

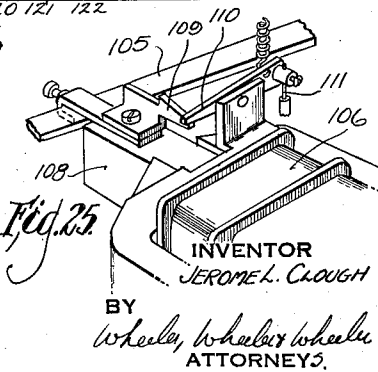
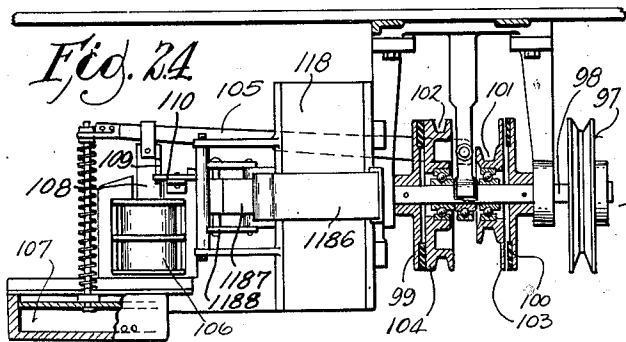
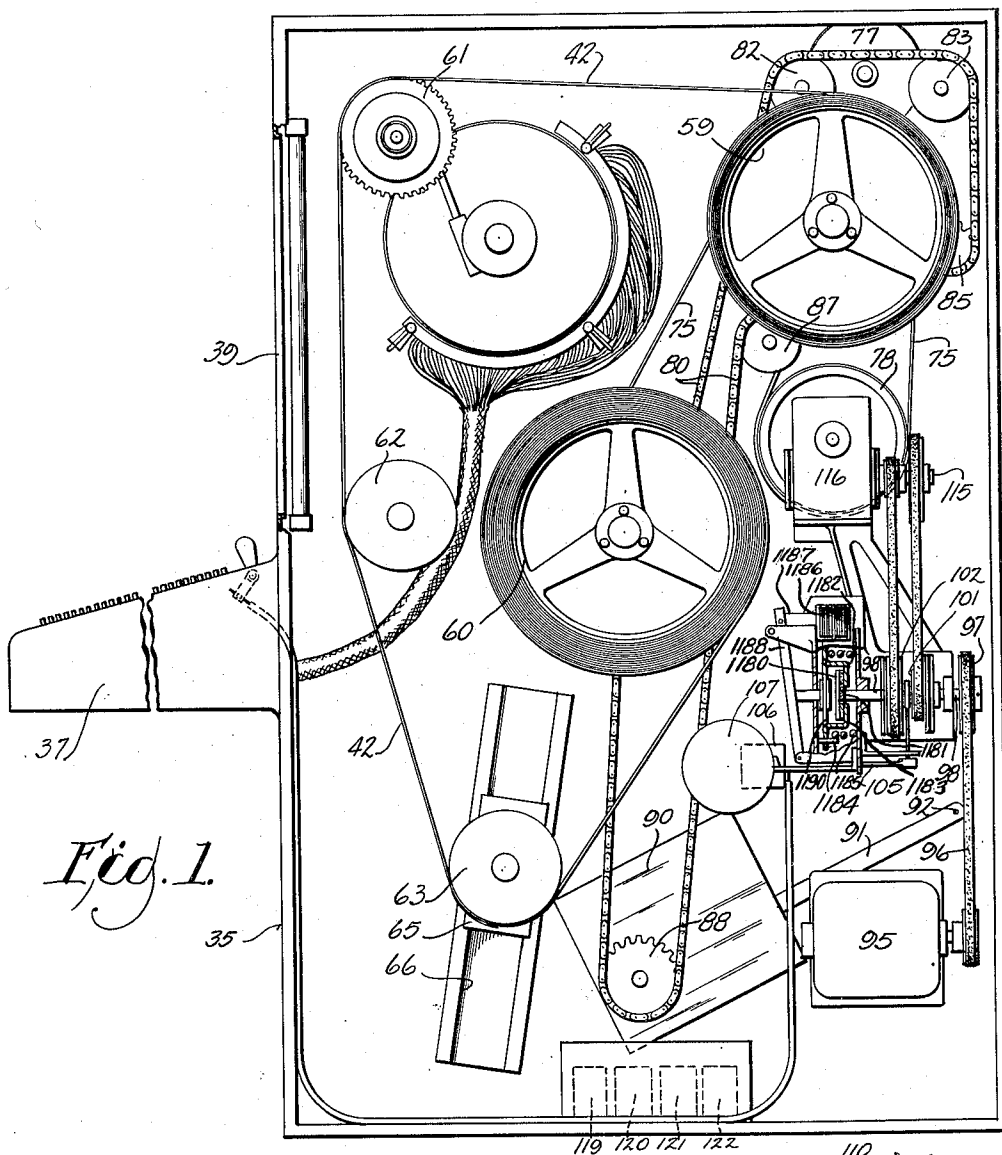
Sept. 5, 1950

J. L. CLOUGH
AUTHORIZER

2,521,284

Filed Jan. 25, 1943

7 Sheets-Sheet 1



Sept. 5, 1950

J. L. CLOUGH
AUTHORIZER

2,521,284

Filed Jan. 25, 1943

7 Sheets-Sheet 2

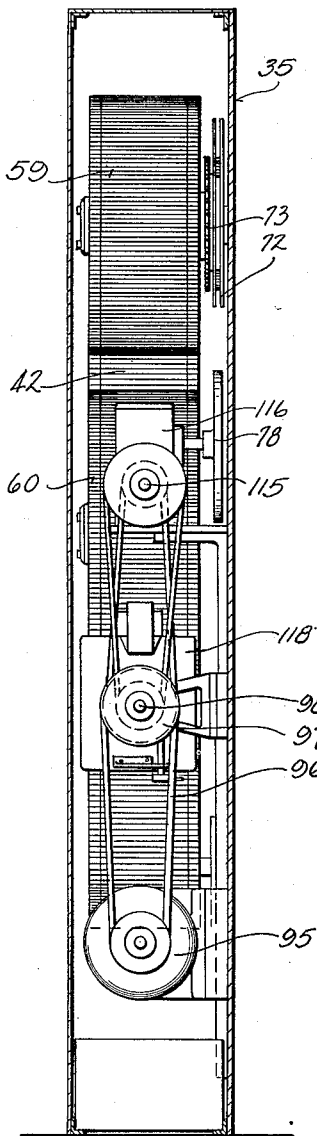


Fig. 2.

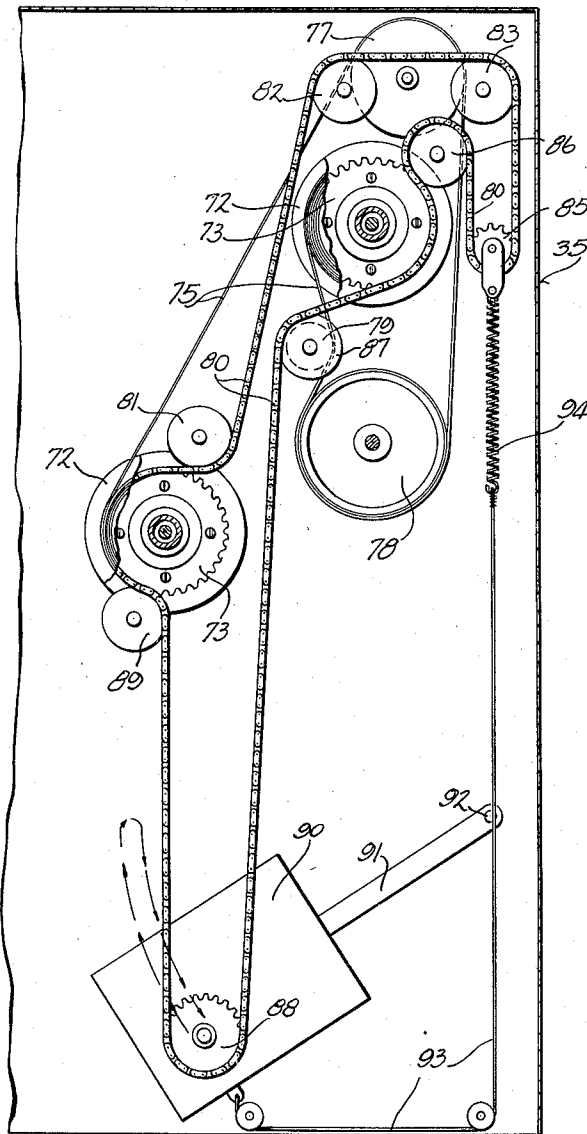


Fig. 3.

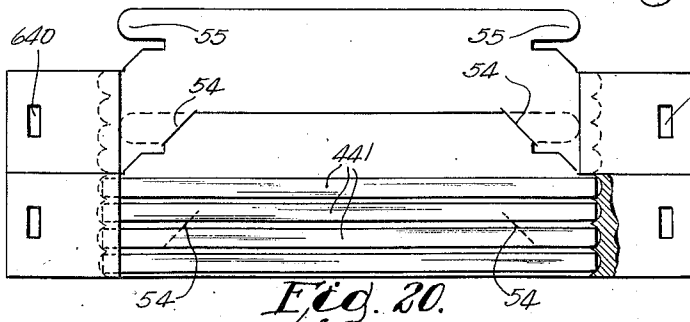


Fig. 20.

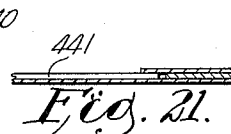


Fig. 21.

INVENTOR
JEROME L. CLOUGH
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

Sept. 5, 1950

J. L. CLOUGH
AUTHORIZER

2,521,284

Filed Jan. 25, 1943

7 Sheets-Sheet 3

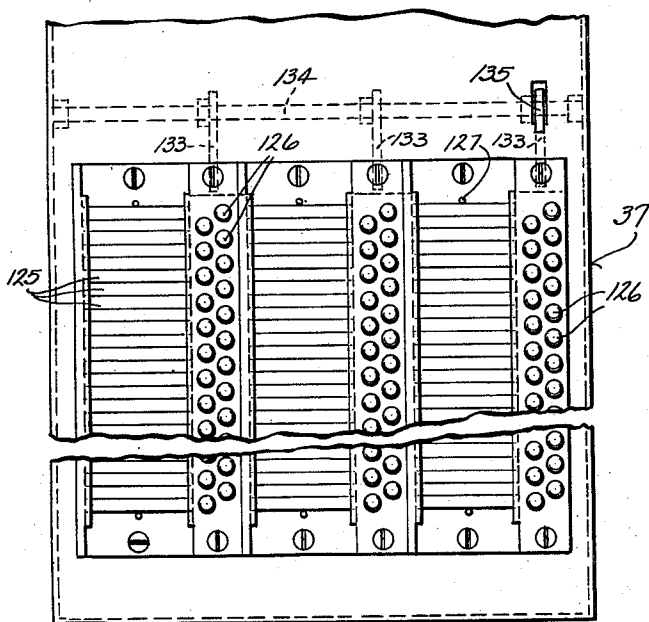


Fig. 4.

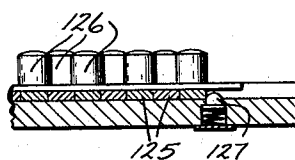


Fig. 5.

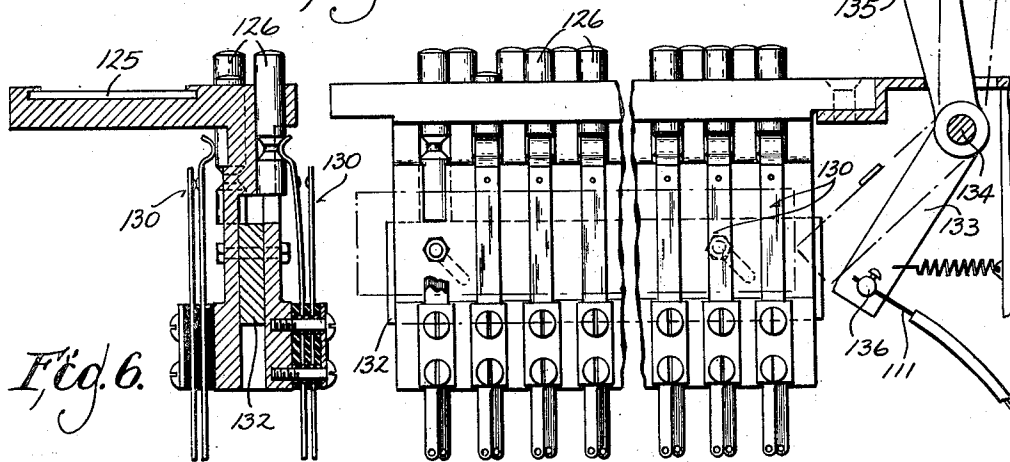


Fig. 6.

Fig. 7.

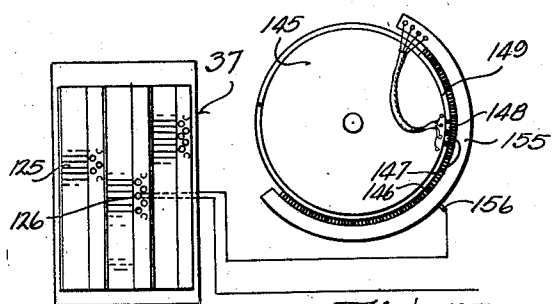


Fig. 13.

INVENTOR
JEROME L. CLOUGH
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

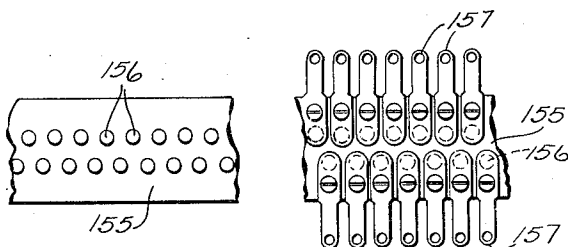
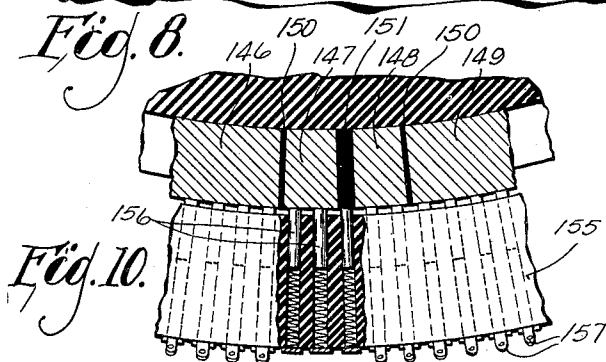
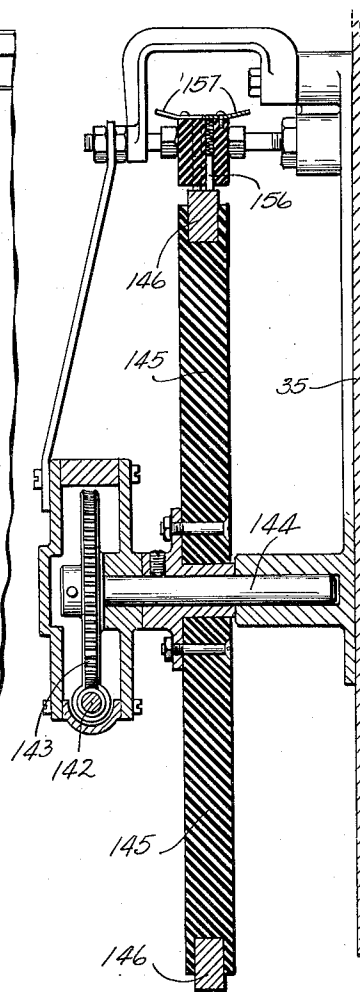
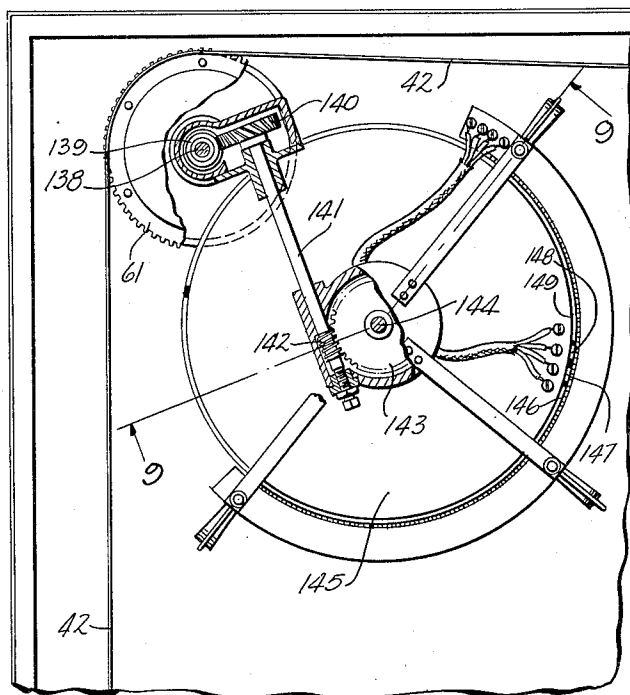
Sept. 5, 1950

J. L. CLOUGH
AUTHORIZER

2,521,284

Filed Jan. 25, 1943

7 Sheets-Sheet 4



INVENTOR
JEROME L. CLOUGH
BY
Wheeler, Wheeler & Wheeler.
ATTORNEYS.

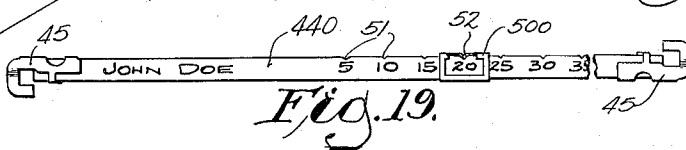
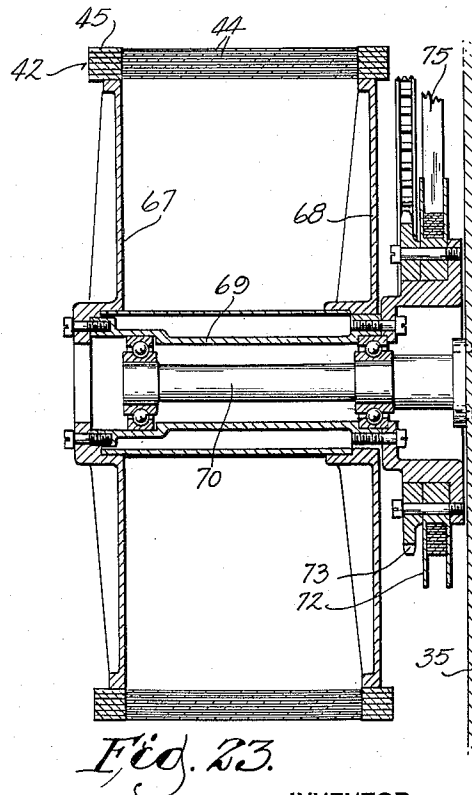
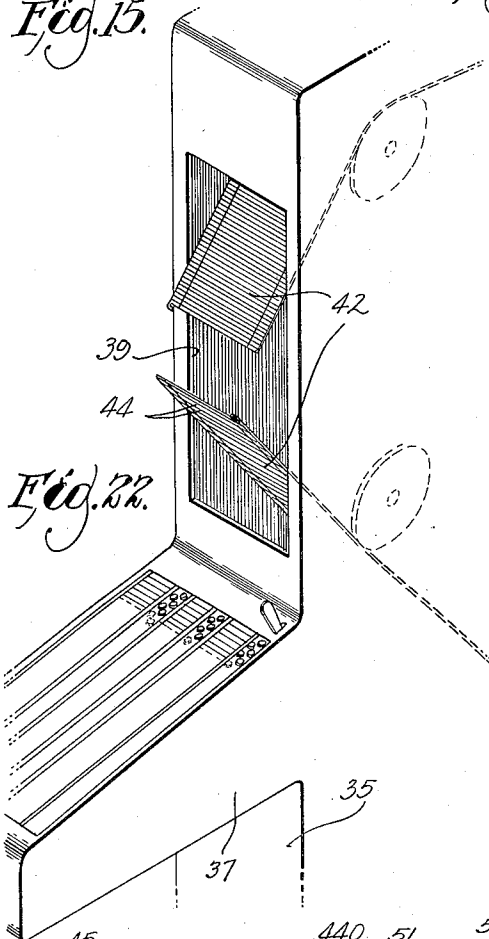
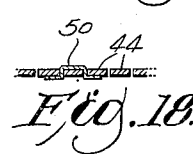
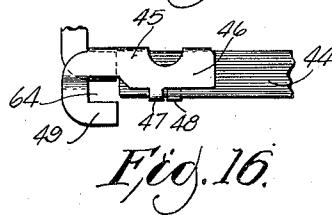
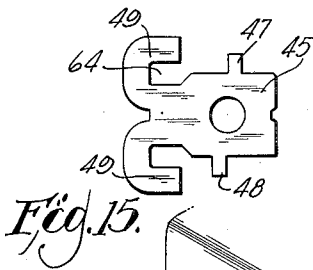
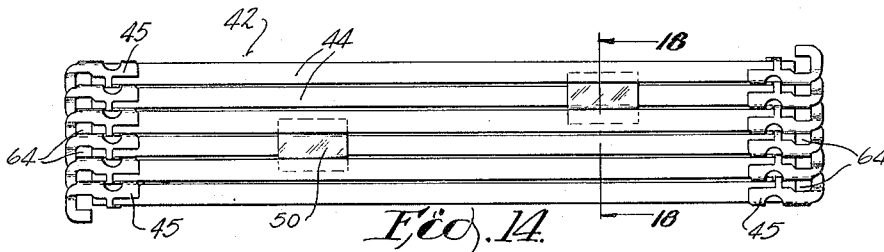
Sept. 5, 1950

J. L. CLOUGH
AUTHORIZER

2,521,284

Filed Jan. 25, 1943

7 Sheets-Sheet 5



INVENTOR
JEROME L. CLOUGH
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

Sept. 5, 1950

J. L. CLOUGH

2,521,284

AUTHORIZER

Filed Jan. 25, 1943

7 Sheets-Sheet 6

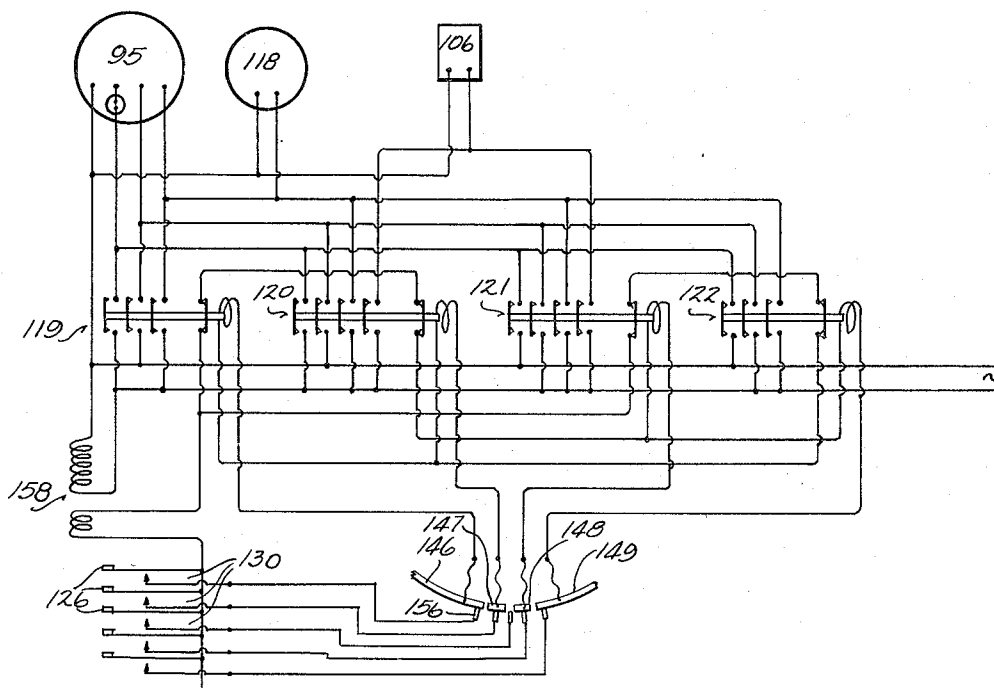


Fig. 26.

INVENTOR
JEROME L. CLOUGH

BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

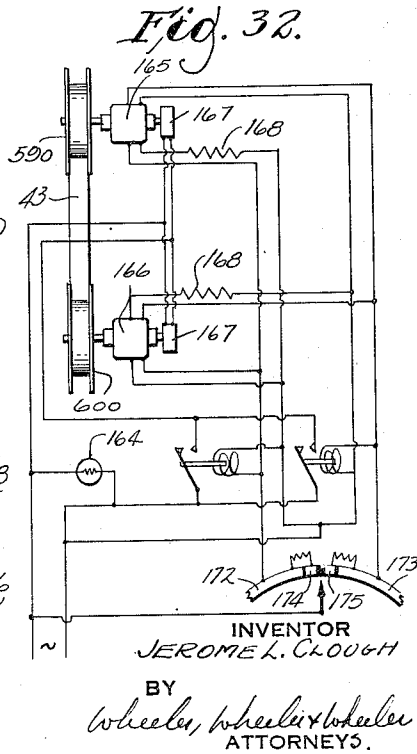
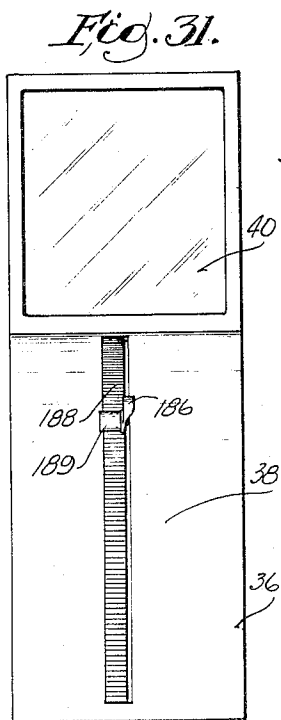
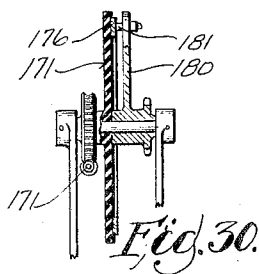
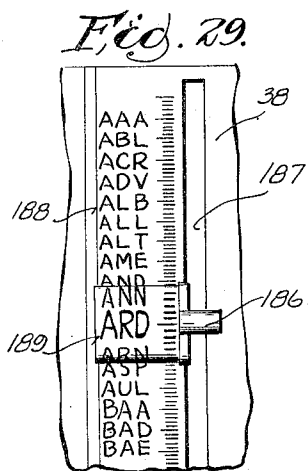
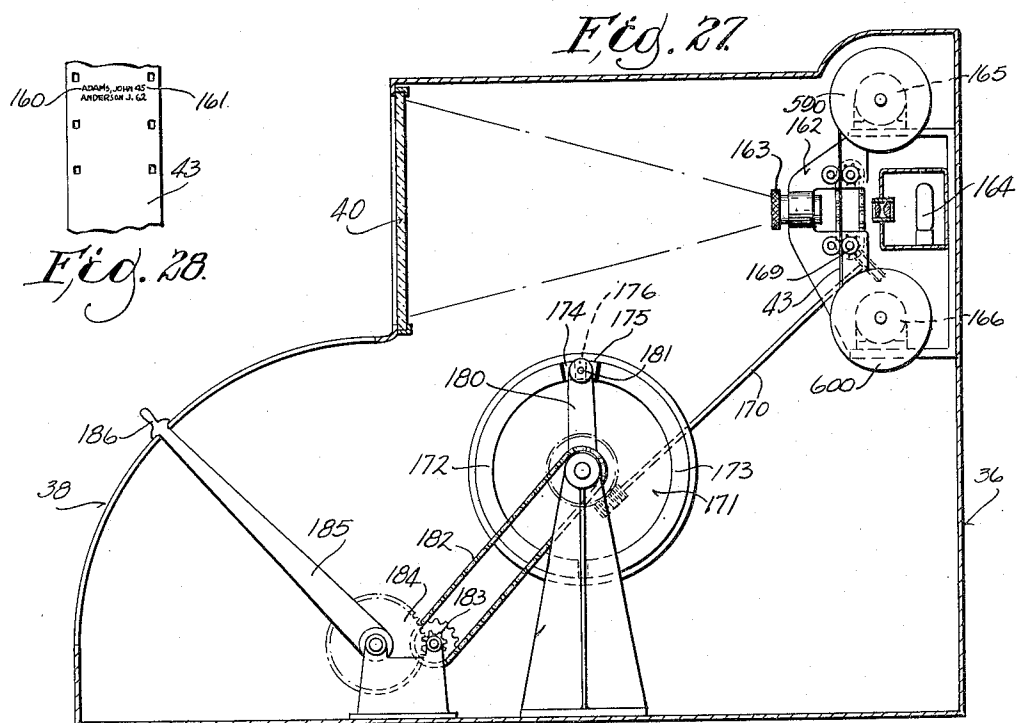
Sept. 5, 1950

J. L. CLOUGH
AUTHORIZER

2,521,284

Filed Jan. 25, 1943

7 Sheets-Sheet 7



INVENTOR
JEROME L. CLOUGH

BY
Wheeler, Wheeler & Wheeler
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,521,284

AUTHORIZER

Jerome L. Clough, Milwaukee, Wis.

Application January 25, 1943, Serial No. 473,508

24 Claims. (Cl. 40—53)

1

This invention relates to improvements in authorizers.

It is the primary object of the invention to provide novel power driven means automatically operable subject to the control of an indexing selector for enabling a credit operator to determine in the shortest possible space of time the credit rating of an applicant for credit. The machine has particular utility in department stores, where persons desiring to use their charge accounts frequently have to wait while the clerk consults the credit department. It is urgently necessary to locate the customer's name and credit rating as rapidly as possible in order not to keep the customer waiting for an undue length of time.

It is a further important object of the invention to provide a compensating drive for reels between which the name belt is wound and unwound, it being desirable that the winding and unwinding reels should be operated at differing rates compensatory for the variation in effective diameter thereof so that the name belt will be unwound from one reel at substantially the same rate of linear travel at which it is wound upon the other.

It is a further object of the invention to provide a novel and improved name belt for use in authorizer machines to facilitate the insertion of new names and the removal of obsolete names from the belt, and to provide an authorizer machine which will accommodate changes in the length of the name belt within the limits required for this purpose, without destroying the relation between the belt and the reel operating mechanism aforesaid.

It is a further object of the invention to provide a novel and improved organization for an authorizer machine in which an effective keyboard provides for automatic selection and the keyboard and the name belt are in a desired relationship to the operator's station and have a desired relationship to each other so that a relatively small number of keys on the keyboard will serve to bring a given name to the inspecting station even though the number of names greatly exceeds the number of available keys.

It is a still further object of the invention to provide for the use of film in an authorizer machine.

Other objects and advantages of the invention will be apparent to those skilled in the art upon analysis of the following disclosure thereof.

In the drawings:

Fig. 1 is a view in side elevation of an authorizer embodying the invention as it appears

2

with one side of the cabinet removed to expose the mechanism.

Fig. 2 is a rear elevation of the machine shown in Fig. 1 as it appears with the rear of the cabinet removed.

Fig. 3 is a detail view partially in side elevation and partially in section illustrating the compensating drive only, all other parts being eliminated.

Fig. 4 is an enlarged detail plan view of the keyboard.

Fig. 5 is a further enlarged detail view of a fragment of the keyboard in longitudinal section.

Fig. 6 is a detail view of a fragment of the keyboard in transverse section.

Fig. 7 is a fragmentary detail view of the keyboard in side elevation as it appears with the cabinet removed to expose the structure.

Fig. 8 is an enlarged detail view in side elevation and partially in section, showing the electrical control commutator and its driving connections.

Fig. 9 is a view taken in section through the control commutator on the line 9—9 of Fig. 8 on a further enlarged scale.

Fig. 10 is a further enlarged fragmentary detail of the commutator taken in section in the plane in which it rotates.

Fig. 11 is a fragmentary detail of the brush holder as it appears in plan.

Fig. 12 is a plan view of a fragment of the brush holder.

Fig. 13 is a wiring diagram diagrammatically illustrating the wiring connection of a single push button to a single brush of the electric control device.

Fig. 14 is an enlarged detail view in front elevation of a fragment of the name belt showing the signals preferably used therewith.

Fig. 15 is a further enlarged detail view in plan of one of the metal stamps used in the construction of such a belt.

Fig. 16 is a fragmentary detail view of the stamping formed and connected to a name strip for use.

Fig. 17 is a fragmentary detail view of the assembled name belt in side elevation.

Fig. 18 is a fragmentary detail view taken in section on the line 18—18 of Fig. 14.

Fig. 19 is a detail view in side elevation of a modified form of name strip.

Fig. 20 shows in elevation another modified embodiment of name strip belt section.

Fig. 21 is a detail view in transverse section illustrating a fragment of the belt section shown in Fig. 20.

Fig. 22 is a fragmentary view in perspective

showing a portion of the machine with the name belt disassembled for the insertion or removal of a name strip.

Fig. 23 is a view in transverse section through one of the reels upon which the name belt is wound, the reel being shown enlarged as compared with Fig. 20.

Fig. 24 (Sheet 1) shows a fragmentary detail view in plan through the high and low speed control mechanism.

Fig. 25 is a fragmentary view in perspective of a latch used in conjunction with the mechanism shown in Fig. 24.

Fig. 26 is a wiring diagram showing the relay motor clutch and brake connections for the construction shown in Figs. 1 to 25.

Fig. 27 is a diagrammatic view in longitudinal vertical section showing a modified embodiment of the invention.

Fig. 28 is a fragmentary detail view of a film used as a name belt in the device of Fig. 27.

Fig. 29 is a fragmentary detail in plan of a portion of the index used in Fig. 27.

Fig. 30 is a fragmentary detail in transverse section through the electric commutator mechanism shown in Fig. 27.

Fig. 31 is a view in front elevation of the mechanism shown in Fig. 27.

Fig. 32 is a wiring diagram of the connections used for the control and operation of the mechanism shown in Fig. 27.

Like parts are identified by the same reference characters throughout the several views.

The authorizer comprises a cabinet designated by reference character 35 in Fig. 1 and 36 in Fig. 27. This cabinet has an index table 37 and 38 respectively and a display station represented by the window 39 in Fig. 1 and the translucent screen 40 in Fig. 27.

At the display station the machine selectively displays one or more names and credit ratings carried by a name belt which comprises the sectional belt 42 in the device shown in Fig. 1 and the film 43 in the device shown in Fig. 27. In each instance the name belt is wound from one reel to another subject to the control of electrical selecting mechanism as will now be described.

Referring first to the construction shown in Figs. 1 to 26 inclusive:

The name belt is made of separable sections. In the preferred construction each name is typed or otherwise impressed upon a strip of cardboard 44 provided at each end with a metal fitting 45 in accordance with the disclosure of Figs. 14, 15 and 16. Fig. 15 shows the blank from which the metal fitting 45 is folded. The blank is so made that the fitting is folded into a channel 46 engaged with the end of the cardboard and retained thereon by two prongs 47 and 48 which are integral with the fitting. A pair of arms 49 of like form are brought into registry by the folding of the blank to constitute a hook. The hook of each fitting 45 passes between the arms of the next contiguous fitting into engagement with the channel portion thereof as clearly shown in Figs. 14 and 16. The result is a belt which is flexible as indicated in Fig. 17 in a direction such as to enable it to be wound upon the reels hereinafter to be described. It is also flexible in a transverse plane due to the flexibility of the strips of cardboard or other material shown at 44 from which the names are imprinted. This latter flexibility enables the belt to be manipulated for the insertion and removal of name strips, for which purpose the belt, stopped at any desired point, may be withdrawn

through the window 39 (Fig. 22) and opened as shown. Small transparent slides having different symbolic meaning according to their color and/or position may be located on the individual name strips by slidably interlocking them between the name strips as shown at 50 in Figs. 14, 18 and 19.

Fig. 19 represents a modification in which the name strip 440 has a margin notched at 51 and credit indicia printed on the name strip opposite each notch, the slide 500 having an inwardly pressed rib at 52 frictionally engageable in the successive notches to assure its position.

A slightly modified form of name strip is illustrated in Fig. 20 (Sheet 2) in which the belt is made up of sheet sections each continuous from side to side of the belt and each provided with diagonal slots at 54 and with the tabs 55 for interlocking connection with the slots of like sections. Fig. 20 shows two such sections in connection. In this embodiment each separable section of the belt is made to detachably receive a number of name strips 441 inserted in suitable pockets provided along the edges of the respective sections by laminae applied to the ends of the sections as shown.

Regardless of how the name belt is constructed, it passes between reels 59 and 60 (Fig. 1) about sprocket pulley 61, idler pulley 62, and take-up pulley 63. The teeth of the sprocket pulley 61 mesh in the apertures provided at 64 in the fittings 45 shown in Fig. 14 and the apertures 640 provided in the belt sections shown in Fig. 20. It is desirable that the sprocket pulley 61 move in exact accordance with the belt because this pulley serves to correlate belt movement with the movement of the electrical control parts.

Take-up pulley 63 is mounted on a carriage 65 movable in a generally vertical direction in a guideway 66 whereby the weight of the carriage and the take-up pulley 63 keep the belt 42 taut and afford sufficient compensation to permit of day to day changes in the length of the belt occasioned by the insertion of additional names and the removal of other names. In the normal department store practice the change in belt length will be nominal over a long period of time.

For the purposes of the type of belt here shown, the respective reels 59 and 60 may comprise simply disks 67 and 68 mounted on a hub 69 supported by suitable bearings from the stationary stud 70 projecting from a wall of the cabinet 35 (see Fig. 23). Connected with the hub to turn therewith is the secondary reel 72 and sprocket 73. A tape or tension belt 75 is wound upon the secondary reels 72 of the respective main reels 59 and 60 to connect the main reels and to unwind from one of such reels and wind upon the other in the same ratio as the name belt is wound and unwound respecting such reels. In other words, there are the same number of turns of the tape upon a given secondary reel 72 as there are turns of the name belt upon the main reel connected therewith. Since the tape is preferably a steel tape having only approximately half the thickness of the fittings which make up the name belt, the secondary reel 72 will have half the diameter in order to maintain the desired ratio so that the effective diameter of the secondary reel will in each instance change in the same ratio to the thicknesses of the respective belts as the effective diameter of the main reel connected therewith. Thus the linear travel of the tape and the name belt to or from a given reel as-

sembly will be alike at all speeds of reel rotation.

It is not necessary that the tape run directly from one reel to the other, and in the construction herein disclosed it does not do so. As clearly appears in Fig. 3, the tape 75 passes from the lower reel assembly to an idler pulley 77 from which it extends downwardly and about a driving pulley 78 and thence upwardly past another idler 79 to the secondary reel 72 of the upper reel assembly.

It will be apparent that the tape will serve to limit the tension on the name belt. This belt or web can be virtually floated from one reel to another because all motion transmission between the two reels is effected by the tape 75.

In order to permit of motion transmission in both directions and to complete the connection between the reel assemblies to assure that neither will overrun and that each will be positively driven, there is a second connection between the reel assemblies opposed in tension to the tension of the tape 75. This is provided by the chain 80 which operates around the respective sprockets 73. Since the chain and sprocket connection does not provide compensation for changes in rate of reel rotation due to changes in effective diameter as the name belt and the tape are respectively wound and unwound therefrom, it is necessary to provide take-up at two points in the length of the chain 80. In practice it is preferred that chain 80 be an endless chain. It is guided about the idlers 81, 82, 83, 85 and 86 in one of its runs between the sprockets 73 and about the idlers 87, 88 and 89 in the other of its runs between such sprockets. Idler 87 and idler 79 are coaxial and may be connected.

Idler 88 subjects the chain to strong bias. This may be done by mounting idler 88 upon a heavy counterweight 90 guided by a lever 91 pivoted to the cabinet at 92. The action of gravity is augmented by connection of the counterweight through a cable 93 to a biasing spring 94 which is connected to the idler 85. The cable provides a connection between the bights of the chain which pass about sprockets 83 and 85 respectively. In the operation of the device it will be found that with all of the name belt on one reel or the other, the sprocket 83 will be at its most extended position, this being the lowest position of the weight as shown in Fig. 3. Conversely, the sprocket 85 will be in its least extended position (the upward position in which such sprocket is illustrated in Fig. 3). As the belt winds onto the empty reel from the full reel, the sprocket 83 will be drawn upwardly toward an intermediate point and will then move downwardly again so that when the name belt has fully passed from one reel to the other both sprockets will be restored substantially to their original positions. Since the sprocket 85 will move downwardly at substantially the same rate at which sprocket 83 moves upwardly, the cable 93 provides a movable anchorage for spring 94 with the result that the tension of spring 94 on sprocket 85 will remain substantially constant, as will the bias on sprocket 83.

The system of reels is a closed system so far as the application of motion thereto is concerned. Moreover, the name belt is not a component element of the motion transmission system. All of the controls hereinafter mentioned and all of the operations of the driving mechanism, can be carried on even if the name belt is not present in the machine except that in this

particular instance the electric commutator mechanism happens to be driven from the name belt rather than from some of the other parts having correlated movement.

While the power may be applied to the system at any point, I have already indicated that in the present device it is applied through the friction surface pulley 78 to the tape 75. The power so applied is derived from motor 95 through belt 96 which drives a pulley 97 (Figs. 1 and 24) on shaft 98. This shaft carries clutch disks 99 and 100 between which a driven element comprising pulleys 101 and 102 is axially shiftable to engage with the clutch disks 99, 100 complementary disks 103 and 104 carried by the respective pulleys. A shifting lever 105 for shifting the driven clutch set so that either pulley 101 or 102 may be driven from shaft 98, is arranged to be operated by solenoid 106 (preferably provided with a dashpot 107). The armature 108 of solenoid 106 preferably carries a latch 109 which, in the inward movement of the armature, is caught by a detent 110 subject to release by a manually controlled Bowden wire 111, as will hereinafter be explained. The inward movement of the armature which is thus arrested by the detent, is the movement which clutches pulley 101 to shaft 98, this being the low speed pulley.

The respective low speed and high speed pulleys 101 and 102 are belt connected with complementary pulleys on the shaft 115 of a speed reducer 116 through which the driving pulley 78 is actuated to operate the reel assemblies as above described.

I provide at 118 a brake for shaft 98 which is self-applying and electromagnetically released. As shown in Fig. 1, the brake 118 may comprise a brake disk 1180 fixed on the end of shaft 98. Co-acting therewith through the intervening lining 1181 is a stationary disk 1182 comprising the bottom of a pan-shaped member 1183 guided for reciproction axially of the shaft by means of one or more pins 1184 fixed to the casing. The compression spring 1185 acts on such member in a direction to engage the stationary disk 1182 with the brake lining 1181 to arrest the movement of shaft 98. Whenever the motors which actuate the respective reels are energized, however, the brake is released electromagnetically by the energization of the solenoid 1186, the armature 1187 of which is connected to the lever 1188. The link 1189 pivoted to such lever extends into the brake housing and is connected with the cross bar 1190 of pan-shaped member 1183 so that energization of the solenoid will release the brake. Whenever the solenoid is de-energized, the spring 1185 will re-engage the brake. A set of relays 119, 120, 121 and 122 at the bottom of the cabinet control the forward and reverse direction of operation of the motor 95, the high and low speed positions of the driving clutches, and the functioning of the brake. See the wiring diagram in Fig. 26. The relays enable me to use low voltage in my electrical control and indexing system as now to be described.

As will be observed in Figs. 1 and 22, the keyboard 37 projects from the front of the cabinet at a convenient point to be immediately above the operator's lap when the operator sits directly before the display station 39. Provision is made on the table 37 for the interchangeable mounting of a series of index strips 125 opposite push buttons 126 as indicated in Fig. 4 and Fig. 5. Ball detents 127 suitably located in the guide slots in

which strips 125 are received, yieldably hold such strips in accurate relation to their respective push buttons. While any desired switches may be controlled by the respective push buttons 126, I have illustrated in Fig. 6 and Fig. 7 jack type switches at 130 closed by the depression of the respective buttons.

A camming member 132 movable between the full and dotted line positions shown in Fig. 7, is provided for each row of push buttons and the several camming members are operable by arms 133 on a rock shaft 134 subject to the control of a hand lever 135 for clearing the keyboard, the arrangement obviously being adapted to elevate any key which has been depressed to close a switch.

It may be stated here that the keyboard described is merely shown by way of illustration and is a simplified form of keyboard which, in actual practice, may preferably be replaced by any self-clearing keyboard such as is used in a calculator machine. The arrangement herein disclosed, while operable, is specifically undesirable in that it is possible to cause short circuits by depressing more than one key simultaneously.

From the rock shaft 135 another arm 136 connects to the Bowden wire 111, as shown in Fig. 1, for the release of the detent 110 shown and described in connection with Fig. 25. The detent which holds the low speed clutch in engagement is not essential but, in case it is used, the Bowden wire connection will provide for its release when the keyboard is cleared preliminary to another selecting operation.

Driven from the sprocket wheel 61 over which the name belt 42 operates, is the commutator mechanism shown in Figs. 1, 8, 9, 13 and 26. The sprocket 61 is mounted on a shaft 138 which carries a worm gear 139 meshing with a worm 140 on shaft 141. This shaft in turn carries another worm gear 142 meshing with worm 143 for driving shaft 144. On shaft 144 is a commutator disk 145 which is dielectric, or at least provides dielectric support for commutator segments 146, 147, 148 and 149. The insulating blocks 150 are relatively narrow as compared with the insulating block 151. Segments 146 and 149 are high speed segments for opposite directions of motor operation, and segments 147 and 148 are low speed segments in the respective directions of motor operation. The connections hereinafter described are such that when a brush passes from segment 146 to 147 the motor continues in operation, but when the brush registers with segment 151 the power to the motor is cut off and the brake applied.

A stationary dielectric arcuate terminal 155 surrounds the disk 145 and carries a series of brushes 156 which are spring biased toward the commutator disk. A separate brush is provided for each button or key 126 of the keyboard. Fig. 13 shows the wiring connections from a single key to a single brush, and also shows the relation of the terminal head to the commutator disk and its respective segments. The preferred disposition of the brushes 156 to provide space for their respective terminals 157 is clearly shown in Figs. 9, 10, 11 and 12.

Fig. 26 diagrammatically illustrates the wiring diagram. It will be seen that the motor 95, the brake magnet 118, and the clutch magnet 106, are supplied with full line voltage. The several switches 130 controlled by the push buttons 126 of the keyboard are supplied with low voltage by a transformer 158. Thus the brushes and the com-

mutator segments also operate at low voltage to control the windings of the several relays 119, 120, 121 and 122. Without describing the wiring system in detail (its analysis will be easy to anyone skilled in the art) suffice it to say that when any one of the brushes is energized by the closing of the corresponding switch 130 when a button of the keyboard is depressed, the energization of such brush will energize one of the several relays 119, 120, 121 or 122, depending upon what segment of the commutator such brush contacts at the time. If it be assumed that segment 146 is the high speed segment for clockwise motor rotation, the relay 119 will close the necessary circuits to the motor windings to assure such rotation at high speed. Such rotation must necessarily propel the name belt through the apparatus in a direction such that the corresponding rotation communicated through the mechanism shown in Fig. 8 to the commutator disk, will turn that disk in a direction to move the insulating segment 151 toward the energized brush.

As the dead segment 151 approaches the energized brush, the brush will first pass from live segment 146 to live segment 147. The relay 120 will not become operative to continue the motor in operation and to energize the clutch throwing solenoid 106 whereby the drive will continue in slow speed until the dead segment 151 registers with the energized brush, whereupon the motor will come to rest.

If the brush energized had been in registry with live segment 149, the name belt and all driven parts would have been operated in an opposite direction at high speed through the energization of the relay 122. Relay 121 would then have been energized to slow down the speed of the name belt and associated parts, and finally registry of the dead segment 151 with the energized brush would have allowed the apparatus to come to rest.

If an energized brush happened to be one registering with one of the slow speed segments, rather than one of the high speed segments, the high speed relays would have been inactive and the operation would have proceeded in the proper direction at low speed.

The driving connections shown through the several relays are preferably such (as illustrated) that when any relay is energizing the motor in one direction the circuits to the relays for operating it in an opposite direction are open.

There are important advantages in the alternative type of electric selector used in the construction shown in Figs. 27 to 32, now to be described. It will be apparent that this type of selector is interchangeable with that just described above, regardless of the type of driving connections used and regardless of the type of name belt employed. Because Fig. 27 happens to illustrate a special type of name belt and a special type of electrical selecting mechanism and a different type of driving connections, it is not to be assumed that these three features are essentially correlated, as any one of them may be interchanged with a corresponding feature illustrated in Fig. 1.

The name belt 43 in Fig. 28 comprises a film of the type used for motion picture projection on which appears the names at 160 followed by a code number or symbol 161. When this film is fed through a projector 162 provided with a lens 163 and a projection lamp 164 an enlarged image of the film, preferably showing a considerable sequence of names and credit symbols, will be

projected onto the viewing screen 40 at the inspection station.

The film is wound upon reels 590 and 600, each corresponding in function to reels 59 and 60 carrying the name belt in the Fig. 1 construction. However, in this device the reels are much smaller since they are only obliged to carry movie film rather than the relatively heavy name belt previously described. Moreover, the operating mechanism is greatly simplified. I provide at 165 a motor having its shaft connected with reel 590 and arranged to rotate such reel in a winding direction. At 166 I provide a motor having its armature shaft connected with reel 600 and adapted to rotate that reel in a winding direction. Brakes at 167 are self-applying to each armature shaft whenever the motors are de-energized. Energization of the respective motors releases both brakes.

Moreover, I may so connect the respective motors that each will act as a drag upon the other to maintain the film under tension. To some extent the motor will do this even without any such provision. However, in the arrangement shown in the wiring diagram in Fig. 32, the hook-up is such that when either motor is primarily energized to turn its respective reel the other motor will be energized also but to a lesser degree through one of the resistances 168 so that the tendency of the partially energized motor to turn its own reel will maintain tension on the film being unwound therefrom against the pull of the partially energized motor.

Power is taken from one of the sprockets 169 of the motion picture projector to drive a shaft 170 which communicates motion to the commutator disk 171. This disk, instead of having segments on its periphery, has high speed forward and reversing segments 172 and 173 and low speed forward and reversing segments 174 and 175 on its face, near its periphery. Between the latter segments is a dead segment 176.

Rotatable coaxially with disk 171 is an arm 180 carrying a single brush 181 connected to the current supply. This arm has a connection by means of chain 182 and gears 183 and 184 to a control lever 185, the handle 186 of which projects through a slot 187 in an arcuate index table 38. On the face of the table is an index 188 as best shown in Fig. 29. The handle may, if desired, be provided with a magnifying glass 189 traversing the index to facilitate the reading thereof.

The low speed segment 174 is connected to the high speed segment of corresponding direction 172 through a resistance. Low speed segment 175 is similarly connected to the high speed segment 173 of corresponding direction through a resistance. The resistances are sufficient to greatly reduce motor speeds when the brush 181 registers with the low speed segment, but the resistances used at this point should preferably have sufficient power so that the motor primarily energized will be able to overcome the weaker energization of the opposite motor for the sole purpose of maintaining the film under tension.

One advantage of this arrangement over the electrical selection mechanism disclosed in connection with the device of Fig. 1, lies in the great reduction in wiring. Another advantage may not, at first, be apparent. If the control lever 186 is moved for a substantial distance over the index the operating mechanism will at once be thrown into operation to propel the name belt

toward the point represented by the selection lever. As that point is approached the brush will, as in the originally described device, run off of the high speed segment onto the low speed segment and the operating mechanism will slow down the movement of the name belt. Preferably, the rate of low speed operation will be sufficiently low so that the names and authorized credit symbols can be read as the images move across the screen. It is not necessary that every word be legible as long as some portion of some names can be read. However, it is possible to operate the belt at a speed such that every name can be read if desired.

The point is that instead of operating toward a fixed point as represented by the depressed button of the selecting device first described, the present device can be operated toward a moving point represented by the lever 185 and the handle 186, these being subject to continuous movement manually by the operator. Thus, if the handle is slowly moved over the index at approximately the same rate at which the film or name strip advances through the machine, the result will be to keep the machine in continuous slow speed operation from one end to the other, or as far as may be desired. This greatly assists in finding a particular name or in reading a particular sequence of names from the name belt. It is a markedly different mode of operation from anything possible with the type of selector previously disclosed.

In both of the devices herein disclosed the inspection station preferably has a sufficient extent with reference to the names exposed in any given position of the name belt so that a considerable sequence of such names and the authorizing symbols associated therewith will be visible at one glance. This makes it possible for the indexing mechanism to operate to bring in a particular name somewhere within the range of the inspecting station even though there may be far fewer names on the index than on the belt. For example, if the belt displays forty names at the inspecting station and the index has one-fortieth as many names as appear on the belt, then an unskilled operator must infallibly bring the desired name into view by manipulating the index to the nearest point. A skilled operator can apportion the space between index symbols through the use of an infinitely variable lever such as that shown in Fig. 27, and can do much better. A skilled operator would not need to have more than one index mark to every two hundred names on the belt in order to bring in with certainty a particular name. The possibility of making such apportionment again depends upon the use of an infinitely variable selecting lever as shown in Fig. 27 in lieu of a selector which operates through a fixed station as does the device of Fig. 1.

As above indicated, however, the selector shown in Fig. 27 is usable in the device of Fig. 1 alternatively with the selector there shown, and vice versa. It is also possible in the device of Fig. 1 to substitute film or other types of name belts for the belt there illustrated. The driving mechanism is also interchangeable, as is the compensating device of Fig. 1 or the retarder suggested in Figs. 27 to 32. The various features shown are illustrative of the possibilities and they may be associated in any desired manner.

I claim:

1. An authorizer comprising a flexible belt including name strips each adapted to display a

name, and an authorizer symbol adjustable transversely of the belt and spanning a particular name strip, said symbol having terminal means engaged marginally about said strip and in a position also to span portions of a name carried thereby and adjustable from point to point over said name.

2. In an authorizer, a name belt operable over pulleys and reels and comprising a flexible belt made up of separable sections, each of said sections comprising a narrow strip flexible throughout its length and provided at its end with interlocking means for connecting it to like strips, said interlocking means being engageable and disengageable with the interlocking means of like strips upon flexing one of said strips respecting another, certain individual sections comprising single line strips bearing individual names.

3. In a device of the character described, a flexible name belt operable over pulleys and reels and comprising separable sections each provided with interlocking means engageable with an adjacent section and each interlocking means being provided with an opening adapted to receive the interlocking means of an adjacent section, each such section being flexible whereby to permit of the manipulation of its interlocking means into the opening of the adjacent section, certain of said sections being provided with authorization indicating means slidable thereon.

4. In a device of the character described, a flexible name belt comprising a series of separable belt sections in interlocking connection, and each such section comprising at least one flexible name strip having an elongated exposed name-receiving area of substantially rectangular form and connected therewith and having exposed marginal portions adapted to provide reciprocable support for an authorizing slide.

5. In a device of the character described, a name belt comprising separable belt sections each co-extensive in width with the belt and each provided at the sides of the belt with receptacles for the ends of a name strip; together with a flexible name strip having its ends engaged in the respective receptacles and detachably connected thereby with a section of said belt.

6. A name belt comprising a series of transverse name-bearing strips, and like fittings at the opposite ends thereof, each such fitting comprising a hook and a hook-receiving opening, the fittings at each end of a series of like strips being in releasable interlocking connection in two longitudinal series of fittings between which the strips provide transverse connection.

7. In a device of the character described, a name belt comprising a series of separable supports including individual name strips, means connecting said supports at the sides of the belt between which said strips extend, and authorizer slides associated with individual strips and movable thereon transversely of the belt.

8. In a device of the character described, a name belt comprising a flexible strip adapted to receive a name and a link belt fitting at one end thereof comprising a channel in which the end of the strip is engaged, and hook-like extensions from the sides of the channel together constituting a hook for engagement in the channel of a like fitting.

9. In a device of the character described, a belt link comprising a channel having side flanges and a top web, arms extending outwardly from said flanges beyond said web and reversely curved and brought together to constitute a hook receivable between the arms and beneath the web

of a like fitting for interlocking connection therewith.

10. In an authorizer, the combination with a display cabinet having a display opening, of a name belt within the cabinet, means for supporting and guiding the name belt for movement past said opening, and means for actuating the name belt to bring a selected name into registry with said opening, the name belt comprising separable sections smaller in all dimensions than the opening and accessible through said opening for the addition or removal of sections, each such section being flexible and elongated transversely of the belt and having a name directly imprinted upon it transversely of the belt, the respective sections being provided adjacent their ends with detachable connecting means including fingers and apertures extending longitudinally of the section and transversely of the belt and engageable and disengageable upon the flexing of one of said sections intermediate its ends.

11. In a device of the character described, the combination with a pair of reels and a record conveyor wound thereon, of a motor connected with each of said reels for propelling it in a conveyor winding direction, a control member, a member connected with said conveyor to partake of the motion thereof, and motor controlling means comprising brush and commutator elements connected with respective members for relative movement according to the movement either of said control member or said second member, said commutator comprising spaced contacts between which said brush element is normally disposed, together with circuit means connecting the respective contacts to the respective motors for the primary operation thereof, and means whereby each motor is secondarily energized at reduced power when the other motor is primarily actuated, whereby said conveyor is propelled by the power differential between said motors in a direction determined by the contact engaged by the brush element and is maintained taut by the resistance of the motor secondarily energized.

12. In a device of the character described, the combination with a pair of reels and a record conveyor wound thereon, of a motor connected with each of said reels for propelling it in a conveyor winding direction, a control member, a member connected with said conveyor to partake of the motion thereof, and motor controlling means comprising brush and commutator elements connected with respective members for relative movement according to the movement either of said control member or said second member, said commutator comprising spaced contacts between which said brush element is normally disposed, together with circuit means connecting the respective contacts to the respective motors for the primary operation thereof, and means whereby each motor is secondarily energized at reduced power when the other motor is primarily actuated, whereby said conveyor is propelled by the power differential between said motors in a direction determined by the contact engaged by the brush element and is maintained taut by the resistance of the motor secondarily energized, and means for limiting the tension of said conveyor, said means comprising mechanism for transmitting unwinding motion from the winding reel to the reel connected with the motor secondarily energized.

13. In a device of the character described, the combination with a pair of supporting members and a web operable thereover and between said

13

members, of electrically energized web actuating means, and control mechanism therefor including a control member adjustable to an infinite number of positions in a predetermined range, a member movable in accordance with the movement of the web, brush and commutator elements connected to the respective members for relative movement in accordance with the movement of either member, said commutator element comprising spaced contacts, one of which is short and the other is a longer contact insulated from the shorter contact, electrical circuit means connecting the respective contacts and the brush element in operative circuit with said web actuating means, said circuit means including in series between the longer and the shorter contacts a resistance for causing said web actuating means to function at low speed, the brush being connected with one side of a current supply and the longer contact means being connected through the web actuating means with the other side of the current supply.

14. A web control system comprising the combination with a web and a pair of rotatable supports therefor, of remote control means for controlling the web position and for advancing it selectively toward either of said supports and to any desired extent, said remote control means comprising a manually operable control member mounted for continuous movement to any one of an infinite number of positions within a predetermined range, a member connected to receive motion in accordance with the rate and extent of web movement, whereby its position will always be a function of the position of said web, brush and commutator elements connected to the respective members and positioned for relative interaction in accordance with the movement of said members, said commutator element comprising spaced contacts between which the brush element is normally disposed, reversible driving connections for the web having reversing contacts connected with the spaced contacts of the commutator element, at least one auxiliary contact connected with the commutator element for movement therewith, said brush element comprising means engageable with the auxiliary contact in approaching and leaving its normal position between the spaced contacts first mentioned, means in operative electrical connection with the said auxiliary contact for retarding the speed of web operation when the auxiliary contact is engaged by said brush means, the electrical connections being such that the direction of web operation in all cases of brush engagement with the respective contacts is such as to move the web and its associated member toward a position of relocating the brush between the spaced contacts first mentioned, engagement of the brush means with said auxiliary contact being adapted to operate the web at low speed.

15. A web control system comprising the combination with a web and a pair of rotatable supports therefor, of remote control means for advancing said web selectively toward either of said supports and to any desired extent, said remote control means comprising a manually operable control member mounted for continuous movement to any one of an infinite number of positions within a predetermined range, a member connected to receive motion in accordance with the rate and extent of web movement, brush and commutator elements connected to the respective members and positioned for relative interaction in accordance with the movement of

14

said members, said commutator element comprising spaced contacts between which the brush element is normally disposed, reversible driving means for the web having reversing contacts connected with the spaced contacts of the commutator element, auxiliary contacts connected with the commutator element for movement therewith, said brush element comprising means engageable alternatively with one of the auxiliary contacts in approaching and leaving in either direction its normal position between the spaced contacts first mentioned, means in operative electrical connection with the auxiliary contacts for retarding the speed of web operation when said auxiliary contacts are engaged by said brush means, the electrical connections being such that the direction of web operation in all cases of brush engagement with the respective contacts is such as to move the web and its associated member toward a position of relocating the brush between the spaced contacts first mentioned engagement of the brush means with one of the auxiliary contacts being adapted to cause the web to follow at low speed the continued manual displacement of said control member throughout any range of control member movement in which the brush means remains in engagement with an auxiliary contact.

16. A web control system comprising the combination with a control member mounted for movement in each of opposite directions, of remote control means for said member comprising a manually operable control part mounted for continuous movement to any one of an infinite number of positions within a predetermined range corresponding to a range through which said member is operable, a second part connected to receive motion in accordance with the rate and extent of movement of said member, brush and commutator elements connected to the respective parts and positioned for relative interaction in accordance with the movement of said parts, said commutator element comprising spaced low speed segments between which the brush element is normally disposed and high speed segments beyond the respective low speed segments from said normal brush position, reversible driving connections for the member, said connections having reversing contacts connected with the high speed contact segments of the commutator elements, resistance means connecting said high speed segments with the respective spaced segments first mentioned, whereby engagement of the brush element with either of the segments first mentioned will operate said driving means at low speed in one of its directions of movement, said brush element contacting one of the segments first mentioned and the electrical connections being such that the direction of operation of said member in all cases of brush engagement with one of the respective contact segments is such as to move the said member and its associated part toward a position in which the brush will be relocated between the spaced contact segments first mentioned; engagement of the brush element with one of the said contact segments first mentioned in the course of movement of the brush element from its said position being adapted to cause said part to follow at low speed the continued manual displacement of the control throughout any range of control part movement in which the brush element remains in engagement with one of said first mentioned contact segments.

17. In a device of the character described, the combination with a record-bearing web and rotatable supports therefor between which said web is movable in opposite directions, said web carrying records so mounted thereon that at least a portion of each such record is visible, of means providing a display station past which said web is operable between said supports, reversible high and low speed driving means for said web, said means being in operative connection with at least one of said supports and the low speed driving means being adapted to actuate said web at a speed sufficiently low to enable the visible portions of records carried thereby to be scanned at said station, and control mechanism for said driving means for selectively actuating said web to expose a selected portion thereof at said station or to maintain any desired portion of said web in continuous low speed motion at scanning speeds past said station.

18. In a device for selectively propelling records by power at legible scanning speeds past an inspection station or, alternatively, for propelling such records to register a selected record automatically with such inspection station, the combination with a cabinet providing an inspection station and having internally a plurality of rotatable supports for a record-web, certain of said supports being arranged to guide said web for movement past said station, and a web mounted on said supports for movement past said station in either direction of movement longitudinally of said web, said web carrying records at least partially legible thereon during web movement, of high and low speed reversible operating connections to one of said supports for the actuation of the web, the low speed operating connections being adapted to actuate the web at scanning speeds past said station so that portions of the records on said web may be read by an operator with the web in motion, and control mechanism for said actuating connections comprising a commutator member mounted for relative movement, a brush member provided with brush means, means providing a driving connection between one of said members and one of the web supports, high speed segments mounted on the commutator member in spaced relation, said brush means normally lying between said segments, low speed segments lying immediately at either side of the normal brush position aforesaid, said brush means being engageable with the several segments when said brush member is displaced relatively to said commutator member, the low speed segments being of relatively limited extent as compared with the high speed segments whereby to be engaged by said brush means only adjacent the aforesaid normal position of the brush means between said segments, a manually operable control part connected to the member other than that to which said belt support is connected, and an index with respect to which said manually operable control part is adjustable infinitely throughout a range of movement corresponding to the range of movement of the web, an electrical supply connection to said brush means, another electrical supply connection to the high and low speed operating means, electrical connections from the respective high speed segments to said operating means for the forward and reverse actuation thereof according to which segment is energized by contact of the brush means therewith, and electrical connections from the respective low speed segments to the low speed operating means for the forward

and reverse operation thereof according to which segment is energized by contact of the brush means therewith, the direction of driving relation between the high and low speed operating means and the web being such that the web, when driven by such operating means, will always move in a direction to move the member connected with the web support toward a position to reregister the brush member between the several segments of the commutator member, whereby the web will follow said manually operable part toward a position corresponding to the position to which said part is moved and will operate at high speed when said brush means clears the low speed segments and is engaged solely with one of the high speed segments, and will operate at low scanning speed when said brush means is engaged with one of the low speed segments and will stop automatically when said part is at rest and the brush means is centered between said segments, and will continue in motion indefinitely throughout its range at scanning speeds so long as said part is manually operated continuously at a rate such as to maintain one of the low speed segments in contact with said brush means.

19. In an authorizer of the character described, a flexible belt adapted to operate over a pulley and comprising substantially throughout its length narrow strips extending transversely of the belt and having proximate edges whereby to provide a nearly continuous surface in which the face of each strip is flush with the faces of contiguous strips, and means detachably mounting said strips at their ends, said mounting means being hingedly connected with each other to comprise said belt.

20. The belt defined in claim 19, in which the mounting means comprises hooked and apertured fittings disposed at the ends of the respective strips and individually connected to respective strips, the hook of each such fitting being engaged in the aperture of the fitting of an adjacent strip.

21. The belt set forth in claim 19, in which the mounting means comprises a series of like sheets having interlocking slit and tongue portions, said sheets being mutually lapped and respectively provided with marginal pockets in which the ends of the strips aforesaid are engaged.

22. The device of claim 19, in which the mounting means comprises a web underlying a series of strips and provided near the margins of the belt with pocket means in which the ends of each of several strips are accommodated.

23. The belt set forth in claim 19, in which the mounting means comprises a series of sheets having interlocking tongue portions, said sheets being connected together in mutually lapped relation and provided along the sides of the belt with pocket portions substantially continuous along the belt, each such pocket portion being adapted to receive the ends of a plurality of said strips and the continuity of the pocket portions being such that the said strips are in substantially continuous series over the lapped sheets.

24. The belt set forth in claim 19, in which a signal spans one of said strips and has portions extending between the margin of the spanned strip and the strips contiguous thereto, said signal being slidably adjustable along the spanned strip.

JEROME L. CLOUGH.

(References on following page)

2,521,284

17

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
302,723	Grimes	July 29, 1884
556,136	Daly	Mar. 10, 1896
1,065,337	Borroughs	June 24, 1913

Number
1,402,075
1,563,382
1,684,683
1,861,718
1,865,057
1,930,540
1,957,120
2,202,419

5

18

Name	Date
Kolk	Jan. 3, 1922
Legg	Dec. 1, 1925
Radke	Sept. 18, 1928
Pratt	June 7, 1932
Hutchings	June 28, 1932
Saxby	Oct. 17, 1933
Weiss	May 1, 1934
Geuder	May 28, 1940