Feb. 18, 1936. J. A. SPENCER 2,030,900

QUOTATION PROJECTING OR ANALOGOUS APPARATUS

Original Filed Jan. 15, 1930 2 Sheets-Sheet 1

Fig. 1

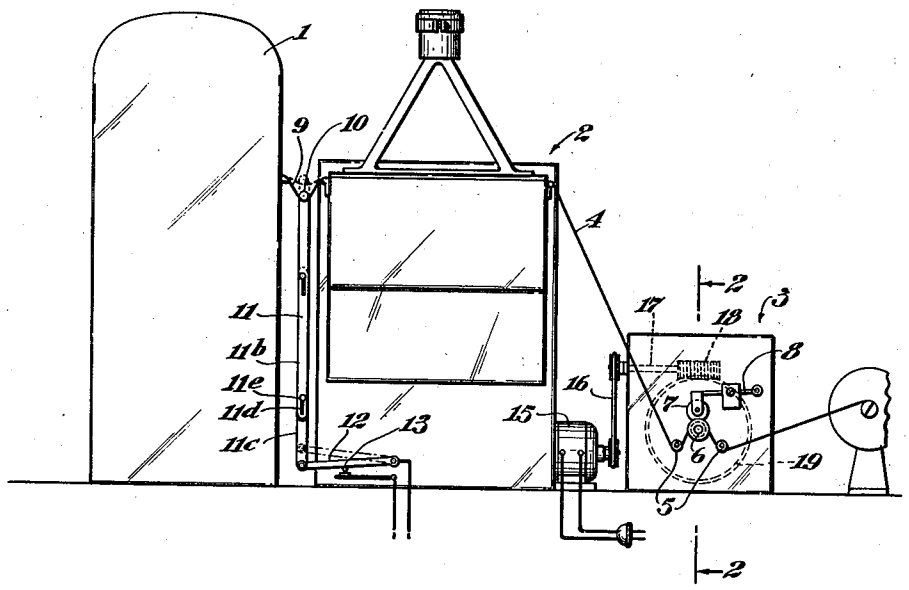
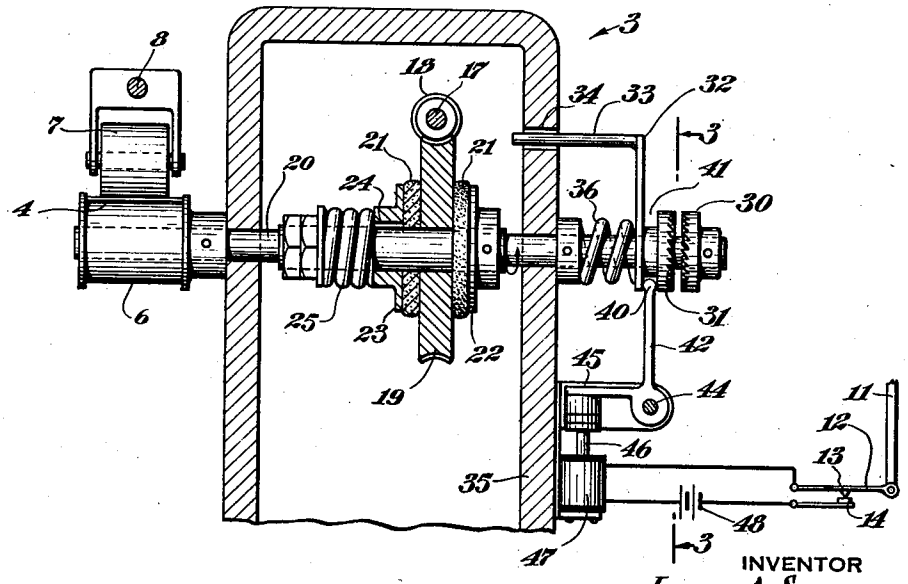


Fig. 2



INVENTOR
James A. Spencer.
BY
Gustav Drews
ATTORNEY

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Fig. 3

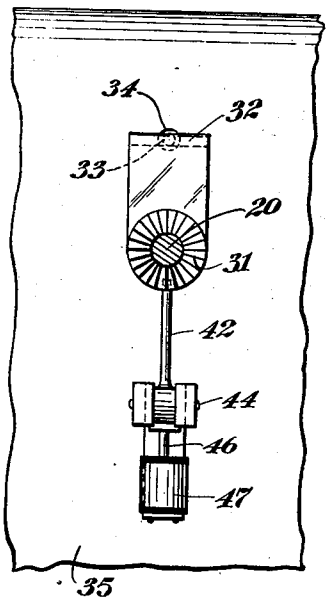


Fig. 5

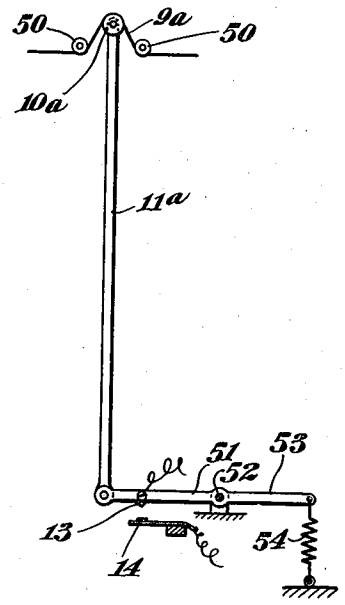
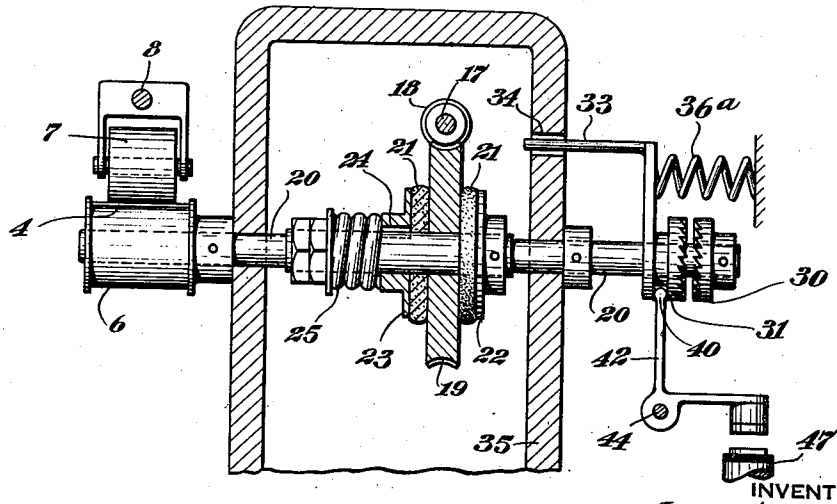


Fig. 4



INVENTOR
James A. Spencer.
BY
Gustav Drews
ATTORNEY

Patented Feb. 18, 1936 2,030,900

UNITED STATES PATENT OFFICE

2,030,900

QUOTATION PROJECTING OR ANALOGOUS APPARATUS

James A. Spencer, Teaneck, N. J., assignor to News Projection Corporation, New York, N. Y., a corporation of New York

Application January 15, 1930, Serial No. 420,847
Renewed August 24, 1934

12 Claims. (Cl. 271—2.3)

My invention relates to machines for projecting on a screen the image of a stock quotation ticker tape, or analogous projecting apparatus.

The principal object is to provide new and improved means for drawing the tape through the projector, and especially for quickly starting, and promptly and positively stopping the tape movement under control of a bend or loop in the tape between the ticker and the projector.

These obects I attain by providing a continuously running motor and friction driving mechanism for pulling the tape through the projector, with stopping or braking means acting on an element of the tape pulling means under control of the tape loop, so that when the loop is taken up to a pre-determined extent the braking means promptly and positively stops the pulling element with correspondingly prompt stoppage of the tape; and when the tape loop again lengthens to a pre-determined extent the braking means is promptly retracted, whereupon the friction driving means promptly starts the tape movement and continues such movement through the projector.

While the invention is applicable to almost any type of stock quotation projecting apparatus, or analogous mechanism in which characters on a tape or strip are to be projected on a screen, it is especially advantageous in the recently developed high speed apparatus, including a high speed ticker and tape pulling means which must operate at corresponding high speed to pull the tape through the projector. In such high speed machines it is important because of the momentum effects and other conditions, as understood by skilled persons, to stop the action of the puller promptly and positively when the tape loop shortens to the pre-determined extent. In the absence of such promptly or positively acting stopping means the puller will in many cases cause tape movement after stoppage of the ticker with consequent derangement of the type wheels or will jerk the tape or even in some cases break it.

In the broader aspect of the invention any suitable means may be employed, under control of the tape, for moving the braking or stopping means to and from active position, but in preferred embodiments, as here shown, it is usually most convenient and desirable to utilize an electro-magnet as the actuator for the stopping or braking element, with a magnet circuit controlled by a contact which is itself controlled by the tape loop, and the mechanism may be constructed or arranged so that the magnet circuit is closed while the ticker is working and the tape is moving and open while the ticker is stopped, or so that the magnet circuit is open while the tape is moving and closed when the ticker stops; and the mechanism may also be arranged to operate with either an upwardly acting or downwardly acting tape loop, and circuit controlling means corresponding to such loop arrangements.

The characterstics and advantages of the invention are further sufficiently explained in connection with the following detail description of the accompanying drawings, which show representative embodiments. After considering these examples, skilled persons will understand that many variations may be made without departing from the principles disclosed and I contemplate the employment of any structures that are properly within the scope of the appended claims.

Fig. 1 is a side elevation of mechanism embodying the invention in one form.

Fig. 2 is a section at 2—2 of Fig. 1.

Fig. 3 is a section at 3—3 of Fig. 2.

Fig. 4 is a section similar to Fig. 2, of a modified brake and brake controlling arrangement.

Fig. 5 is a diagrammatic view of a modified tape loop and contact controlling arrangement.

Referring first to Figs. 1, 2 and 3:

In Fig. 1, 1 is printing apparatus such as a stock ticker which may be a high speed ticker; 2 is the projector, and 3 is the tape puller for pulling the tape 4 through the projector. The elements acting directly on the tape may be as usual. As shown, the tape passes under guide rolls 5 and over a main driving roll 6 and is held in contact therewith by a roll 7 carried by a weighted arm 8. The tape loop to control the action of the puller is at 9, between the ticker and the projector, and in the arrangement of Figs. 1 to 3 the loop extends downward as usual. A small roll 10 runs on the loop and is connected by an adjustable link 11 to a lever or contact arm 12 which carries a movable contact 13, co-operating with another contact 14 in the controlling circuit as will appear.

Preferably, the tape puller is driven by an electric motor 15, which runs constantly during active time, that is in case of the stock ticker so long as the market is open and quotations are to be received, and regardless whether or not the ticker is running or temporarily stopped during periods when no quotations are being transmitted.

The motor is connected by a belt 16 or any other suitable driving means to a shaft 17 of the tape puller 3. This shaft has a worm 18 engaging a worm gear 19 revolvably mounted on the shaft

20, which carries tape driving pulley 6. The worm is frictionally connected to shaft 20 by any suitable means. As shown, friction discs or pads 21 act on opposite faces of the worm gear. One of them is carried by a plate 22 fixed on the shaft and the other by a plate 23 slidable on the shaft and connected to it by a spline 24, with a spring 25 acting on the movable plate to apply friction to opposite faces of the worm gear, tending to constantly rotate the shaft while the motor is running.

At a convenient point on the shaft is clutch or braking means. In the arrangement shown such means includes a positive, toothed clutch member 30 fixed on the shaft, and a co-operating positive clutch member 31 slidable on the shaft. The shaft rotates freely in relation to the movable clutch member, which is restrained from rotation and permitted to move axially on the shaft by an arm 32 carrying a rod 33 engaging in a socket or hole 34 in a wall 35 or other stationary part of the pulling mechanism. The spring 36 urges the movable clutch or braking member to engage with the other member 30 fixed on shaft 20 and upon such engagement the shaft is immediately stopped by the interlocking of the clutch teeth, stopping pulley 6 and the tape movement with equal promptness, gear 19 continuing to rotate and slipping in relation to the frictional means connecting it to the shaft; and when the movable clutch or brake member 31 is withdrawn, as shown in Fig. 2, the friction means immediately becomes effective to revolve shaft 20 and pulley 6 and pull the tape through the projector at proper speed.

The movable brake member is operated by a yoke or similar element 40 engaging in an annular channel 41. This shifting device is carried by an arm 42 of a lever fulcrumed at 44 and having another arm 45 connected to the movable core 46 of an electro-magnet 47. The magnet circuit contains a source of supply such as line connections or as conventionally shown, a battery 48, in series with the contacts 13 and 14 above referred to.

For clearness and simplicity I show ordinary, simple, metal contacts, and a simple series circuit, although evidently any other known or suitable switch, such as a mercury switch, as frequently employed in apparatus of this class, may be substituted for the contacts, and other circuit arrangements may be made.

The connection between the loop and the contact arm 12 may include any suitable means, such as a lost motion device, to control the contact movement. Thus, as shown in Fig. 1, the link 11 includes separate members 11*b* and 11*c* connected by a slot 11*d* and pin 11*e*, so that when the loop drops to a pre-determined point the contacts are brought together to close the circuit and thereafter greater lengthening of the loop is taken care of by the relative movement of the link members 11*b* and 11*c*, and similary as the loop is shortened the contacts will remain together until the lost motion in link 11 is taken up and thereafter the circuit will be broken.

In operation, with the motor running, after any stoppage of the ticker and tape puller, and resumption of ticker operation, the tape 9 is extended and drops under the pull of the roll 10 and link 11 to a pre-determined point, approximately as illustrated in full lines in Fig. 1. Thereupon arm 12 carrying contact 13 is moved downward sufficiently to close the magnet circuit at contacts 13, 14, as shown in Figs. 1 and 2; the magnet is energized, lever 42 retracts the clutch, or stopping or braking member 31 to the position also shown in Figure 2; shaft 20 is immediately driven and pulling of the tape through the projector at proper speed is immediately commenced, and continues until, after a stoppage of the ticker the tape loop is shortened to a pre-determined extent, for example, as shown in dotted lines in Fig. 1, and thereupon the magnet circuit is broken by separation of the contacts; the magnet is de-energized, and spring 36 immediately throws the stopping, clutch or brake member 31 to active position, in engagement with member 30, and shaft 20 and the tape pulling action are instantly stopped, and so on.

The tape pulling means may be arranged to move the tape somewhat faster than the normal rate of tape movement from the ticker and in such cases the stopping action will occur at the proper time to prevent excessive tape movement beyond the ticker, whether the ticker stops or not.

In Fig. 4 I show a modified arrangement in which spring 36*a* is arranged to urge the stopping, or movable braking element 31 to inactive position, that is, to separate it from the other member 30, freeing shaft 20 and permitting the tape pulling action, and lever 42 which controls the braking member is so arranged that the magnet 47 will move the braking member to active position and stop tape feed through the projector when the magnet circuit is closed. With such arrangement I may also maintain the tape loop 9*a* in an upward position, as between guides or rolls 50. The loop is maintained by roll 10*a* acting on the under side of the tape, this roll being connected as by a link 11*a* to a contact lever 51, fulcrumed at 52, the contacts 13 and 14 being as before. The lever has an arm 53 acted on by a spring 54 to maintain the lever in open circuit position and support the loop through link 11*a* and roll 10*a*. When the loop is shortened to the pre-determined extent the contact lever is moved down and the magnet circuit is closed and remains closed during stoppage of the tape; and the circuit is open while the tape is moved by the puller.

Evidently therefore, I may provide a controlling circuit which is closed while the tape is moving or one which is open while the tape is moving, and either arrangement may be employed depending on the average time of ticker operation compared to non-operating time, or other considerations.

I claim:—

1. In a stock quotation projection machine, the combination with a tape puller, of a motor, friction driving means between the motor and the puller, a clutch member on a driven element of the puller, a movable stopping clutch member, an electro-magnet arranged to operate the movable clutch member into stop clutching engagement with said driven clutch member, a magnet circuit including a contact, an element running on a tape loop, and a connection from said element to the contact to close the magnet circuit with a deflection in the tape by said element, said connection including lost motion means.

2. In a tape feeding mechanism adapted for use with a stock ticker and a projecting mechanism, the combination with a tape pulling mechanism comprising a single shaft, of a puller fixed to said shaft, a motor, friction driving means mounted on said shaft and adapted to connect said motor to said shaft, a clutch member fixed to rotate with said shaft, a second clutch mem-

ber restrained against rotation but slidably mounted on said shaft, and means responsive to deflections in a tape to actuate said slidable clutch member into stop clutching engagement with said rotatable clutch member.

3. In a tape feeding mechanism adapted for use with a stock ticker and a projecting mechanism, the combination with a tape pulling mechanism comprising a single shaft, of a puller fixed to rotate with said shaft, a motor, friction driving means mounted on said shaft to be driven by said motor, a clutch member fixed to rotate with said shaft, a second clutch member slidably mounted on said shaft but restrained against rotation with said shaft, and means responsive to deflections in the tape to actuate said slidable clutch member into stop clutching engagement with said rotatable clutch member to arrest said shaft.

4. In a tape feeding mechanism adapted for use with a stock ticker and a projecting mechanism, the combination with a tape pulling mechanism comprising a shaft, of a tape puller for advancing the tape fixed to rotate with said shaft, a motor, friction driving means mounted on said shaft and adapted frictionally to connect said shaft into driving relation with said motor, a clutch member fixed to rotate with said shaft, a second clutch member slidably mounted on said shaft but restrained from rotation with said shaft, and electromagnet means under control of a tape loop for operating said slidable clutch member.

5. In a tape feeding mechanism adapted for use with a stock ticker and a projecting mechanism, the combination with a tape pulling mechanism comprising a shaft, of a tape puller for advancing the tape fixed to rotate with said shaft, a motor, friction driving means mounted on said shaft and adapted frictionally to connect said shaft into driving relation with said motor, a clutch member fixed to rotate with said shaft, a second clutch member slidably mounted on said shaft but restrained from rotation with said shaft, and electromagnet means under control of a tape loop for actuating the slidable clutch member into stop clutching engagement with said fixed clutch member in turn to arrest said shaft.

6. The combination of a tape pulling mechanism comprising a shaft, a puller fixed to said shaft, a continuously operating motor, a driving gear revolvably mounted on said shaft but drivingly connected to said motor, yieldable means for drivingly connecting said gear to said shaft, a clutch member fixed to rotate with said shaft, a second clutch member restrained against rotation but slidably mounted relative to said rotatable clutch member, and means responsive to deflections in a tape to actuate said slidable clutch member into stop clutching engagement with said rotatable clutch member.

7. In a tape feeding mechanism adapted for use with a stock ticker and a projecting mechanism having a light aperture, the combination of a tape pulling mechanism for effecting a uniform smooth feed across the light aperture of the projecting mechanism with a minimum loss of time during the starting period and stopping period comprising a puller operating at a predetermined rate of speed and disposed at the posterior end of the light aperture of the projecting mechanism for imparting a uniform even rate of speed to the tape between the starting and stopping periods of the same, a continuously operating motor, friction driving means between the motor and the puller, a clutch member fixed to rotate with said puller, a second clutch member restrained from rotation with said puller but movable relative to said rotatable clutch member into instantaneously positive stop clutching engagement with said rotatable clutch member thereby to instantaneously and positively arrest the rotation of said puller, and means for controlling the movement of said movable clutch member consisting in a lever engaging the tape anterior to the light aperture of the projecting mechanism and responsive to slack formed therein, the slack being maintained at a minimum between the ticker and the light aperture of the projecting mechanism.

8. In a tape feeding mechanism adapted for use with a stock ticker and a projecting mechanism having a light aperture, the combination of a tape pulling mechanism for effecting a uniform smooth feed across the light aperture of the projecting mechanism with a minimum loss of time during the starting period and stopping period comprising a puller operating at a predetermined rate of speed and disposed at the posterior end of the light aperture of the projecting mechanism for imparting a uniform even rate of speed to the tape between the starting and stopping periods of the same, a continuously operating motor, friction driving means between the motor and the puller, a clutch member fixed to rotate with said puller, a second clutch member restrained from rotation with said puller but movable relative to said rotatable clutch member into instantaneously positive stop clutching engagement with said rotatable clutch member thereby to instantaneously and positively arrest the rotation of said puller, and means for controlling the movement of said movable clutch member consisting in a lever engaging the tape anterior to the light aperture of the projecting mechanism and responsive to slack formed therein, an electromagnet arranged to move the movable clutch member against spring action, and a magnet circuit including a contact associated with said lever for energizing the magnet in turn to move the movable clutch member when said lever is actuated by said slack in the tape,

9. In a tape feeding mechanism adapted for use with a stock ticker and a projecting mechanism having a light aperture, the combination of a tape pulling mechanism for effecting a uniform smooth feed across the light aperture of the projecting mechanism with a minimum loss of time during the starting period and stopping period comprising a puller operating at a predetermined rate of speed and disposed at the posterior end of the light aperture of the projecting mechanism for imparting a uniform even rate of speed to the tape between the starting and stopping periods of the same, a continuously operating motor, a driven member operatively associated with said puller, a driving member operatively associated with said motor, a slip clutch between said driven member and said driving member, a non-slippage stop member movable positively to arrest said driven member and thereby interrupt the driving engagement of said driven member with said driving member in turn to arrest the rotation of said puller, and means for controlling the movement of said movable stop member consisting in a lever engaging the tape anterior to the light aperture of the projecting mechanism and responsive to slack formed therein.

10. In a tape feeding mechanism adapted for use with a stock ticker and a projecting mechanism having a light aperture, the combination of a tape pulling mechanism for effecting a uniform smooth feed across the light aperture of the projecting mechanism with a minimum loss of time during the starting period and stopping period comprising a puller operating at a predetermined rate of speed and disposed at the posterior end of the light aperture of the projecting mechanism for imparting a uniform even rate of speed to the tape between the starting and stopping periods of the same, a continuously operating motor, a shaft on which said puller is fixed, a driving member rotatably mounted on said shaft and operatively associated with said motor, a slip clutch connecting said shaft with said driving member, a non-slippage stop mounted on said shaft and movable positively to arrest said shaft and thereby interrupt the driving engagement of said shaft with said driving member in turn to arrest the rotation of said puller, and means for controlling the movement of said stop member consisting in a lever engaging the tape anterior to the light aperture of the projecting mechanism and responsive to slack formed therein.

11. A tape pulling mechanism operable to come to rest when the supply of tape thereto is interrupted comprising a tape puller, restraining members one of which restraining members is operatively connected to rotate with said tape puller, a movably mounted bracket in engagement with the tape, an electric circuit including an electromagnet, and electric contacts, one of which contacts is operatively associated with said bracket, said electromagnet being operatively associated to said other restraining member when energized to actuate said other restraining member to engage and anchor said rotatable restraining member against rotation, said bracket when rocked by the tension in the tape resulting when the supply of tape to said tape puller is interrupted to actuate its electric contact into engagement with another of said contacts in turn to energize said electromagnet.

12. A tape pulling mechanism operable to come to rest when the supply of tape thereto is interrupted, comprising a tape puller, a rotatable restraining member operatively connected to rotate with said tape puller, a second restraining member, a pivotally mounted bracket in engagement with the tape to be rocked thereby responsive to varying tension in the tape, an electric circuit including an electromagnet, a fixed electric contact and a movable electric contact operatively associated with said bracket, said electromagnet being operatively associated to said second restraining member when energized to actuate said second restraining member to engage and anchor said rotatable restraining member against rotation, said bracket when rocked by the tension of the tape resulting when the supply of tape to said tape puller is interrupted to actuate said movable electric contact into engagement with said fixed contact in turn to energize said electromagnet.

JAMES A. SPENCER.