United States Patent [19]

Aldo

[11] **3,925,143**

[45] **Dec. 9, 1975**

[54] **METHOD AND APPARATUS FOR AUTOMATICALLY SPLICING FILM**

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[21] Appl. No.: **475,946**

[52] **U.S. Cl.** **156/505;** 156/159; 156/506; 156/507

[51] **Int. Cl.²** **G03D 15/04**

[58] **Field of Search** 156/157, 159, 502, 505, 156/506, 267, 269, 304, 507, 508, 510, 516, 517, 543

[56] **References Cited**

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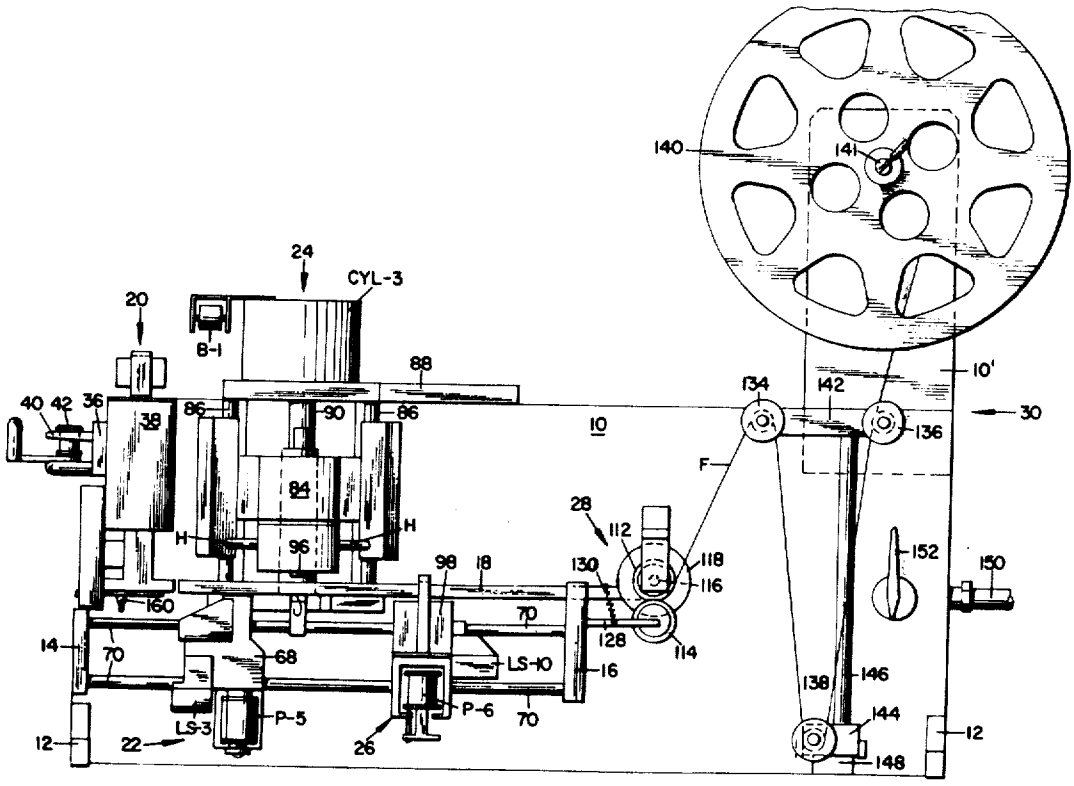
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Primary Examiner—William A. Powell
Assistant Examiner—Brian J. Leitten
Attorney, Agent, or Firm—Ross, Ross & Flavin

[57] **ABSTRACT**

A method and apparatus for assisting the photofinisher in securing together, in a continuous master roll, a plurality of film strips for purposes of subsequently processing same. The apparatus severs the trailing end of a first film strip or leader previously introduced thereinto, severs the leading end of a second film strip following its introduction thereinto, photographically codes that second film strip for ready identification, and secures the adjacent ends of the two (first and second) film strips together with an interconnecting tab to form the two films as integral parts of the continuous master roll.

5 Claims, 17 Drawing Figures



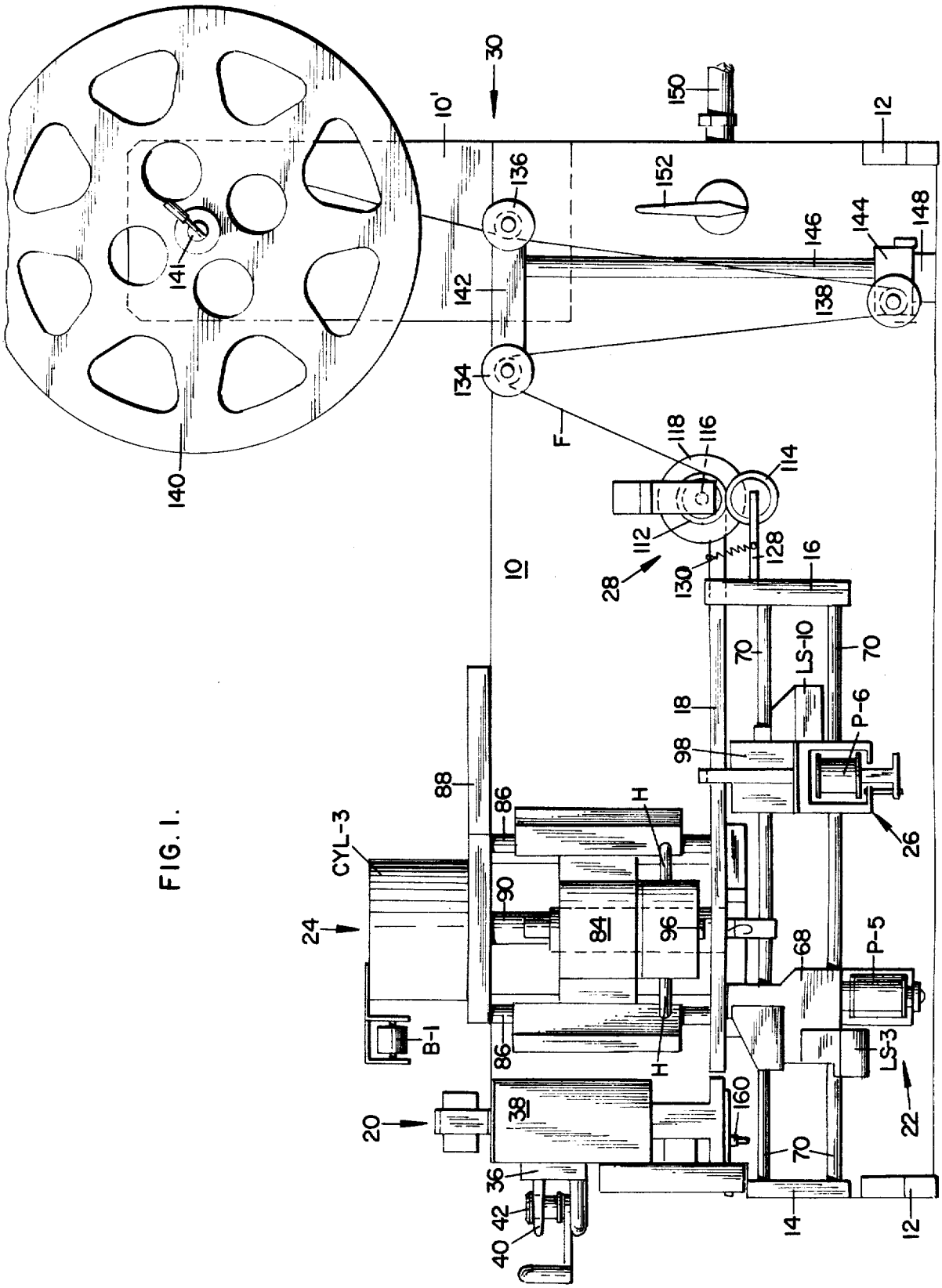

10'
30
150
12
136
152
146
144
148
141
142
138
134
F
140
118
116
114
112
128
16
28
130
10
70
LS-10
70
18
P-6
98
88
86
H
26
CYL-3
90
24
84
96
68
P-5
B-1
86
H
LS-3
22
160
20
38
70
36
42
40
14
12

FIG. 1.

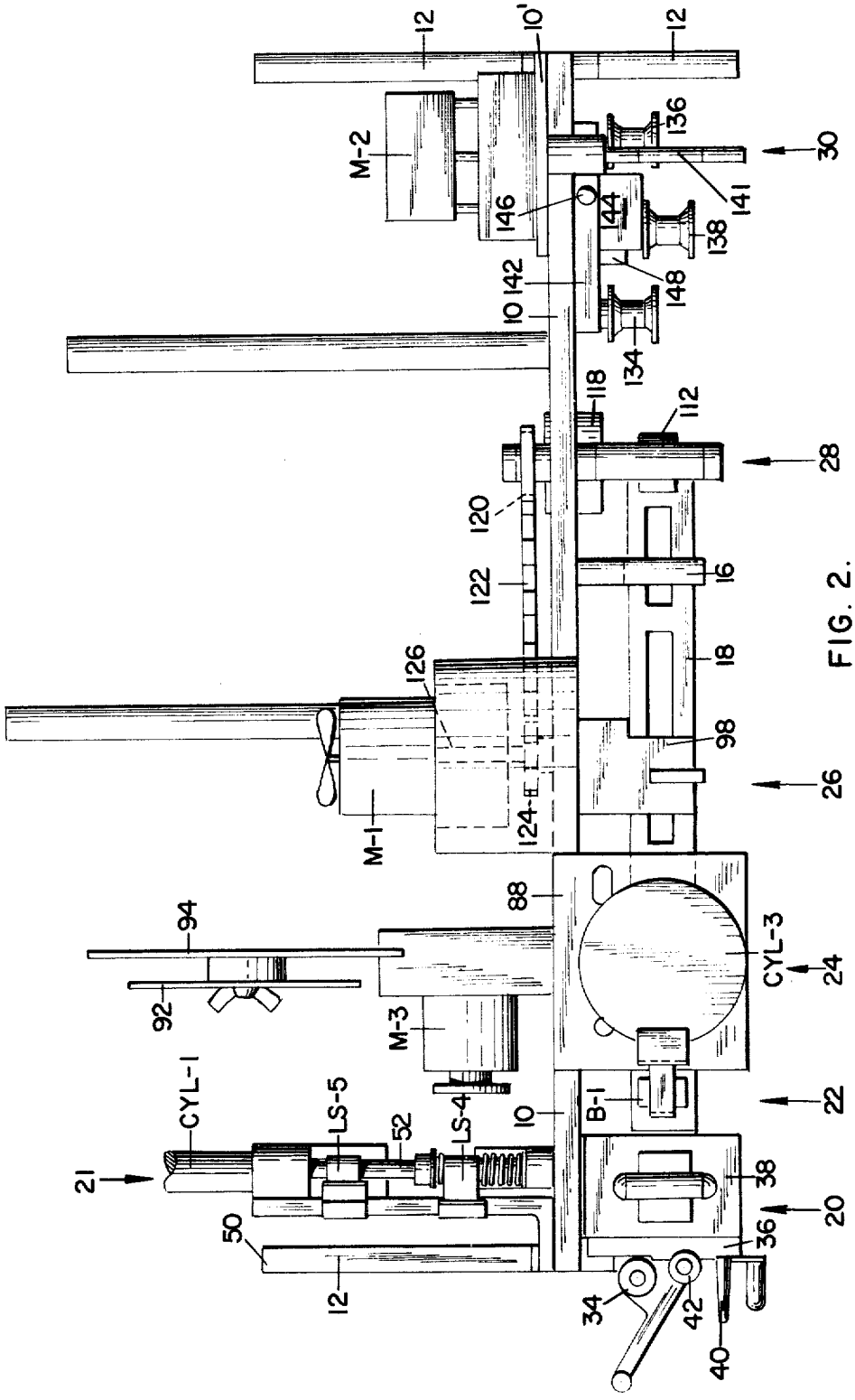

12
10'
12
M-2
136
30
146
144
141
138
142
148
10
134
118
112
28
120
122
16
18
126
98
26
M-1
124
88
94
CYL-3
24
92
M-3
CYL-1
LS-5
52
LS-4
10
B-1
22
21
38
20
50
36
12
34
42
40

FIG. 2.

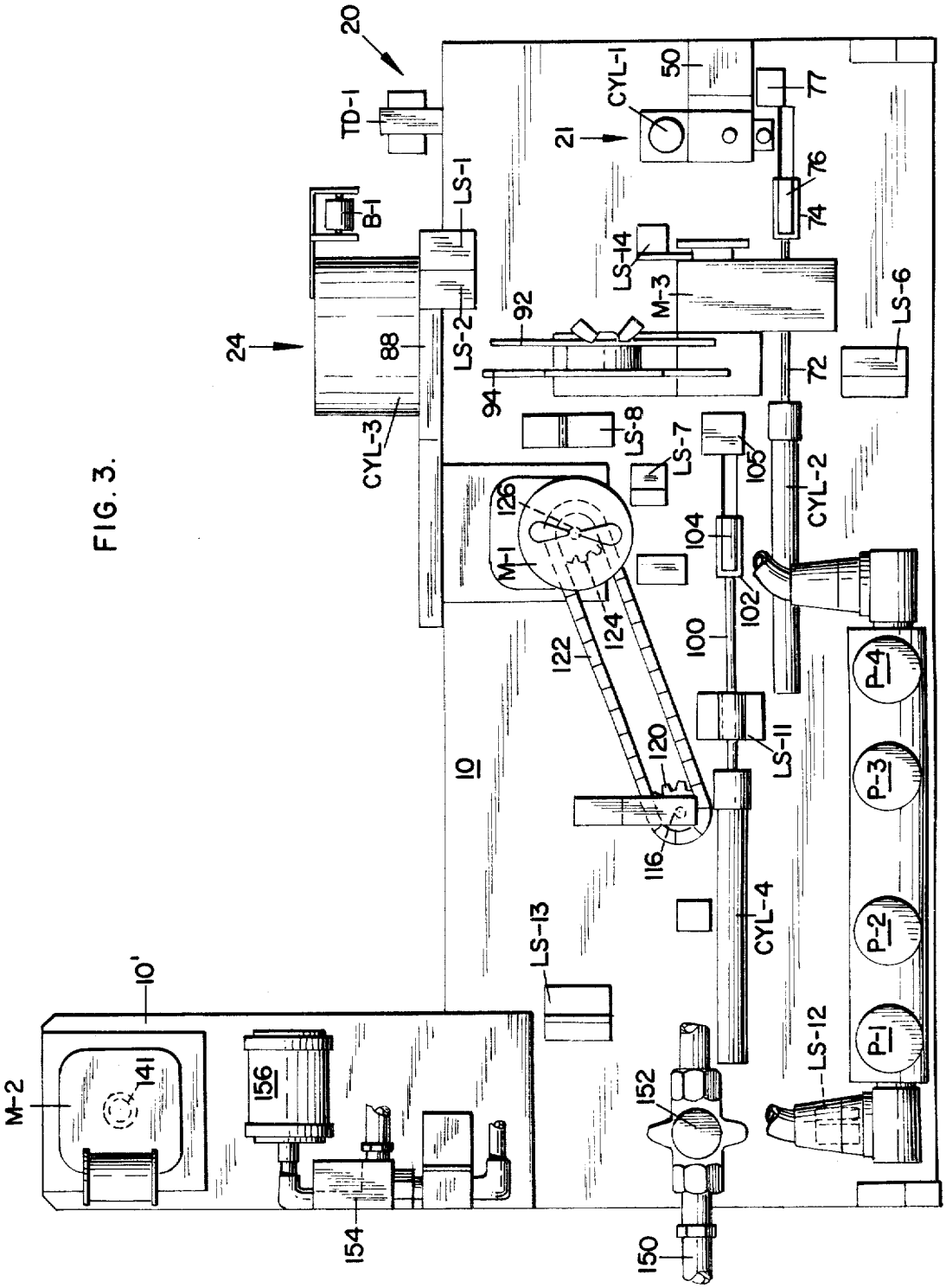

20
TD-1
21
CYL-1
50
77
76
74
B-1
LS-1
LS-14
M-3
LS-6
24
88
LS-2
92
94
72
CYL-3
LS-8
LS-7
105
CYL-2
126
M-1
104
102
124
122
100
P-4
P-3
P-2
P-1
10
120
LS-11
116
CYL-4
LS-13
LS-12
10'
M-2
141
156
152
154
150

FIG. 3.

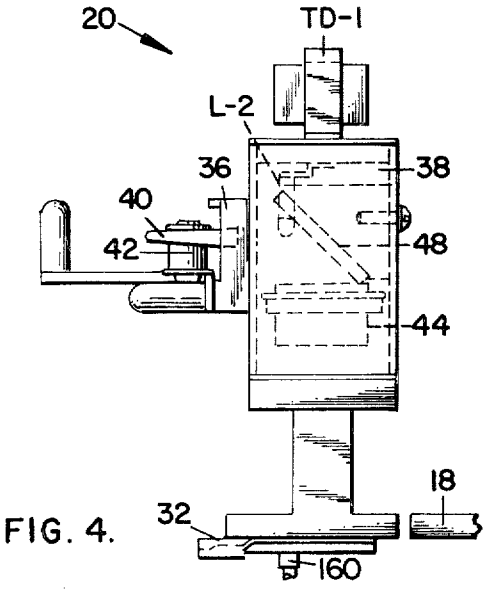


FIG. 4.

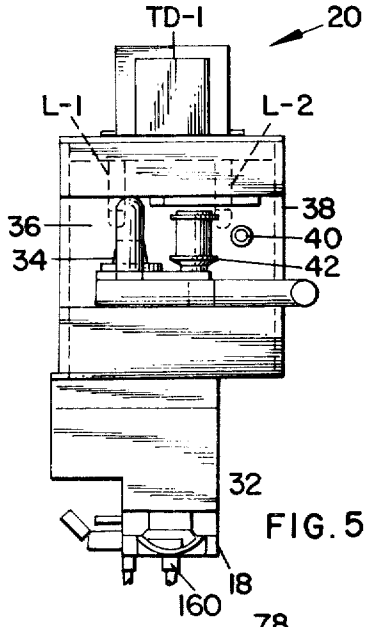


FIG. 5.

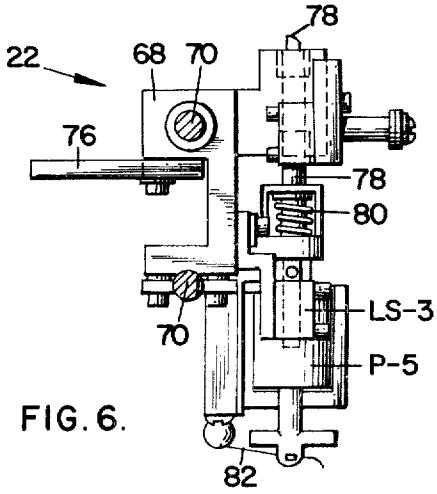


FIG. 6.

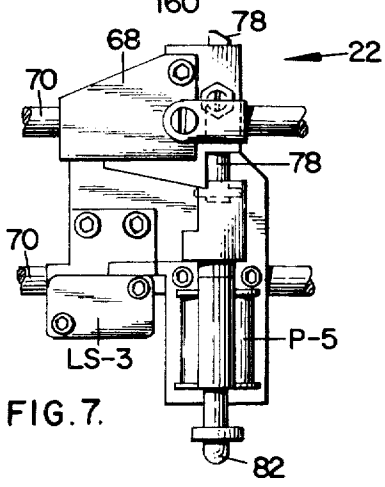


FIG. 7.

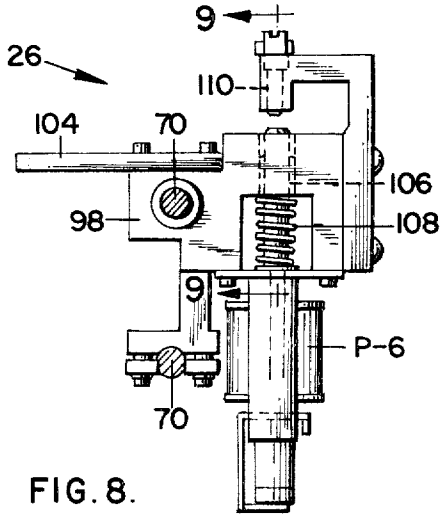


FIG. 8.

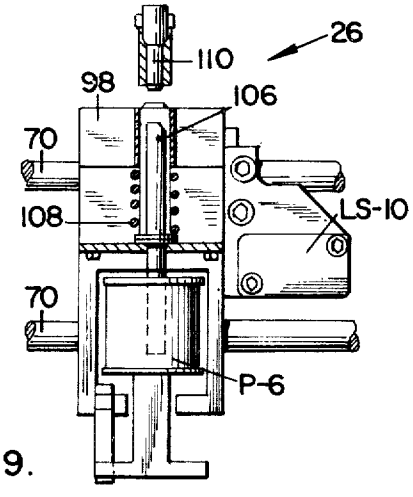


FIG. 9.

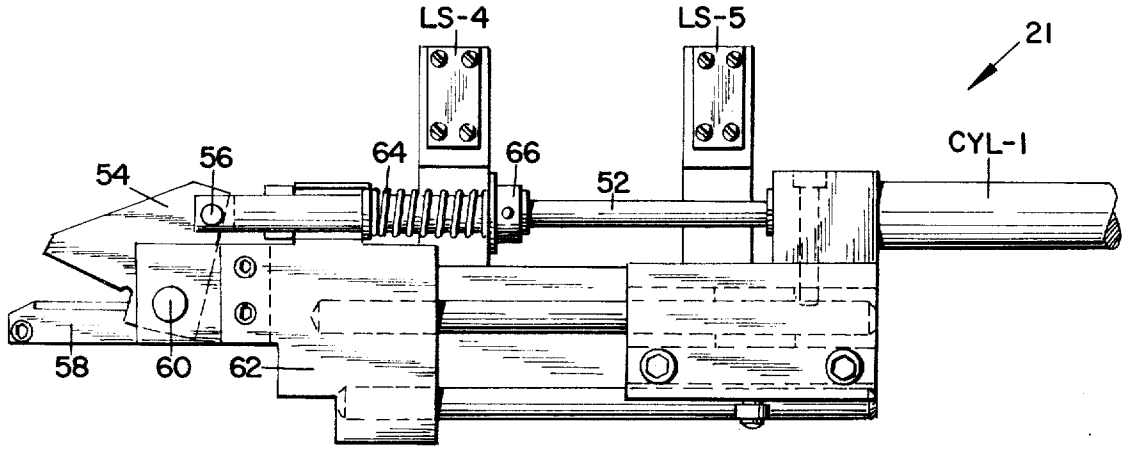


FIG. 10.

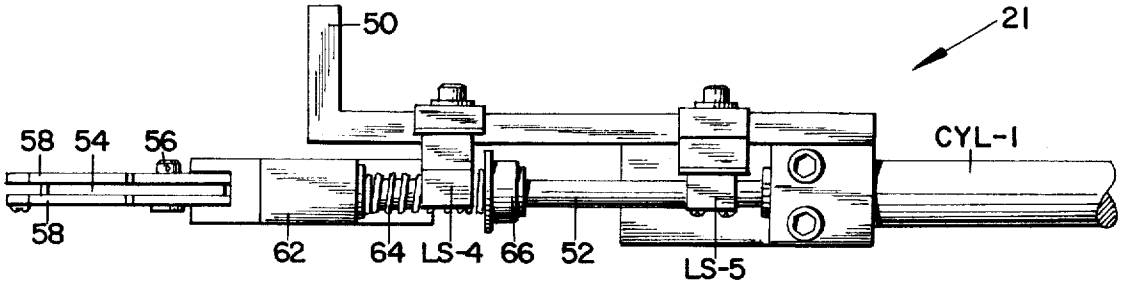


FIG. 11.

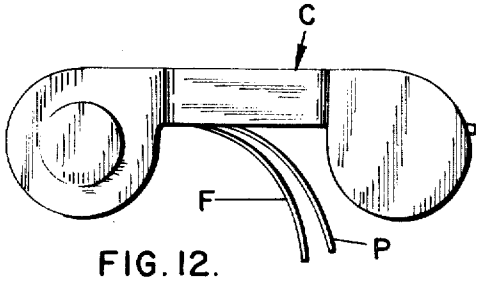


FIG. 12.

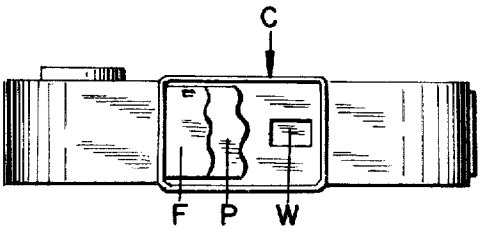


FIG. 14

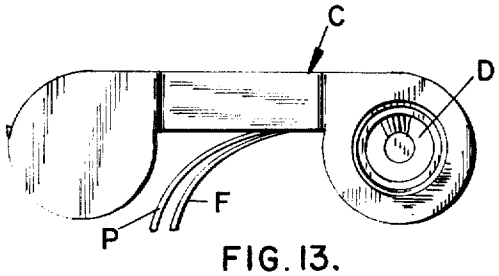


FIG. 13.

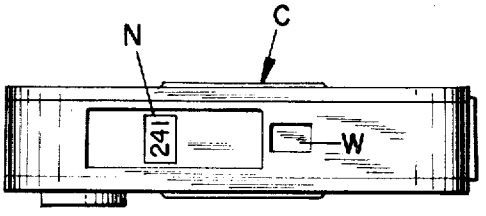


FIG. 15.

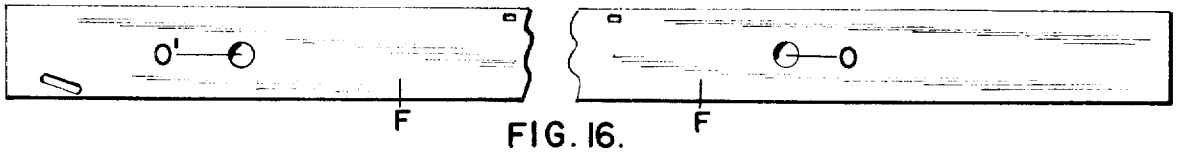


FIG. 16.

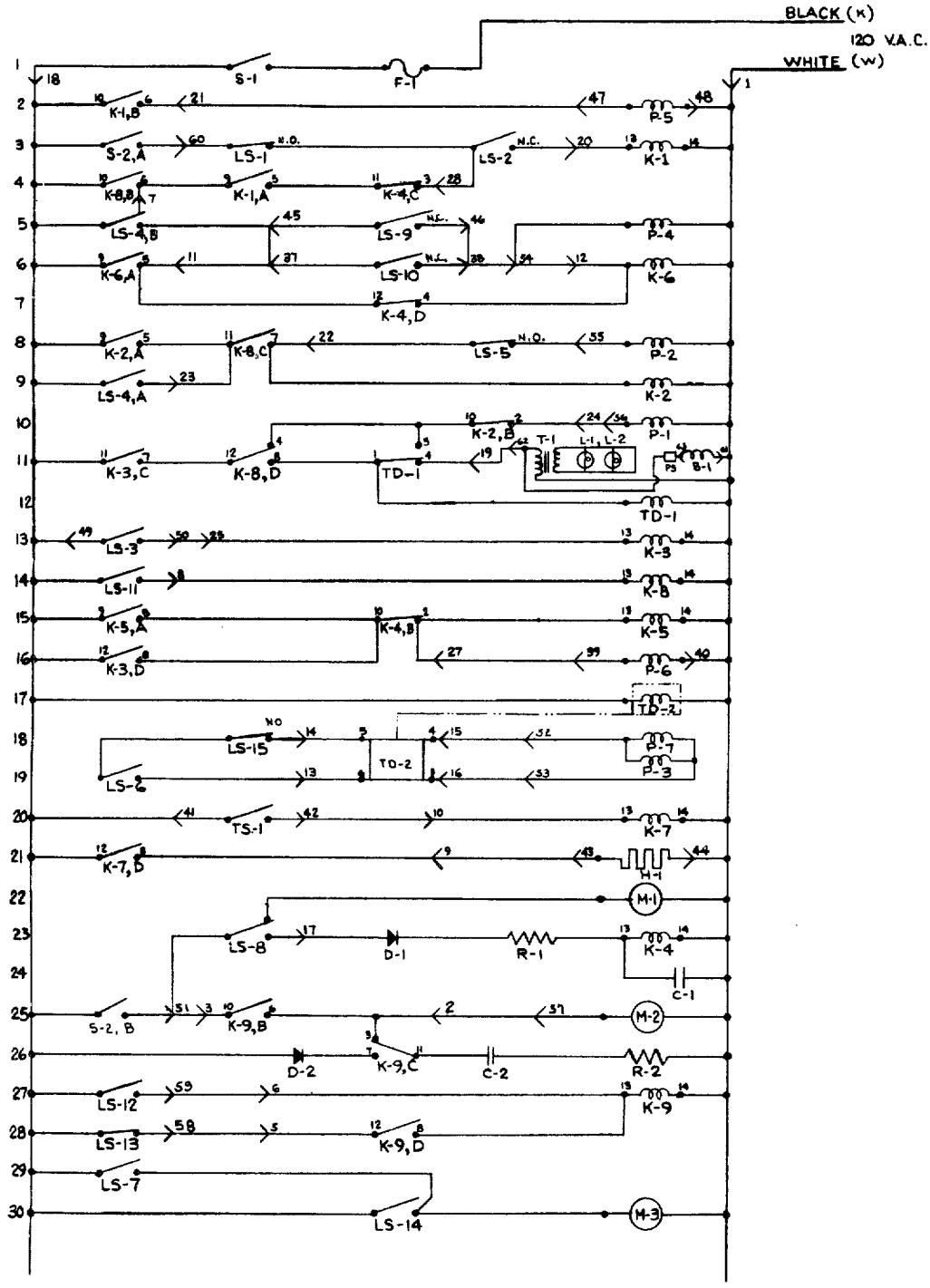

BLACK (K)
120 V.A.C.
WHITE (W)
S-1
F-1
K-1,B
P-5
S-2,A
LS-1
LS-2
K-1
K-8,B
K-1,A
K-4,C
LS-4,B
LS-9
P-4
K-6,A
LS-10
K-6
K-4,D
K-2,A
K-8,C
LS-5
P-2
LS-4,A
K-2
K-2,B
T-1
L-1, L-2
P-1
K-3,C
K-8,D
TD-1
B-1
LS-3
K-3
LS-11
K-8
K-5,A
K-4,B
K-5
K-3,D
P-6
TD-2
LS-15
P-7
P-3
LS-6
TS-1
K-7
K-7,B
H-1
M-1
LS-8
D-1
R-1
K-4
C-1
S-2, B
K-9,B
M-2
D-2
K-9,C
C-2
R-2
LS-12
K-9
LS-13
K-9,D
LS-7
LS-14
M-3

FIG. 17.

METHOD AND APPARATUS FOR AUTOMATICALLY SPLICING FILM

The photofinisher normally removes a plurality of exposed films from their cartridges and manually secures them together to form a large master roll for subsequent processing. Thus, a large group of films may be processed at one time rather than running each film individually through the processing equipment in what would obviously be a time-consuming, extremely-inefficient procedure.

The securement of the exposed films to each other so as to define a master roll obviously must be performed in the darkroom in order to prevent film spoilage through unwanted exposure; ergo the fact that such splicing operations are difficult to perform.

The construction hereof comprehends the identification photographically of each film strip joined to the continuous master roll, as the film is removed from each cartridge and transported through the apparatus for the splicing thereof to the continuous master roll.

The roll of film removed from its cartridge is held in a position where it can be readily grapsed by one hand of the operator who, with his other hand, inserts the numbered empty cartridge into a film identification assembly of the apparatus where a twin check number carried on the cartridge is recorded photographically on the film.

By the twin check system, the number on the cartridge is photographed and the roll is identified with one number while the other number on an identifying envelope remains outside the system, the film and envelope being eventually brought together again following film processing for the identification purpose.

The roll of film is inserted into an automatic transport system having horizontally reciprocable lead and tail carriage assemblies having pins engageable in provided openings in the film for transporting the film to various stations.

A tab severed from a supply of splicing tape of a heat sealable resin coated type is used to interjoin the trailing end of one film and the leading end of a nextfollowing film, the tab being applied with heat and pressure to achieve a strong bond, which results in an accurately spaced in-pitch splice for faultless feeding in the subsequent photo finishing machinery. The splicing tape contains an opaque material which will automatically trigger the end-of-order mark system on the usual color printer and on the usual automatic film cutting systems.

The apparatus is of simple design and construction and provides a fully-automatic apparatus for the in seriatim steps of severing the trailing end of a first film or leader, severing the leading end of a second film, photographically coding the second film for identification purposes, severing a length of splicing tape from a supply thereof, securing the severed length of the tape to the adjacent butting ends of the trimmed first and second films in overlapping relationship therewith, trimming the tail end of the second film, and stopping the tail end of the second film to await a third next-to-follow film for a next splicing operation.

FIG. **1** is a view, in front elevation, of apparatus constructed in accordance with the invention;

FIG. **2** is a view, in top plan, of the apparatus of FIG. **1**, with certain parts omitted for clarity;

FIG. **3** is a view, in rear elevation, of the apparatus shown in FIG. **2**;

FIG. **4** is a view, in front elevation, of the film identification assembly of the apparatus of the invention;

FIG. **5** is a view, in end elevation, of the film identification assembly, as seen from the left of FIG. **4**;

FIG. **6** is a view, in front elevation, of the lead carriage assembly of the apparatus of the invention;

FIG. **7** is a view, in end elevation, of the lead carriage assembly, as seen from the right of FIG. **6**;

FIG. **8** is a view, in front elevation, of the tail carriage assembly of the apparatus of the invention;

FIG. **9** is a view, in cross section, taken on line **9—9** of FIG. **8**;

FIG. **10** is a view, in side elevation, of the knife assembly of the apparatus of the invention;

FIG. **11** is a view, in top plan, of the knife assembly of FIG. **10**;

FIGS. **12** and **13** are views, in front and rear elevation respectively, on an enlarged scale, of a cartridge of the type carrying the film severed by the apparatus of the invention;

FIGS. **14** and **15** are views, in bottom and top plan respectively, of the film cartridge of FIGS. **12** and **13**;

FIG. **16** is a segmental view, in top plan, on an enlarged scale, of the film carried by the cartridge of FIGS. **12** – **15** and served by the apparatus of the invention; and

FIG. **17** is a schematic diagram of the electrical control circuitry of the apparatus of the invention.

For purposes of orientation, the apparatus, as viewed from the tending side, is seen to have a loading or tending or front end located on the far left of FIGS. **1** and **2** and a delivering or rear end located adjacent the far right of FIGS. **1** and **2**.

A vertically-disposed base plate **10** is supported upwardly of a table or work bench, not shown, by legs **12**. Support brackets **14** and **16** are fixed to the base plate and support an elongated film track **18** which extends horizontally substantially throughout the length of the apparatus from its tending and to its delivering end.

Film track **18** is open at its opposite tending and delivering ends.

The leading ends of the films to be formed into spliced end-to-end relationship, preparatory to the next subsequent film processing program, are fed to seriatim into the open end of the film track at the tending end.

To describe the apparatus in a logical sequence, componentwise and operationwise simultaneously, it will first be explained that the major operating components are disposed with reference to the film track at spaced stations in series, from the tending to the delivering ends, in the forms of:

a film identification assembly **20**;
a knife assembly **21**;
a lead carriage assembly **22**;
a film splicing assembly **24**;
a tail carriage assembly **26**;
a film drive assembly **28**; and
a film take-up assembly **30**.

To simplify the recitation, a first film or leader is assumed to have been transported through the film track past various stations to a point where its trailing end is strategically disposed somewhere adjacent splicing assembly **24** whereat it remains to await the advancement of the leading end of a next-following second film into abutting relation therewith, wherefore the trailing end of the first film and the leading end of the second film may be spliced together by the splicing assembly **24** at a proper moment.

The leading ends of the films are fed in seriatim into the film track at the tending end, being guided thereinto by a film track entering guideway **32**, (see FIG. 4), provided at film identification assembly **20**.

Various of the station components to be described have elements which are reciprocable vertically from nonoperative position to operative position according to the dictates of individual electrically-controlled actuating means, to be described.

THE FILM AND CARTRIDGE

Film F of the type to be serviced by the apparatus of the invention is best seen in FIG. **16** and includes locator openings **0** and **0'** in the leading end and trailing ends respectively thereof, which locator holes are utilized in manner to be described.

The film is contained in a cartridge C of the type shown in FIGS. **12 – 15** having a depression D in one side thereof and also having the usual paper backing P which may be viewed through a window W in the cartridge for identifying the particular frame on the film being utilized, all as is well known.

The cartridge carries a processing number N for identification purposes, which number is utilized herein in manner to appear.

Of course, the film must be separated from the cartridge and the paper backing before servicing and such separation is effected at film identification assembly **20**, best seen in FIGS. **4** and **5**.

THE FILM IDENTIFICATION ASSEMBLY

The film identification assembly includes a hub **34** which extends upwardly from a support **36** fixed to one side of a camera housing **38** fixed to base plate **10**. Hub **34** is receivable in depression D of the film cartridge.

After the cartridge is mounted on hub **34**, it is pressed inwardly toward the camera housing, whereupon a post **40**, which extends horizontally outwardly from the housing, passes freely through window W in the cartridge to press against the paper P to urge the paper and film away from the cartridge so that they can be grasped by an operator and pulled free from the cartridge, with the paper passing on one side of a roller **42** provided on support **36** and the film passing on the other side thereof.

The paper is discarded and the free end of the film is inserted into entering guideway **32** of track **18** at which time the identification number N on the rear face of the cartridge is photographed by a camera **44** within housing **38**, the camera being controlled by a timer TD-1. Also disposed within the housing are a pair of lamps L-1 and L-2 and a mirror **48** wherefore the number on the cartridge can be transferred from the cartridge to the leading edge of the film disposed on track **18** for positive identification.

A buzzer B-1 is actuated upon initiation of identification to signal the operator that identification is taking place.

THE KNIFE ASSEMBLY

Knife assembly **21**, best seen in FIGS. **10** and **11**, includes a bracket **50** fixed to and extending rearwardly from base wall **10**, and supporting a cylinder CYL-1 having a piston rod **52** which has a movable blade **54** pivoted at **56** to its outboard end. CYL-1 is controlled by a solenoid P-1. (see FIG. 3).

Movable blade **54** is cooperant with a pair of stationary blades **58** and is further pivoted adjacent its lower end at **60** to a knife carrier **62**.

A compression spring **64** sleeves piston rod **52** and is trapped between knife carrier **62** and a collar **66** fixed to the piston rod to spring load the movable blade.

A pair of spaced limit switches LS-4 and LS-5, fixed to bracket **50**, is engageable by collar **66** as the piston rod reciprocates for sensing the termination of the forward and rearward stroke of the piston rod.

The blades of the knife assembly are disposed relative to film track **18** so as to be capable of trimming the ends of the film carried by the track.

THE LEAD CARRIAGE ASSEMBLY

Lead carriage assembly **22**, best seen in FIGS. **6** and **7**, includes a body portion **68** which is slidably disposed upon a pair of spaced, parallel slide rods **70, 70**, which extend horizontally between support brackets **14** and **16**.

The lead carriage assembly is reciprocated by a lead carriage cylinder CYL-2 fixed to the rear face of base plate **10** and controlled by a solenoid P-3, (see FIG. 3), the piston rod **72** of the cylinder being linked to the lead carriage assembly as by a clevis **74** engageable with a clevis tongue **76** which extends rearwardly from body portion **68**.

A carriage stop **77**, (see FIG. 3), provided on base plate **10**, limits the range of travel of the lead carriage assembly to the left as seen in FIG. **1** when contacted by clevis tongue **76**.

The lead carriage assembly is also adapted to contact a limit switch LS-6, (see FIG. 3), when it moves to the extreme right position as viewed in FIG. **1**, for purposes to appear.

A hunting pin **78**, (see FIG. 6), vertically reciprocable relative to the body **68** under actuation by a solenoid P-5 and control by a limit switch LS-3, is spring-loaded by means of return springs **80** and **82**.

The hunting pin is engageable in the holes O and O' of film F for purposes to appear.

THE FILM SPLICING ASSEMBLY

Film splicing assembly **24** includes a splicer head **84** which is mounted on spaced, upright guide rods **86** which are fixed at their lower ends to base plate **10** and at their upper ends to a platform **88** provided at the upper edge of the base plate.

The splicer is reciprocated by a cylinder CYL-3 mounted on the platform and having its ram **90** fixed to the splicer. Actuation of the cylinder to reciprocate the splicer is controlled by a solenoid P-3, (see FIG. 3).

The splicer head **84** is heated by heating elements H enclosed therewithin, which elements are controlled by a thermostat, TS-1, (see FIG. 17).

Splicing tape is fed to the splicer from a tape supply reel **92** rotatably mounted relative to a bracket **94** on base plate **10**, the tape passing through a provided opening in the base plate, to a shear plate **96** disposed on the lower face of splicer head **84** so that the free end of the tape is disposed immediately below the splicer head and in overlying relationship to film track **18**.

On the downward stroke of the splicer head the tape is pressed against the adjacent ends of the films to join the films together.

Means, including a tape feed motor M-3 and a limit switch LS-14, (see FIG. 3), is provided for feeding the tape forwardly from supply reel **92** to the splicer as

needed and in timed relation to movements of the splicer and film.

Limit switches LS-7 and LS-8, (see FIG. 3) define the lower and upper limits of travel of splicer head **84.**

THE TAIL CARRIAGE ASSEMBLY

Tail carriage assembly **26,** best seen in FIGS. **8** and **9,** includes a body portion **98** which is slidably disposed upon slide rods **70, 70.**

The tail carriage assembly is reciprocated by a tail carriage cylinder CYL-4 fixed to the rear face of base plate **10,** and controlled by a solenoid **P-4,** (see FIG. 3), the piston rod **100** of the cylinder being linked to the tail carriage assembly as by a clevis **102** engageable with a clevis tongue **104** which extends rearwardly from body portion **98.**

A tail carriage stop **105,** (see FIG. 3), provided on base plate **10,** limits the range of travel of the tail carriage assembly to the left as seen in FIG. **1** when contacted by clevis tongue **104.**

The tail carriage assembly is also adapted to contact a limit switch LS-11, (see FIG. 3), when it moves to the extreme right position as viewed in FIG. **1,** for purposes to appear.

A plunger or push rod **106,** vertically reciprocable relative to body **98** under actuation by a solenoid P-6 and control by a limit switch LS-10, is spring-loaded by means of a return spring **108.**

Plunger or push rod **106** is engagable with an axially aligned upper gripper pin **110** disposed thereabove, to effectively trap film F between the push rod and gripper pin, with movement of the push rod being timed so that the film is gripped on the frames between image areas.

THE FILM DRIVE ASSEMBLY

Film drive assembly **28** includes an upper feed roll **112** adapted to engage the upper surface of the film, and a lower pressure roll **114** vertically axially aligned with upper feed roll **112** and adapted to engage the lower surface of the film.

Upper feed roll **112** is fixed to one end of the drive shaft **116** of a hysteresis clutch **118** mounted on base plate **10,** the opposite end of the drive shaft having a sprocket **120** fixed thereto, (see FIG. 3).

A chain **122** extends between sprocket **120** and a second sprocket **124** fixed to the drive shaft **126** of a film drive motor M-1 fixed to base plate **10.**

Lower pressure roll **114** is rotatably mounted on the free end of a yoke **128** which extends outwardly from support bracket **16,** the yoke being loaded as by a spring **130** extending therefrom to track **18.**

Hysteresis clutch **118** functions as a tensioning device, always trying to drive the film unless the film is gripped between the push rod **106** and gripper pin **110** of tail carriage assembly **26,** in which case the clutch will slip. The clutch imparts a controlled and constant amount of tension to the film.

THE FILM TAKE-UP ASSEMBLY

As seen in FIG. **1,** film F leaving film drive assembly **28** at the delivering end passes to the film take-up assembly **30.**

Film take-up assembly **30** includes a trio of spools **134, 136** and **138** and a take-up reel **140,** which take-up reel may be manually removed when it has taken up the desired number of spliced-together films in the form of a continuous master roll.

The take-up reel is releasably fixed to a shaft **141** journalled in and extending through a wall **10'** which extends upwardly from base plate **10,** the shaft being driven by a take-up motor M-2 fixed to the rear face of wall **10'.**

Spools **134** and **136** are rotatably mounted relative to a spool support block **142** fixed to base plate **10** on a horizontal plane above that of film guide **18.**

Spool **138** is rotatably mounted relative to an elevator block **144** slidably mounted upon an elevator shaft **146** which extends vertically between support block **142** and a lower support block **148.**

As film builds up on take-up reel **140,** elevator block **144** and spool **138** are caused to ride upwardly relative to shaft **146** wherefore the proper tension is maintained on the film at all times.

An upper limit switch LS-13, (see FIG. 3) stops the take-up motors when contacted by elevator block **144** and a lower limit switch LS-12 starts the take-up motor when contacted by the elevator block.

THE PNEUMATIC SYSTEM

Pressurized air is delivered to the several air cylinders CYL-1 through CYL-4 by an air inlet line **150** controlled by a manual shut-off **152,** a vacuum transducer **154** and a vacuum muffler **156,** (see FIG. 3).

An air jet **160,** (see FIG. 5), is located below track **18** adjacent the tending end of the apparatus and is utilized in conjunction with limit switches LS-1 and LS-2, in sensing the openings O and O' in film F, for purposes to appear.

SIMPLIFIED SEQUENCE OF OPERATION

The following is a simplified recitation of the sequence of operation following insertion of the film into the track:

1. The lead hole O in the film F is sensed by air jet **160** controlled by limit switch LS-1 causing hunting solenoid P-5 and hunting pin **78** of lead carriage assembly **22** to hunt for the hole;

2. When hunting solenoid P-5 finds the hole, hunting pin **78** enters the hole, limit switch LS-3 initiates identification by means of film identification assembly **20** and buzzer B-1 sounds;

3. When identification timer TD-1 times out completing identification, knife **54** is advanced by air cylinder CYL-1 to cut the lead end of the film;

4. As the knife retracts, limit switch LS-5 is actuated and lead carriage assembly **22** moves the film up to splicing section **24;**

5. Limit switch LS-6, actuated by the lead carriage assembly, initiates the splice cycle. As the sealing iron of the splicer comes down, hunting solenoid P-5 and hunting pin **78** of lead carriage assembly **22** and tail gripping solenoid P-6 and push rod **106** of tail carriage assembly **26** are released;

6. The tail carriage assembly **26** now moves left as seen in FIG. **1** which in turn causes the lead carriage assembly **22** to move left;

7. As the sealing iron retracts, limit switch LS-8 is released to complete the circuit to motor M-1 at film drive assembly **28** causing the film to move;

8. The LS-1 air jet **160** senses the tail hole O' in the film, causing hunting solenoid P-5 and hunting pin **78** of lead carriage assembly **22** to hunt for the hole;

9. When solenoid P-5 finds the hole, hunting pin **78** enters the hole, locates the film and actuator limit switch LS-3;

10. Limit switch LS-3 energizes tail gripper solenoid P-6 and push rod 106 of tail carriage assembly 26 to grip the film and CYL-1 knife of knife assembly 21 to cut the film; and

11. As the cut is completed, the tail carriage assembly 26 moves right, carring the film therewith and locating the properly cut tail end of the film at splicing assembly 24 ready for the next film.

DETAILED SEQUENCE OF OPERATION

Reference is now made to the simple two-line schematic wiring diagram of FIG. 17 wherein each line of the diagram has been assigned a number from 1 through 30. For ease of reference, when a particular component is referred to, same is designated by a reference followed by a parenthetical indication of its line location in FIG. 11. For example, a main switch S-1 is designated at S-1(1) since it is located on line 1 of the wiring diagram.

In further explanation of the organization of this specification, it is explained that letter A is used to denote a first set of contacts of a component, B to denote a second set of contacts, and C to denote a third set of contacts.

This sequence description assumes that the air supply has been turned on, that the main switch S-1 (1) and film drive S-2(2) are on, and that the machine is threaded and ready for operation.

The lead end of film is inserted and covers air jet 160 allowing LS-2 (3) to close, setting up K-1 (3). LS-1 (3) opens and will not close again until a hole appears. The lead hole momentarily actuates LS-1 (3) to energize K-1 (3). K-1, B (2) energizes P-5 (2) of lead carriage assembly 22; K-1, A (4) forms a holding circuit through K-8, B (4). K-8 (14) is energized at this point because tail carriage assembly 26 is in a right hand position actuating LS-11 (14) and K-5 (15). P-6 (16), K-4 (23) and P-4 (15) are also energized. P-5 (2) pin 78 of lead carriage assembly 22 actuates LS-3 (13) as it moves into lead hole O energizing K-3 (13).

K-3, C(11) energizes L-1 (11) and TD-1 (12) to photograph the number N onto the film. When TD-1 (12) times out the normally open contacts close (11) breaking the circuit to the lamps L-1 and L-2 and energizing P-1 (10) through K-2, B (10). P-1 (10) causes knife 54 to advance to cut the film and LS-5 (11) is opened preventing P-2 (8) from moving the lead carriage assembly until the knife returns fully. As the knife completes its stroke, LS-4, A (9) and LS-4, B (5) are actuated. LS-4, A (9) energizes K-2 (9) and P-2 (8) which are held in by K-2, A (8). K-2, B (5) has no effect since K-4 (23) and P-6 (16) are already energized, and the K-1 (3) holding circuit is completed through K-8, B (4).

When CYL-1 returns LS-5 (8) is closed completing the circuit to P-2 (8). Lead carriage assembly 22 moves to the right hand position locating the film at splicer assembly 24 and actuating LS-6 (19). LS-6 (19) energizes TD-2 (19) through LS-15 (18) and P-3 (19) splicing solenoid and P-7 (18) vacuum are energized. As the sealing head 84 starts down LS-8 (23) is actuated removing power from the M-1 film drive motor and energizing delayed pull in K-4 (23). M-1 is interrupted to prevent the film from moving until the sealing iron is clear of the film on its return stroke, thereby preventing possible scratches.

K-4 (23) is slowed down to allow the sealing iron to grab the ends of the film before it is released as follows:

K-4, C (4) breaks K-1 (3) holding circuit;

K-1, B (2) releases P-5 (2) solenoid and LS-9 (5) interlock;

K-4, B (15) breaks K-5 holding circuit releasing P-6 (16) film gripper of tail carriage assembly 26 and LS-10 (6) interlock; and

K-4 D (7) breaks K-6 (6) holding circuit releasing P-4 (5) solenoid allowing the tail carriage assembly to go left.

P-5 (2) pin 78 and P-6 (16) grippers 106 and 110 must release and open LS-9 (5) and LS-10 (6) interlocks before K-4, D (7) can release P-4 (5) and K-6 (6) during the splice cycle. The de-energizing of P-4 (5) enables the tail carriage assembly 26 to move left.

As the tail carriage assembly moves left, LS-11 (14) opens releasing K-8 (14). K8, C (8) breaks K-2 (9) holding circuit releasing P-2 (8) solenoid and allowing the lead carriage assembly to go left. TD-2 (17) times out releasing P-3 (19) and P-7 (18).

As sealing iron 84 moves upward LS-8 (23) releases K-4 (23) and energizes motor M-1 (22) causing the film to move. LS-7 (29) is also pulsed as the sealing iron moves upward starting the tape feed motor M-3 (30). LS-14 (30) is held closed for 90° of cam rotation, to meter the splicing tape, and, upon opening, de-energizes M-3 (30).

LS-1 (3) senses tail hole O' and energizes K-1 (3). K-1, A (4) holds K-1 (3) energized through LS-4, B (5). K-8 (14) is de-energized at this point because the tail carriage assembly is to the left and LS-11 (14) is released. Therefore:

A. K-8, B (4) allows K-1 (3) and P-5 (2) pin 78 to de-energize as soon as the cut is complete as sensed by LS-4, B (5).

B. K-8, C (8) prevents K-2 (9) and P-2 (8) from moving the lead carriage assembly; and

C. K-8 D (11) prevents T-1 (11) and TD-1 (11) from making and effecting identification exposure.

K-1, B (2) energizes P-5 (2). P-5 (2) pin 78 actuates LS-3 (13) as it moves into tail hole O' which in turn energizes K-3 (13). K-3, C (11) energizes P-1 (10) through K-8, D (11) to cut the film. As the cut is completed, LS-4, B (5) is actuated releasing K-1 (3) and P-5 (2). LS-4, B (5) also energizes K-6 (6) and P-4 (5) to move the carriage assembly to splicing position ready for the next cycle.

I claim:

1. Apparatus for splicing the lead end of a second identified exposed film strip to the trailing end of a first or next preceding film strip, each film strip being of the type having image-bearing areas thereon and openings therein adjacent the leading and trailing ends thereof, comprising:

a film track for guiding the film strips,

a lead carriage assembly and a tail carriage assembly for selectively gripping and moving the film strips along the film track,

means for effecting reciprocating movement of the lead carriage and tail carriage assemblies relative to the track, means for photographically exposing the leading end of the second film strip for an impression of identifying coded indicia thereon,

a cutting station for cutting the leading and trailing ends of the second film strip along a predetermined transverse line with reference to the image bearing areas,

a splicing station for splicing together the trailing end of the first or next preceding film strip to the leading end of the second film strip by means of a heat-

setting adhesive tape member joined in sealed interlocking position with respect to the respective ends, and means for sensing the openings adjacent the leading and trailing ends of the film strips for selectively actuating the lead carriage assembly and the tail carriage assembly.

2. Apparatus according to claim 1, including a film drive assembly having slip-clutch means for imparting a controlled and constant amount of tension to the film.

3. Apparatus according to claim 1, including a pin on the lead carriage assembly selectively engageable in the openings adjacent the leading and trailing ends of the film strips.

4. Apparatus according to claim 1, including gripper pins on the tail carriage assembly for selectively gripping the film strips.

5. Apparatus according to claim 1, including a film takeup assembly for receiving the spliced together film strips.

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