

[54] **TAPE DISPENSING APPARATUS**

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[58] Field of Search. **83/203, 205, 243, 83/242, 241, 208, 369; 226/135, 145, 156, 47, 46, 157**

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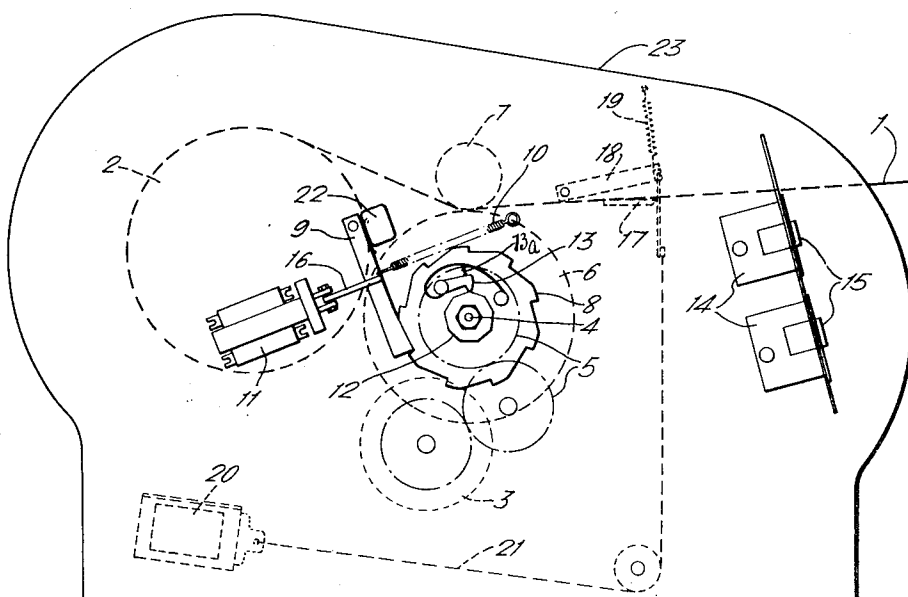
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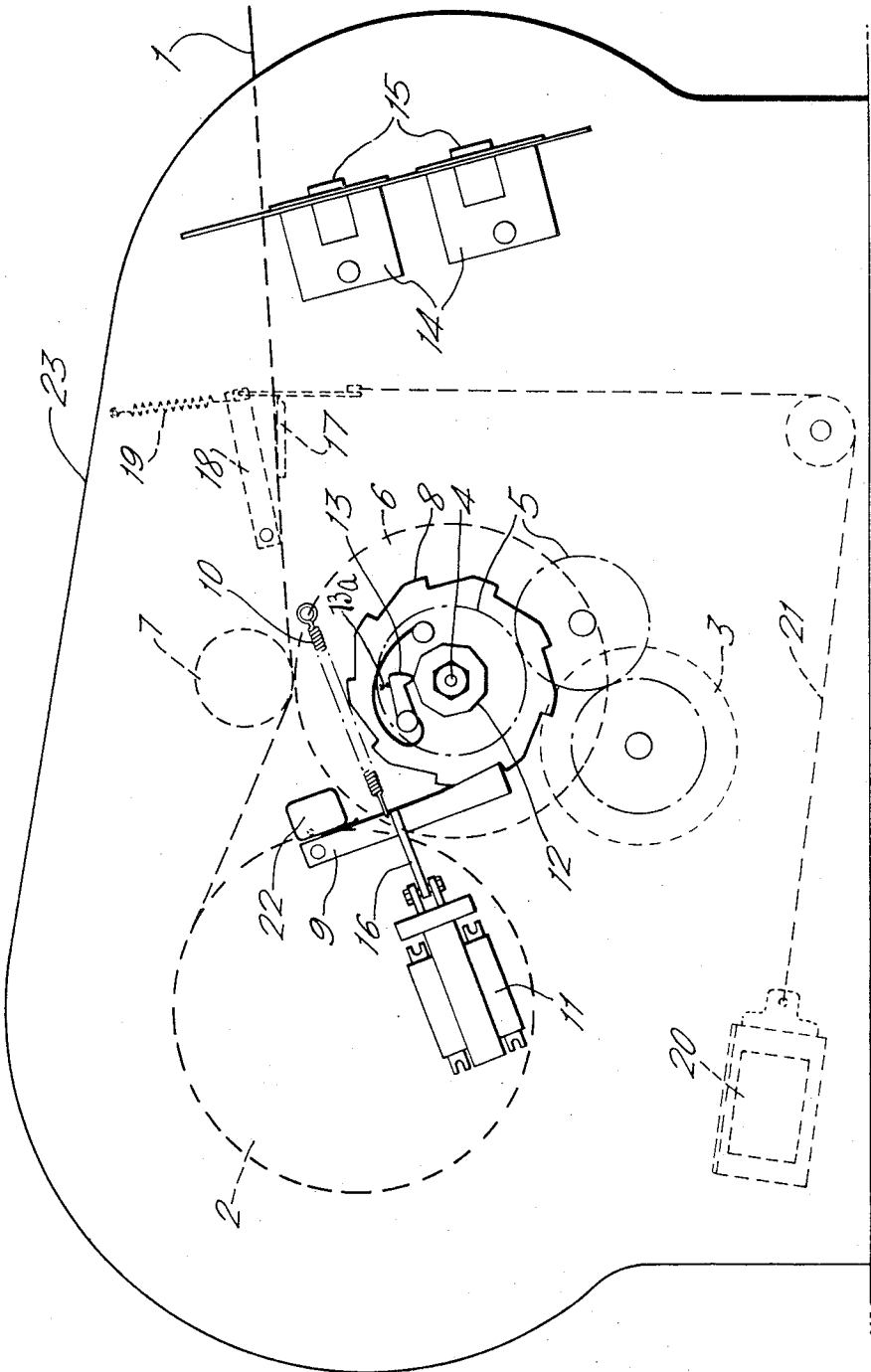
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[57] **ABSTRACT**

In a tape dispensing apparatus by which predetermined lengths of tape material are dispensed from a reel by co-operating rotatable feed and pressure rollers the feed roller is rotatable by a motor through a spindle driven by the motor. An electric signal producing means is operated by the spindle following a predetermined angle of rotation of the spindle and then sends an electric signal to a selection device which in response to the signal applies the brake to stop rotation of the spindle thus determining the length of tape drawn from the reel by the feed and pressure rollers.

2 Claims, 1 Drawing Figure





TAPE DISPENSING APPARATUS

BACKGROUND OF THE INVENTION

1. Field of the Invention.

This invention relates to tape dispensing apparatus for automatically dispensing predetermined lengths of tape material from a reel thereof.

Such apparatus is of use for dispensing predetermined lengths of gummed paper tape for use in sealing packages or for dispensing book binding tape material.

2. Description of the Prior Art.

In known such apparatus the length of tape material dispensed at a dispensing operation is determined by means of a roller physically contacting the tape material or a feed roll therefor, the mechanical means serving to terminate the dispensing operation when a predetermined length of the tape material has been dispensed. Such known apparatus has the disadvantage that slippage can occur between the roller and the tape material or feed roll, and thus the lengths of dispensed lengths of tape material are not maintained constant.

Further, known such apparatus having purely mechanical means for predetermining the lengths of dispensed lengths of tape material, has the disadvantage that the lengths cannot easily be predetermined to a high degree of accuracy as is required, for example, in the dispensing of tape material used for book binding.

Another disadvantage of known such apparatus is that it cannot be set selectively to dispense any one of a plurality of different length predetermined lengths of tape material, or, therefore programmed to dispense different length lengths in a required order in a cyclically repetitive manner.

SUMMARY

According to this invention the length of a portion of tape material to be drawn from a reel by co-operating feed and pressure rollers is determined by initiating an electric signal when the drive spindle for the feed roller has rotated through a predetermined angle of rotation and transmitting the electric signal to a selection device which on receipt of the signal causes a brake to be applied to the spindle to stop rotation thereof.

The brake can comprise an anti-overflow stepped cam mounted on the driven spindle and a co-operating lever mounted for movement into and out of engagement with the steps of the cam. The driven spindle, and thus the tape material feed roll mounted on the driven spindle, can thereby be stopped in any one of a number of angular positions determined by the number of steps on the cam, the steps preferably being equidistantly spaced around the cam. The length of tape material dispensed on operation of the apparatus is thus dependent upon the diameter of the tape material feed roll and the angular rotation of the driven spindle, i.e. the number of cam steps passing the brake lever.

The electric signal producing means can comprise an electric pulse signal producing means, for example, in the form of a contact breaker arrangement comprising a counter cam mounted on the driven spindle and a co-operating contact breaker arm arranged to open and close a pair of contacts to provide an electric pulse signal. Otherwise the electric pulse signal can be produced by means in the form of a magnetically operable switch, for example a reed switch, arranged to be operated by a magnet or magnets mounted for rotation with the driven spindle. With either of these arrangements

the number of pulses produced by the electric pulse signal producing means during one complete revolution of the driven spindle is preferably equal to the number of steps on the brake cam or to an integral multiple of this number, pulses being produced in synchronism with the brake cam steps passing the brake lever.

When using an electric pulse signal the selection means can comprise a pulse counter, preferably of electronic construction, arranged to effect application of the brake after a predetermined number of pulses have been received from the electric pulse signal producing means.

The selection means can also include a start switch arranged to initiate operation of the apparatus.

The apparatus can include a plurality of selection means each responsive to an individual signal from the electric signal producing means, the apparatus thus being capable of selectively dispensing any one of a plurality of predetermined lengths of tape.

Such apparatus can include programming means settable to effect automatic usage of the selection means in any desired order whereby the apparatus will automatically dispense different length lengths of tape material in any desired order and if required cyclically.

The apparatus can also include repeat switch means responsive to removal of a dispensed length of tape material from the apparatus to initiate a further cycle of operation of the apparatus.

The drive motor can be an electric motor coupled to the driven spindle by means of a drive gear train. Preferably a friction clutch is included in the gear train in order to minimise the wear of the drive gears.

The brake can be operated electromagnetically, for example by means of a solenoid arranged to be energised on initiation of operation of the apparatus and to be de-energised by the selection means after a predetermined length of tape material has been dispensed.

The apparatus can include a cutting device for cutting each dispensed predetermined length of tape material from the remainder of the reel. The cutting device can comprise a knife blade arranged to be moved against the tape material to cut the tape material, movement of the knife blade being effected electromagnetically by means of a solenoid which is energised momentarily on application of the brake.

If the tape material to be dispensed is gummed and requires moistening before use, then the apparatus can include means to moisten each dispensed length of tape material. The moistening means can comprise a tank arranged to contain water and provided with means, for example a brush or brushes, to apply water from the tank to dispensed lengths of tape material. Preferably the moistening means also includes a reservoir arrangement adapted to maintain a constant level of water in the tank.

One embodiment of apparatus in accordance with this invention will now be described by way of example with reference to the drawing which is a diagrammatic side elevation of the apparatus.

DESCRIPTION OF THE PREFERRED EMBODIMENT

The apparatus to be described is for dispensing individual predetermined lengths of a gummed paper tape 1 from a reel 2 of the tape.

The apparatus includes an electric drive motor 3 which is coupled to a driven spindle 4 by means of a

train of drive gears 5 and a friction clutch (not shown). A tape feed roll 6 is mounted on the driven spindle 4 for rotation therewith, the tape 1 being urged against the tape feed roll 6 by means of a pressure roller 7. Thus, on rotation of the spindle 4 tape is drawn off the reel 2 by the feed roll 6.

Also mounted on the spindle 4 is an anti-overnrun stepped cam 8 having nine steps, which co-operates with a pivotally mounted lever 9 to provide a brake for the spindle 4. The lever 9 is urged into engagement with the steps of the cam 8 by a tension spring 10, and can be disengaged from the cam 8 by means of a solenoid 11, the core 16 of which is connected to the arm 9.

A counter cam 12 is also mounted on the spindle 4 for rotation therewith, and has nine high points individually radially aligned with the nine steps of the cam 8. The counter cam 12 co-operates with a contact breaker arrangement 13 through a pair of contacts 13a to provide an electrical pulse signal in a control circuit (not shown) of the apparatus, nine pulses being produced during each complete rotation of the spindle 4. Alternatively, the contact breaker arrangement 13 may be replaced by a magnetically operable switch and the counter cam 12 be formed as a magnet.

The apparatus also includes two selection devices 14 in the form of electronic pulse counters, to which devices 14 the pulse signal produced by the contact breaker arrangement 13 is supplied. Each selection device 14 also incorporates a start switch 15 with which operation of the apparatus can be initiated.

After leaving the tape feed roll 6, the tape 1 passes through a cutting device comprising a fixed knife blade 17 and a movable knife blade 18 which is mounted for pivotal movement towards and away from the blade 17. The blade 18 is normally held away from the blade 17 by a tension spring 19, but can be moved towards the blade 17 against the action of the spring 19, to cut the tape 1, by means of a solenoid 20, the core of which solenoid 20 is connected to the blade 18 by means of a chain 21. Energisation of the solenoid 20 is controlled by a micro-switch 22 which is arranged to be operated by the lever 9 of the brake arrangement.

The apparatus is housed in a case 23, the start switches 15 and the free end of the tape 1 being accessible from outside the case 23.

The apparatus operates as follows:

Initially the motor 3 and solenoids 11 and 20 are de-energised. On operation of one of the start switches 15 the motor 3 and the solenoid 11 are energised, the solenoid 20 remaining de-energised. The solenoid 11 pulls the lever 9 out of engagement with the cam 8, and thus the spindle 4 commences to rotate, driven by the motor 3. The tape feed roll 6 is thus rotated and draws tape from the reel 2 and feeds it through the cutting blades 17 and 18. As the spindle 4 rotates the contact breaker arrangement 13 is operated and feeds a pulse signal to the operated selection device 14. When a predetermined number of pulses have been received by the operated selection device 14 it responds and breaks the energising circuits of the motor 3 and solenoid 11. The spring 10 draws the lever 9 into engagement with the

cam 8 and the rotation of the spindle 4 is thus halted, feed of the tape 1 from the reel 2 also ending. As the lever 9 moves into engagement with the cam 8 it operates the micro-switch 22 which effects momentary energisation of the solenoid 20. The solenoid 20 thus pulls in the chain 21, this in turn pulling the blade 18 towards the blade 17 to cut off the dispensed length of tape 1. When the solenoid 20 is de-energised the spring 19 urges the blade 18 back into its rest position.

From the above description it will be seen that the length of tape dispensed at one operation of the apparatus is dependent upon the number of pulses required for response of the operated selection device 14. The two devices 14 are set to respond to different numbers of pulses, and thus the apparatus is able selectively to dispense either one of two different predetermined lengths of tape at each operation.

I claim:

1. Tape dispensing apparatus for dispensing predetermined lengths of tape material from a reel thereof, comprising a drive motor; a driven spindle coupled to the drive motor; a tape material feed roll mounted on the driven spindle; a brake arranged to act on the driven spindle; electric signal producing means operated by the driven spindle and adapted to provide an electric signal indicative of a predetermined angle of rotation of the driven spindle; and selection means responsive to the electric signal produced by the electric signal producing means to effect application of the brake to halt rotation of the driven spindle after a predetermined angular rotation of the driven spindle in which the electric signal producing means comprises an electric pulse signal producing means in the form of a contact breaker arrangement comprising a counter cam mounted on the driven spindle and a co-operating contact breaker arm arranged to open and close a pair of contacts to provide an electric pulse signal.

2. Tape dispensing apparatus for dispensing predetermined lengths of tape material from a reel thereof, comprising a drive motor; a driven spindle coupled to the drive motor; a tape material feed roll mounted on the driven spindle; a brake arranged to act on the driven spindle; electric signal producing means operated by the driven spindle and adapted to provide an electric signal indicative of a predetermined angle of rotation of the driven spindle; and selection means responsive to the electric signal produced by the electric signal producing means to effect application of the brake to halt rotation of the driven spindle after a predetermined angular rotation of the driven spindle in which the brake comprises an anti-overnrun cam rotatable with the spindle and provided with a plurality of steps equispaced around the periphery thereof, and a lever movable into and out of co-operation with said steps, and in which the electric signal producing means comprises a contact breaker rotatable with the spindle and provided with a number of peripheral high points radially aligned one with each of said steps, a pair of electrical contacts, and a contact breaker arm operable by said high points to effect operation of the contacts.

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