording position on the bed **24** and for the pins or projections **34** on the drum **26** to engage in the holes **36** of the paper. The carriage **60** is then at the left hand limit of its travel as viewed in FIG. 1. The device is now ready for operation.

When the inspector sees the forward edge of the length of fabric to be inspected reach a predetermined inspection point, he closes switch **200** (FIG. 5) which may be located at any suitable position, such as on the keyboard **12**. The closing of switch **200** energizes the magnetic clutch **79** by a circuit which extends from the plus terminal of a battery or other suitable source of current denoted at **210**, and includes switch **200**, contact **212** of a relay **215**, the magnetic clutch **79**, and closed contacts **213** of the normally-closed pushbutton K_1, to the minus terminal of the battery **210**. This causes the motor **76** to drive the reel **42** to move the carriage **60** laterally across the form **14** from left to right, at a speed which is directly proportional to the speed of travel of the fabric. If the device is being manually operated, and the operator sees a flaw in the fabric, say a chaff mark, for example, he presses the button which is provided to indicate that type of flaw, say the pushbutton B_1. This causes the associated type character, B in the instance suggested, to strike the form **14** to print or otherwise record thereon this flaw. If this flaw were three yards from the leading or front edge of the fabric, for example, the carriage **60** would have moved by that time far enough for the character B to be above the third column of the form; and the letter B would print in this column, as shown in FIG. 4.

A plurality of buttons A_1 through K_1 on the keyboard **12** may be operated simultaneously, causing the type characters corresponding to the buttons pushed to record simultaneously and in the same column, denotitng more than one type of flaw at that particular yard of the fabric.

Assuming that the length of fabric being inspected is longer than sixty yards for example, thus making it necessary to use two forms **14** to record the inspection of that length of fabric, when the carriage **60** reaches the right hand limit of it travel, as viewed in FIG. 1, which denotes that sixty yards of fabric have passed that inspection point, the carriage **60** will hit micro-switch **120**. This operates micro-switch **120** to energize relay **215** by a circuit which extends from the + side of the battery **210** and includes closed switch **200**, micro-switch **120**, and the winding of the relay **215** to the (—) terminal of the battery **210**. The energizing of relay **215** opens its contact **212** deenergizing the magnetic clutch **79**. The deenergizing of the clutch **79** permits the spring-loaded reel **50** to quickly move the carriage **60** to the left hand limit of its travel as viewed in FIG. 1.

The energizing of relay **215**, also closes its front contact **216**. This holds the relay **215** energized through a circuit which extends from + and includes switch **200**, normally-closed contact **217** of micro-switch **121**, front contact **216**, and the winding of the relay **215** to (—). This prevents the clutch **79** from engaging after the carriage **60** moves out of contact with the micro-switch **120** and before the carriage reaches the left hand limit of its travel.

When the carriage **60** reaches the left hand limit of its travel and is in line with column 1 on the form **14**, it opens micro-switch **121** opening contact **217** and closing contact **218**. This breaks the holding circuit for relay **215**, causing the clutch **79** to be reenergized, and it simultaneously energizes the one revolution clutch **115** to cause drum **26** to move the now completed record out of the machine and to move a new form onto the bed **24**. This entire operation occurs quickly and without attention on the part of the inspector.

When the end of a length of fabric passes the inspection point, the inspector presses button K_1. This opens the closed contacts **213**, causing the clutch **79** to become disengaged by opening its previously described energizing circuit. This permits the spring-loaded reel **50** to move the carriage **60** back to starting position or to the left hand limit of its travel, as viewed in FIG. 1. The pushing of button K_1 also closes contacts **223** to close a circuit to the solenoid 103_k which operates the bail k_1 just prior to the movement of carriage **60** to the left in FIG. 1, causing a distinctive mark to be made on the form denoting the end of the piece of fabric. This mark al-

though described herein as being the type character K, may be a star, for example, or any other distinguishing mark. When the carriage **60** reaches its starting position it strikes switch **121** to once again close the circuit to the one revolution clutch **115** through contact **218**, thereby moving the completed form **14** out of the recorder and indexing a new form **14** into recording position. The inspector then merely detaches the completed from **14** from the roll **20** and may pin or otherwise attach it to the bolt of fabric inspected. This form has permanently imprinted thereon an accurate record of all the various flaws which exist in the particular length of fabric, their location along its length, and a record of the number of yards in a particular bolt as well.

In addition to being manually operated, as described, to record the end of a length of fabric and to index the completed form **14** to the delivery ledge **27** and to bring a new form **14** into recording position, the apparatus can be wired so that the end of the piece of fabric will be recorded automatically and the simultaneous indexing of the completed form out of, and of a new form into, recording position will be effected automatically. One way in which this may be done is shown in FIG. 6.

It is the practice to sew successive lengths of fabric together. This produces a seam at the juncture of adjacent ends of successive pieces of fabric which is at least double the thickness of the fabric. In FIG. 6, T denotes the fabric being inspected, and S denotes the bunch or seam between two adjoining lengths of fabric. **250** denotes a feeler positioned to ride on the fabric T and temporarily to close switch contacts at **251** and to open switch contacts at **252**, simultaneously, when it rides up on the thicker bunch of material at the seam S. Closing of the contact at **251** closes a circuit to solenoid 103_k, to mark on the form **14**, which is at the recording station, the end of the piece of fabric. Opening of the switch contact at **252** deenergizes clutch **79** so that carriage **60** is returned to its starting position where it strikes switch **121** and enerizes clutch **115**, thereby to index a form away from recording position and to bring another form into recording position. The apparatus may be otherwise wired as illustrated in FIG. 5.

Instead of manually operating the pushbuttons A_1 to J_1, to actuate the solenoids **103** for actuating the markers A to J, the machine can also be wired to detect flaws automatically and to actuate these solenoids correspondingly automatically. Detection of the flaws may be effected by light beams and photoelectric cells, or by feelers. FIG. 7 shows the way in which the apparatus may be wired to detect flaws when using light beams and photoelectric cells.

T again denotes the fabric; L_1 the positive side of the battery; and W denotes a hole or other flaw therein. When the flaw W passes in front of the light source **260**, the light beam from this source falls on the photoelectric eye **261** closing a circuit to a relay coil **262** through the battery **265**. Energization of relay coil **262** closes the contact **266** of the relay, which is wired in parallel with, say, the button A_1 (FIG. 1), thereby closing the circuit to the solenoid 103_A that operates bail a_1 and marker A. The rest of the circuit may be the same as disclosed in FIG. 5.

Other flaws than holes can be deteched automatically by providing other light beams and photoelectric cells which may be masked to respond to passage of these other kind of flaws therebetween, or instead of using light beams and photoelectric cells, spring-pressed feelers may be employed. These feelers may be of different shapes and may be connected so that when they engage the different flaws, which they are adapted, respectively, to detect, they may close a contact similar to that at **251** in FIG. 6, to close a circuit to the associated solenoid **103**. On course, for complete detection, the light beams and photoelectric cells should be positioned to cover or to travel over the full width of the fabric, as should the feelers also.

Before start of a recording operation or after its finish, the operator writes on the spaces provided therefor as illustrated in FIG. 4 data identifying the length of fabric inspected or to be inspected.

Thus, I have provided an apparatus which, without interfering with the rate of processing of the fabric, permits an operator accurately to make a record of fabric flaws of various types, and which automatically designates the position of these flaws in the length of fabric.

While the invention has been described in connection with a specific embodiment thereof, it will be understood that it is capable of further modification, and this application is intended to cover any variations, uses, or adaptations of the invention following, in general, the principles of the invention and including such departures from the present disclosure as come within known or customary practice in the art to which the invention pertains and as may be applied to the essential features hereinbefore set forth, and as fall within the scope of the invention or the limits of the appended claims.

Having thus described my invention what I claim is:

1. Apparatus for making a record of flaws in an elongate piece of material while the material is traveling past an inspection point, comprising a keyboard, a plurality of manually-operable separately-movable buttons mounted on said keyboard, each of said buttons representing, respectively, a separate type of flaw and adapted to be actuated when the corresponding flaw in the material passes the inspection point, a frame, a bed mounted in said frame for supporting a record form, a carriage slidably mounted on said frame in operative relation to said bed, a plurality of aligned marking members movably mounted in said carriage and spaced from one another in a direction perpendicular to the direction of movement of said carriage, spring means constantly urging said marking members away from said bed, means connected to said carriage to move said carriage in one direction substantially parallel to the surface of said bed at a rate of speed proportional to the rate of speed of travel of the piece of material, a plurality of bail bars movably mounted on said frame above said carriage, each of said bail bars having an elongated portion spaced above a respective marking member and extending a distance at least equal to the maximum travel of said carriage, spring means constantly urging said bail bars in one direction away from said marking members, a plurality of electromagnetic means mounted in engagement with said bail bars and each operative when energized to engage a respective bail bar to cause the elongate portion thereof to engage a marking member to cause said marking member to mark the form positioned on said bed, and electrical circuit means connecting each of said manually-operable buttons to one of said electromagnetic means for energizing a respective electromagnetic means when a corresponding button is actuated, thereby causing a record to be made on said form in a position corresponding to the location of the flaw along the longitudinal length of the material.

2. Apparatus for making a record on a form, which has laterally-spaced, parallel record columns and a width corresponding to a certain length of material, of flaws in the material while the material is being moved lengthwise past an inspection station, said apparatus comprising a bed for supporting the form, a carriage mounted for movement over said bed, means operatively connected to said carriage to move said carriage across said form transverse to the record columns thereon and at a rate of speed in direct ratio to the speed of lengthwise movement of the material, a plurality of aligned marking members movably mounted in a column on said carriage and spaced from one another in a direction perpendicular to the direction of movement of said carriage

and parallel to the record columns on said form, each of said marking members representing a different type of flaw, a keyboard, a plurality of manually-operable keys movably mounted on said keyboard, means operatively connecting each key to a respective marking member to cause a respective marking member to mark on the form when the corresponding key is actuated, whereby a distinctive mark may be made upon the form, in a location corresponding to the location lengthwise of a distinctive fault in said length of material, while the material is moving past the inspection station.

3. Apparatus for making a record on a form of flaws in a length of material as it travels past an inspection station, comprising a support for holding a form, a second support, a plurality of marking members pivotally mounted on said second support in axially spaced relation on a first common pivotal axis, different marking members designating, respectively, different flaws in the material, means for moving one of said supports relative to the other in a direction at right angles to said first common pivotal axis, a plurality of actuating members pivotal on a second common axis at right angles to said first common axis and extending in the direction of movement of said movable support, there being one of said actuating members for each of said marking members, each of said actuating members having an operating portion aligned with the marking member that is associated therewith, the operating portions of the separate actuating members being spaced different radial distances from said second common axis and extending for the full width of travel of the associated marking member with said movable support, said actuating members being selectively actuatable during movement of said movable support, and means for moving said movable support at a rate of speed proportional to the travel of said material.

4. Apparatus for making a record of flaws in an elongate web, which is made up of a plurality of pieces of material joined together, while the web is traveling past an inspection station, said apparatus comprising a support for a form on which the flaws are to be recorded, means for intermittently and successively feeding forms onto said support, marking means mounted adjacent said support, means for detecting when the end of each piece of material passes said inspection station, and means operatively connecting said detection means to said marking means and said feeding means to actuate said marking means and said feeding means, when said detecting means is operated, successively to mark the form on said support, and to feed a new form onto said support.

5. Apparatus for making a record of flaws in an elongate web, which is made up of a plurality of pieces of material joined together, while the web is traveling past an inspection station, said apparatus comprising a support for holding a record form, a second support, a plurality of marking members movably mounted on said second support in operative relation to the form, different marking members designating, respectively, different flaws in the material, means for moving one of said supports relative to the other at a rate proportional to the rate of travel of the web, means for stopping movement of the movable support when it has traveled to a predetermined position, means for returning said movable support to its starting position upon said stoppage, and means for detecting when each piece of material passes said inspection station, and means connecting said detecting means to said stopping means to stop movement of said movable support and to cause its return to said starting position when said detecting means is operated.

6. Apparatus for making a record on a form of flaws in a web, which is made up of a plurality of pieces of material joined together, as the web is traveling past an inspection station, comprising means for holding a supply of forms, a support for holding one of said forms, a second support, a plurality of marking members movably mounted on said second support in operative relation to said one form, different marking members designating, respectively, different flaws in the material, means for moving one of said supports relative to the other in one direction at a rate proportional to the rate of travel of the web, means for stopping movement of said movable support when it has traveled a predetermined distance, means for returning said movable support to its starting position upon said stoppage, means for detecting when each piece of material passes said inspection station, means connecting said detecting means to said stopping means to stop movement of said movable support and to cause its return to said starting position when said detecting means is operated, and means operative upon stoppage of said movable support for moving a form off its support and moving another form from said supply holding means into position on said form support.

7. Apparatus as claimed in claim 6, having means for automatically restarting movement of said movable support in said one direction upon return of said movable support to its starting position.

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