Dec. 24, 1929. E. A. MARGESON 1,740,517

AUTOMATIC DISPLAY MACHINE

Filed Feb. 29, 1928 4 Sheets-Sheet 1

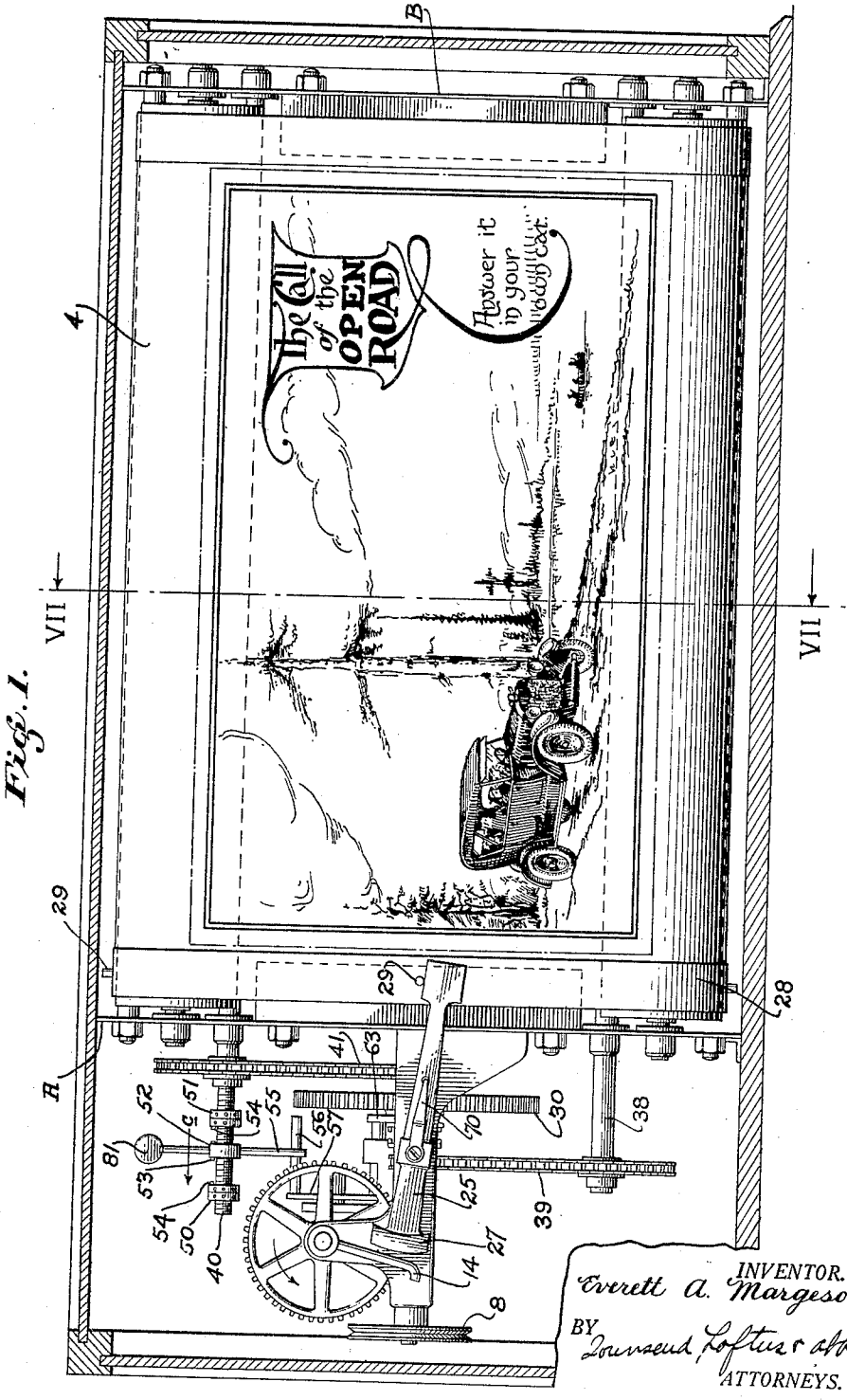


Fig. 1.

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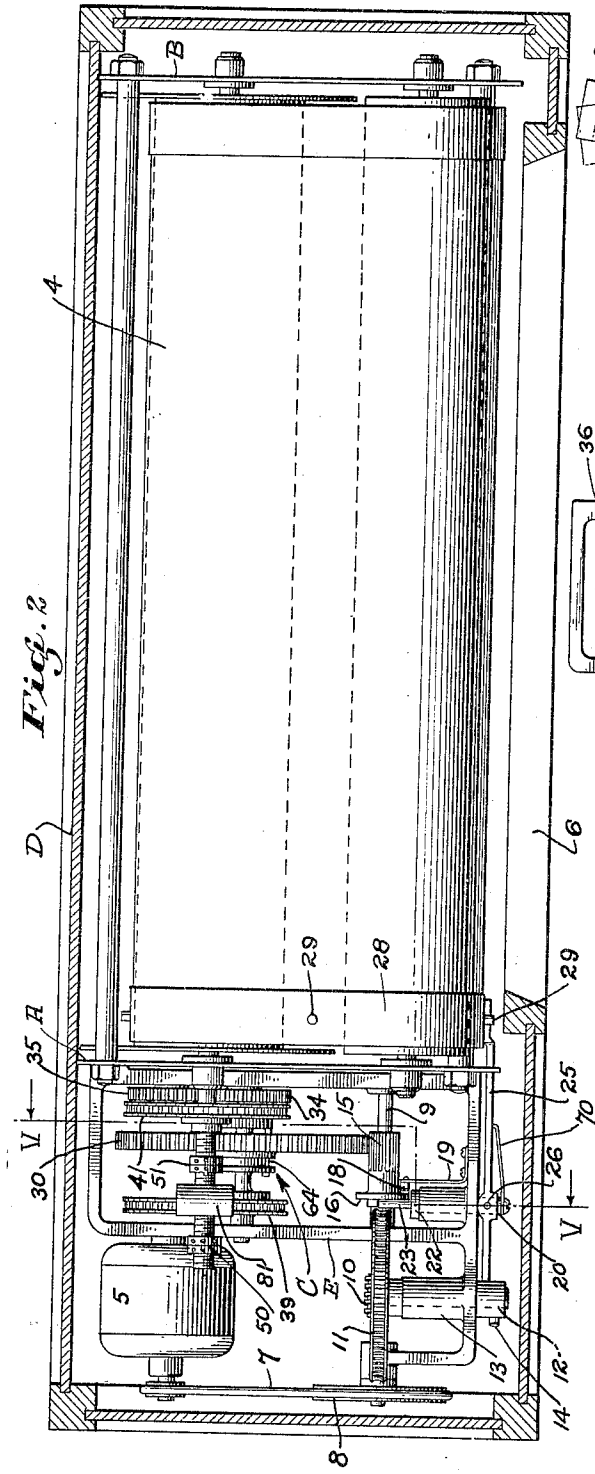


Fig. 2.

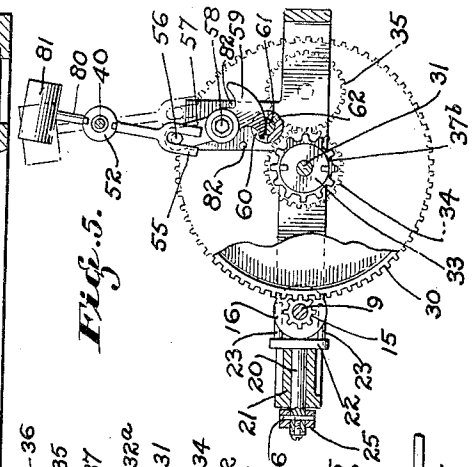


Fig. 5.

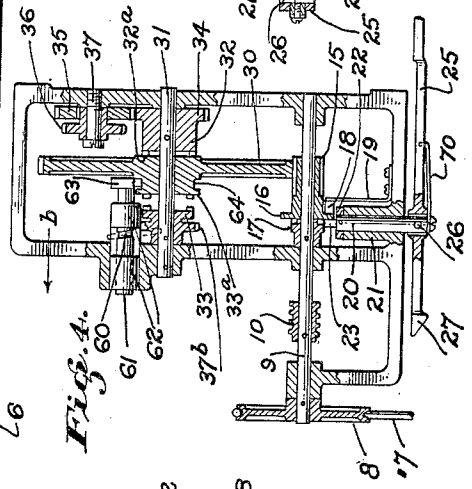


Fig. 4.

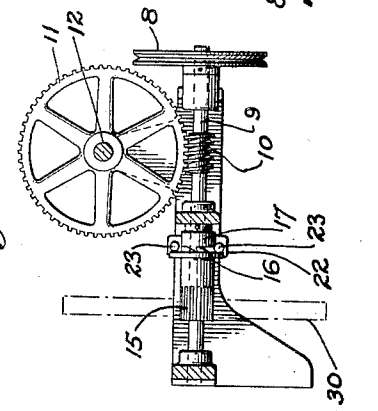


Fig. 3.

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Fig. 7.

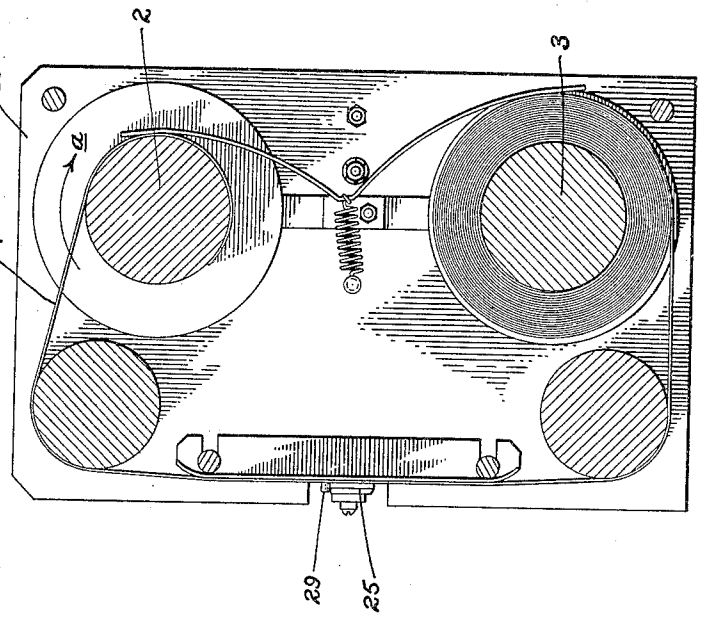
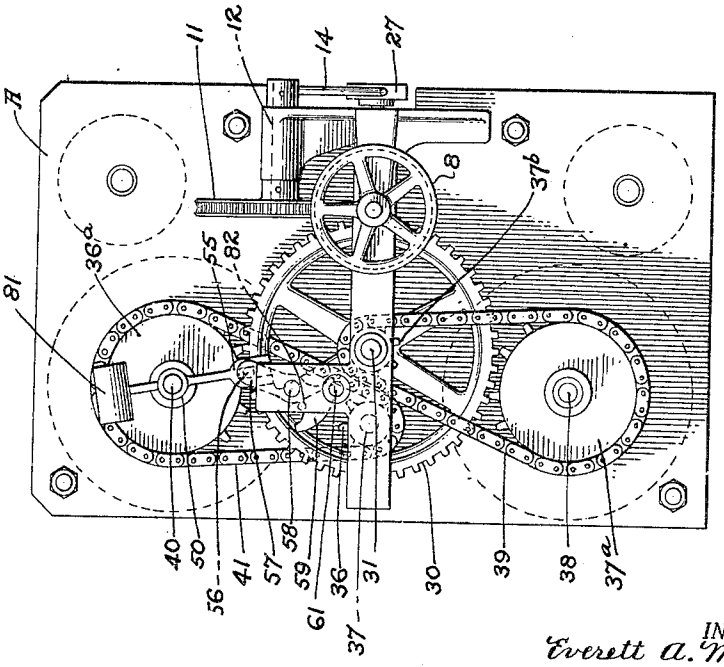


Fig. 6.



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Fig. 8.

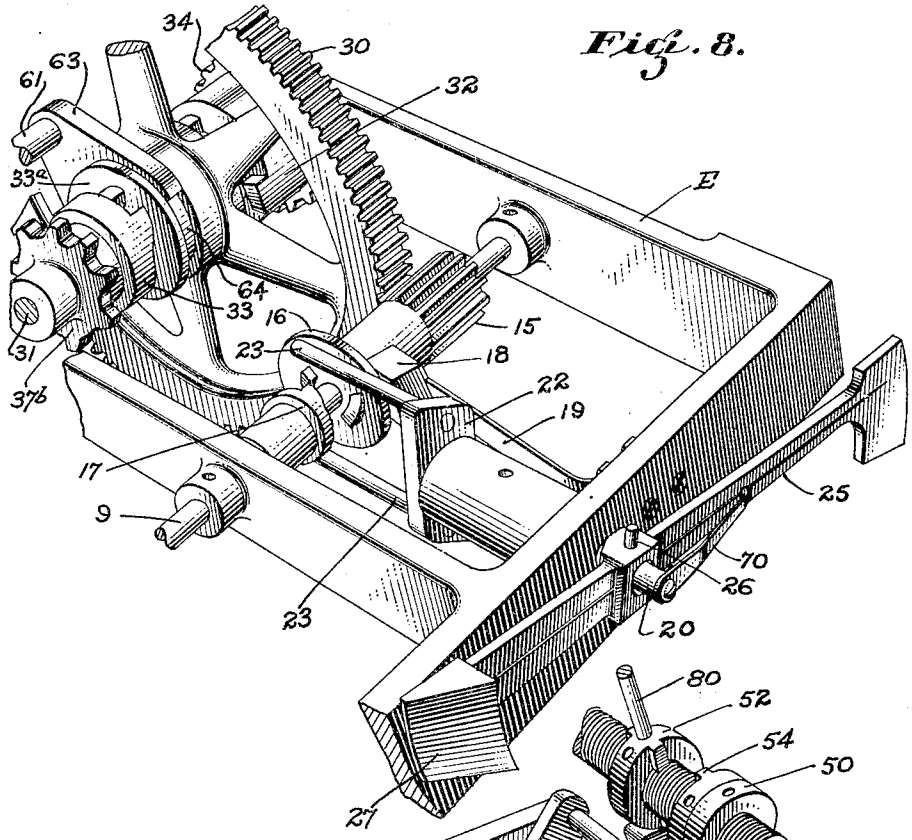
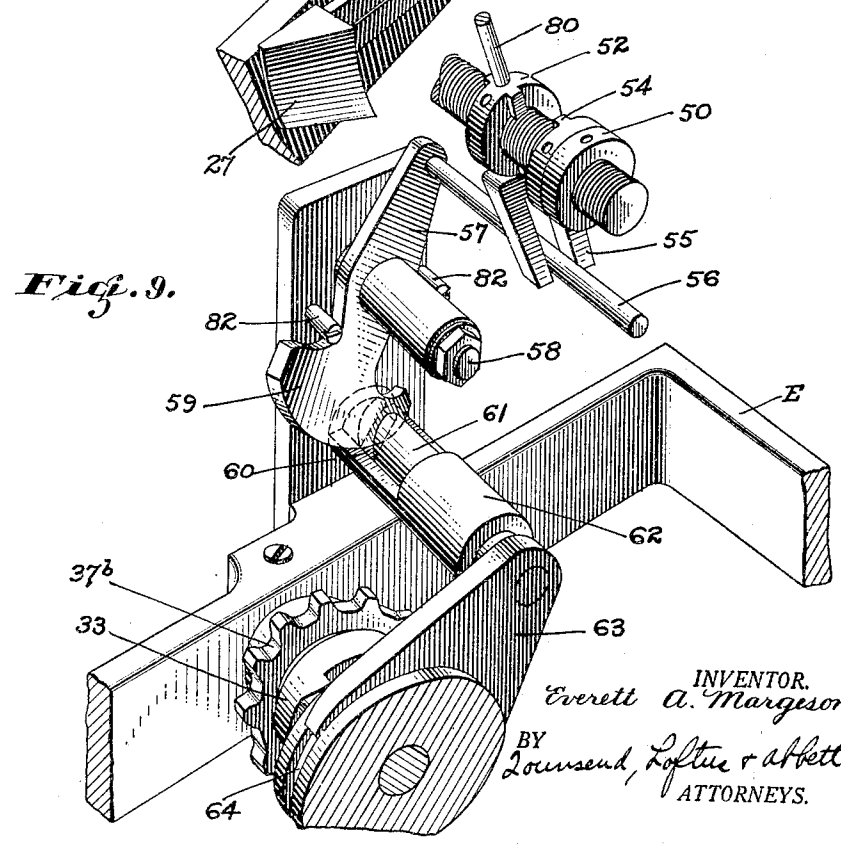


Fig. 9.



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Patented Dec. 24, 1929

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UNITED STATES PATENT OFFICE

EVERETT A. MARGESON, OF SAN JOSE, CALIFORNIA

AUTOMATIC DISPLAY MACHINE

Application filed February 29, 1928. Serial No. 257,805.

This invention relates to a display or advertising machine and especially to a driving mechanism whereby intermittent movement may be transmitted to a curtain or web containing a number of displays or advertisements so that each advertisement may be successively moved into register with a display opening and there displayed for a predetermined time interval.

The object of the present invention is to generally improve and simplify the construction and operation of machines of the character described; to provide a pair of reels and a web upon which is printed or otherwise formed successive displays, advertisements, or the like; to provide means whereby a step by step movement is transmitted to the reels and the web so that each display or advertisement may be moved into register with the display opening; to provide means whereby the movement of the reels and the web are automatically reversed when either end of the web is reached; to provide means whereby such reversal may be obtained at any point intermediate the ends of the web; and further, to provide means whereby the reels and web automatically actuate both the step by step movement of the web and the reversal thereof. The invention is shown by way of illustration in the accompanying drawings, in which:

Fig. 1 is a front view of the machine showing the housing removed,

Fig. 2 is a plan view of the machine showing it within the housing,

Fig. 3 is a detail view of the drive shaft and the gears and clutch driven thereby,

Fig. 4 is a plan view of the drive shaft, the intermediate drive shaft and the gears and clutches carried thereby, said view being partially in section,

Fig. 5 is a section taken on line V—V, Fig. 2, parts of the view being broken away,

Fig. 6 is an end view of Fig. 1,

Fig. 7 is a cross section taken on line VII—VII, Fig. 1,

Fig. 8 is a perspective view of the drive shaft clutch and the mechanism actuating the same,

Fig. 9 is a perspective view of the reversing gear clutch and the mechanism actuating the same.

Referring to the drawings in detail and particularly Figs. 1 and 2, A and B indicate a pair of end plates, between which is journaled a pair of reels 2 and 3 on which is wound a curtain or web 4. One end of the web is secured to the reel 2 while the opposite end of the web is secured to the reel 3. The web may be of considerable length and it is wound on one reel when the machine is in operation until the end is reached, when rotation of the reels is automatically reversed, and the web will then be unwound from the first reel and rewound on the second reel, this operation continuing until the end of the web is reached, when it is again reversed and the operation is continued as long as power is transmitted. The reels are driven by an electric motor 5 and a driving mechanism generally indicated at C, the motor and the driving mechanism being disposed adjacent the end plate A and the entire mechanism being preferably enclosed within a housing D, such as shown in Fig. 2. The curtain or web employed has printed or otherwise formed thereon displays, advertisements or the like. The advertisements are interspaced and a step by step movement is transmitted to the reels and the web so that each advertisement will be brought into register with the display opening, such as indicated at 6, and there retained for a predetermined time interval. A driving mechanism is, accordingly, employed which intermittently transmits movement to the web and which also reverses the movement of the web when either end is reached.

The driving mechanism comprises an electric motor 5 which transmits power through a belt 7 or the like to a pulley 8 which is secured on the drive shaft 9. This shaft is journaled in a frame E suitably secured to the end plate A, as shown in Figs. 1, 2 and 6. Secured on the shaft is a worm pinion 10 which intermeshes with and drives a worm gear 11. This gear is secured on a shaft 12 supported in a journal 13 and secured on shaft 12 on the end opposite the worm gear 11 is a trip arm 14, the function of which will hereinafter be described. Freely rotatable on the drive

shaft 9 is a driving pinion 15 on one end of which is formed a clutch collar 16. Secured on the shaft is a cooperating clutch 17. A shoe 18 engages one face of the clutch collar 16. This shoe is secured on a spring arm 19 and the spring arm and shoe normally serve the function of retaining the clutch members 16 and 17 in mesh so that power will be transmitted to the driving pinion 15. Means are, however, employed for throwing the clutch members into and out of mesh. This means or mechanism comprises a shaft 20 journaled in a bearing 21. Secured on the inner end of the shaft is a cross arm 22, on opposite ends of which are secured pins 23. These pins engage the face of the clutch collar 16 opposite the spring actuated shoe 18 and when shaft 20 is partically rotated, one or another of the pins 23 will engage the clutch collar and thereby impart longitudinal movement to the clutch collar and the gear 15, and thereby throw the clutch out of mesh. When the shaft 20 assumes a position where the pins 23 align in a vertical direction, spring 19 and shoe 18 throw the clutch members into engagement and the driving connection is thereby made. The rocking movement of the shaft 21 to disengage the clutch members is controlled by a trip lever 25, which is pivotally secured, as at 26, on the outer end of the shaft 20. One end of the trip lever is provided with a cam shaped head 27, while the other end of the trip lever is extended to overlie the edge 28 of the curtain or web. Suitably secured on this edge are a plurality of pins 29, there being one pin for each advertisement or display carried by the curtain. When the web is moving and at the time that an advertisement moves into register with the display opening in the housing, a pin 29 engages the trip lever 25 and thereby imparts a rocking movement to the trip lever, the rocking movement being sufficient to cause one or another of the pins 23 to engage the clutch collar and thereby disengage the clutch. When such disengagement is obtained, the transmission of power between the drive shaft and the reels is broken and the reels and web will come to rest. The advertisement which now aligns with the display opening will remain stationary for a predetermined time period, which may be half a minute or whatever the case may be. The moment the half minute period is up, the trip arm 14 on shaft 12 engages the cam head 27 on the opposite end of the trip lever and as the trip lever is pivotally mounted as at 26 on the end of the shaft 20, the opposite end of the trip lever is moved outwardly with relation to the pin and the clutch members 16 and 17 are thus released as the tension of the spring 19 will move the clutch member 16 back into engagement with the member 17. The trip lever is at the same time returned to normal position and as the driving connection is established, movement will again be imparted to the web.

The mechanism so far described relates to the step by step movement imparted to the web and the mechanism whereby it is actuated. The mechanism whereby the reels are driven and whereby they are reversed when one end of the web is reached will now be described. By referring to Figs. 2 and 4, it will be noted that the driving pinion 15 intermeshes with a gear 30 and that this gear is freely turnable on an auxiliary driving shaft 31. This shaft is journaled crosswise of the frame E and it has secured thereon two clutch members 32 and 33. Cooperating clutch faces are formed on the hub of the gear 30, as indicated at 33^a and 32^a. The clutch member 32 carries a spur gear 34 which intermeshes with a spur gear 35 which is secured on the hub of a sprocket gear 36, this gear being in turn journaled on a stud shaft 37 which is secured in the frame E. The clutch member 33 carries a sprocket gear 37. A sprocket gear 37^a is secured on a shaft 38 of the lower web reel 3, and a sprocket chain 39 which passes over the sprocket gears 37 and 37^a transmits power from the auxiliary drive shaft to rotate the lower reel 3. A sprocket gear 36^a is similarly secured to the shaft 40 of the upper reel 2. A sprocket chain 41 passes around the sprocket gears 36 and 36^a, and power is thus transmitted to rotate the upper reel. The sprocket gear 36 is, however, driven from the auxiliary drive shaft through the clutch 32 and the intermeshing spur gears 34 and 35, and the direction of rotation is, accordingly, reversed. Only one reel is driven at a time, either the upper reel 2 or the lower reel 3. If the upper reel is driven, the direction of rotation will be that indicated by the arrow indicated at *a* (see Fig. 7). If the lower reel is being driven, the direction will be reversed or opposite and it is thus possible to drive the reels in either one direction or another, depending upon which of the clutches 32 or 33 is being engaged.

The reversal of the movement of the web and the rotation of the reels will under ordinary conditions take place when one end of the web is reached, as shown in Fig. 7, but it may be reversed at any intermediate point, as will hereinafter be described. The reversing mechanism is automatic and is constructed as follows:

By referring to Figs. 1, 4, 5, and 9, it will be noted that the outer end of the upper reel shaft 40 is threaded from end to end and that pairs of lock nuts are mounted on the threaded section, as indicated at 50 and 51. A nut 52 is disposed between the lock nuts and lugs 53 are formed on the opposite faces of the nuts. Lugs 54 are similarly formed on the inner faces of the lock nuts. The nut 42 carries a fork-shaped extension 55 which straddles a pin 56 secured in the upper end of a

lever 57 which is pivotally mounted on a shaft 58. The lower end of this lever is cam shaped, as shown at 59, and it engages a slot 60 formed in a shifting rod 61. This rod is slidably mounted in a pair of bearings 62 and the outer end of the rod carries a fork-shaped lever 63 which engages an annular groove 64 formed in the hub of the gear 30. When the lever 57 of the cam member 59 is swung about the pivot or shaft 58 in one direction, the shifting rod 61 and the fork lever 63 are moved longitudinally in the direction of arrow *b* and the clutches 33 and 33ª are thus engaged. On the other hand, if the lever 57 and cam 59 are swung about the pivot 58 in the opposite direction, the shifting rod will move in the direction opposite to arrow *b* and the clutches 32 and 32ª will engage. When these clutches are engaged, the upper reel will be driven and when the clutches 33 and 33ª are engaged, the lower reel will be driven. The shifting mechanism so far described is automatically controlled by the nut 52 and the adjustable pairs of lock nuts indicated at 50 and 51, i. e., nut 52 with its fork shaped extension 55 is held against rotation with the shaft 40 by means of the pin 56 carried by the lever 57. Thus, as shaft 40 rotates in one direction, nut 52 will advance longitudinally along the shaft, for instance in the direction of arrow *c*, and when the lug 53 on the nut 52 engages the lug 54 on the nut 50, an interlock is made and nut 52 together with the fork 55 will rotate a partial revolution with shaft 40. This partial revolution imparts rocking movement to the lever 57 and the cam member is thus swung in one direction to disengage one clutch and at the same time to cause engagement of the opposite clutch. Reversal instantly takes place in this manner and shaft 40 immediately commences to rotate in the opposite direction. The nut 52 will then advance along shaft 40 in the opposite direction and when lug 53 engages with the lug on the lock nuts 51, rotation of nut 52 and the fork 55 will for a partial revolution take place in the opposite direction, and lever 57 together with cam 59 is accordingly reversed and the position of the clutches is reversed. The lock nuts 50 and 51 are normally set so that reversal will not take place until one end or another of the web is reached, but by setting them closer together, it is obvious that reversal may be obtained at any intermediate point.

By referring to Figs. 2, 4 and 9, it will be noticed that a leaf spring 70 is secured to the outer end of shaft 20 and that this leaf spring engages with the trip lever 25. The function of this spring is to normally maintain one end of the trip lever in engagement with the edge 28 of the web, i. e., the trip lever is intermittently engaged by the arm 14. When so engaged the lever swings about the pivot 26 so as to free it with relation to one or another of the pins 29. It is, however, immediately returned into engagement with the edge of the web the moment the arm 14 swings out of register with the cam member 27.

By referring to Figs. 5, 6 and 8, it will be noted that the nut 52 is provided with an upwardly extending arm 80 and that this is provided with a counterweight 81. The function of the counterweight is that of maintaining the clutches 32 and 32ª or 33 and 33ª in engagement, i. e., arms 55 and 80 normally assume either the full line position shown in Fig. 5 or the dotted line position, and in either of these positions the counterweight 81 serves the function of retaining the cam segment 59 in either one position or another and as this controls the position of the clutch, engagement will be maintained when the reels are being driven in one direction or another. Stop pins 82 (see Figs. 5 and 8) are also employed and these limit the movement of the arms 55 and 80 and also the cam segment 59.

From the foregoing it should be noted that the motor 5 is continuously operated and so is the drive shaft 9, and further that the rotation of these members will at all times be in the same direction, as will also be the rotation of the gear 30 and the auxiliary drive shaft 31. The driving pinion 15 is, however, controlled through the clutch members 16 and 17, and as these clutch members are actuated by the trip lever 35 and the pins or buttons 29 on the web, it is obvious that a step by step drive will be transmitted to the web. By providing the clutches 32, 32ª, 33 and 33ª together with the reversing gear 35, a reverse movement may be transmitted to the reels of the web and the web may, accordingly, be driven in either direction and reversal will be automatically actuated by the clutch actuating mechanism, which in turn is controlled by the nut 52 and the lock nuts 50 and 51. The driving mechanism is simple and substantial in construction. All of the operations are automatic and no care or attention is required with the exception of lubrication from time to time. The mechanism is, accordingly, ideal for advertising purposes as it may be run indefinitely, night and day. Practically any size reels and length of web may be employed and a great variety and number of displays or advertisements will, accordingly, be exhibited.

While the machine has been described as an advertising machine, it is obvious that it may be used for other purposes; similarly, that the materials and finishes of the several parts employed may be such as the manufacturer may decide or varying conditions or uses may demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:—

1. In a device of the character described a continuously driven drive shaft, a pair of

reels, a web secured at opposite ends to the respective reels, a drive mechanism interposed between the drive shaft and the reels, a clutch in the driving mechanism, means for connecting or disconnecting the clutch, a lever for actuating said means, means on the web for actuating the lever to disconnect the clutch, and means driven by the drive shaft for actuating the lever to connect the clutch.

2. In a device of the character described a continuously driven drive shaft, a pair of reels, a web secured at opposite ends to the respective reels, a drive mechanism interposed between the drive shaft and the reels, a clutch in the driving mechanism, means for connecting or disconnecting the clutch, a lever for actuating said means, a plurality of interspaced pins on the web intermittently engageable with one end of the lever to swing the same to disconnect the clutch, and means driven by the drive shaft and engageable with the opposite end of the lever to swing the same to connect the clutch.

3. In a device of the character described a continuously driven drive shaft, a pair of reels, a web secured at opposite ends to the respective reels, a drive mechanism interposed between the drive shaft and the reels, a clutch in the driving mechanism, means for connecting or disconnecting the clutch, a lever for actuating said means, a plurality of interspaced pins on the web intermittently engageable with one end of the lever to swing the same to disconnect the clutch, a shaft continuously driven by the drive shaft, and an arm projecting from the shaft and rotatable therewith, said arm being engageable with the opposite end of the lever to swing the same to connect the clutch.

4. In a device of the character described a continuously driven drive shaft, a pair of reels, a web secured at opposite ends to the respective reels, a drive mechanism interposed between the drive shaft and the reels, a threaded shaft forming an extension of one of the reels, a nut on said threaded shaft and adapted to travel longitudinally thereon during rotation of the threaded shaft and reel, means limiting said longitudinal movement of the nut, and means actuated by the nut and the limiting means for automatically reversing the driving mechanism when either end of the web is reached.

5. In a device of the character described a continuously driven drive shaft, a pair of reels, a web secured at opposite ends to the respective reels, a drive mechanism interposed between the drive shaft and the reels, a threaded shaft forming an extension of one of the reels, a nut on said threaded shaft and adapted to travel longitudinally thereon during rotation of the threaded shaft and the reel, adjustable means limiting said longitudinal movement of the nut, and means actuated by the nut and the adjustable limiting means for automatically reversing the driving mechanism when either end of the web is reached.

6. In a device of the character described a continuously driven drive shaft, an auxiliary drive shaft, a double-faced clutch freely rotatable on the auxiliary drive shaft, a driving connection between said clutch and the continuously driven drive shaft, a first and a second clutch secured on the auxiliary drive shaft, one on each side of the double-faced clutch, a pair of reels, a web secured at opposite ends to the respective reels, a reversing gear driven by the second clutch, a drive formed between the reversing gear and one reel, a drive formed between the first clutch and the other reel, means normally maintaining the double-faced clutch in engagement either with the first or second clutch to drive one or another of the reels, and means for automatically shifting the double-faced clutch from engagement with one clutch and into engagement with the other clutch when either end of the web is reached.

EVERETT A. MARGESON.