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PAPER CUTTING MACHINE WITH CONTROL FOR SPACING DEVICE

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Fig. 1

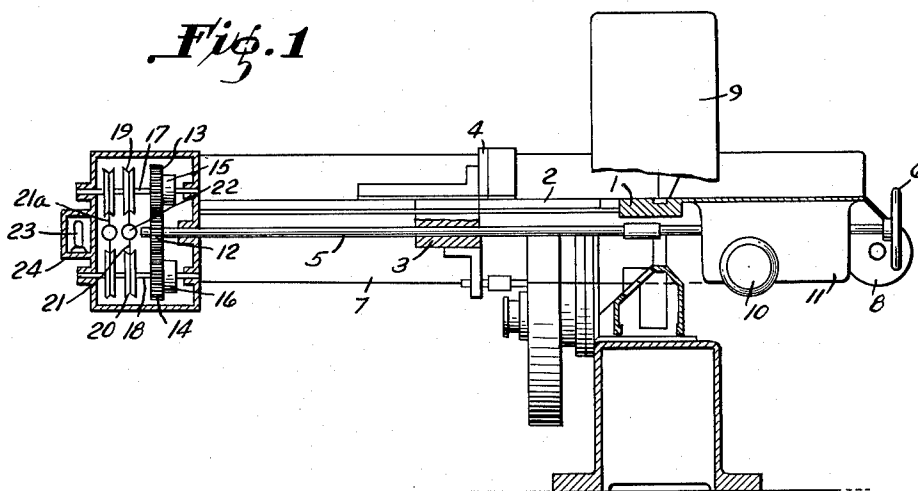
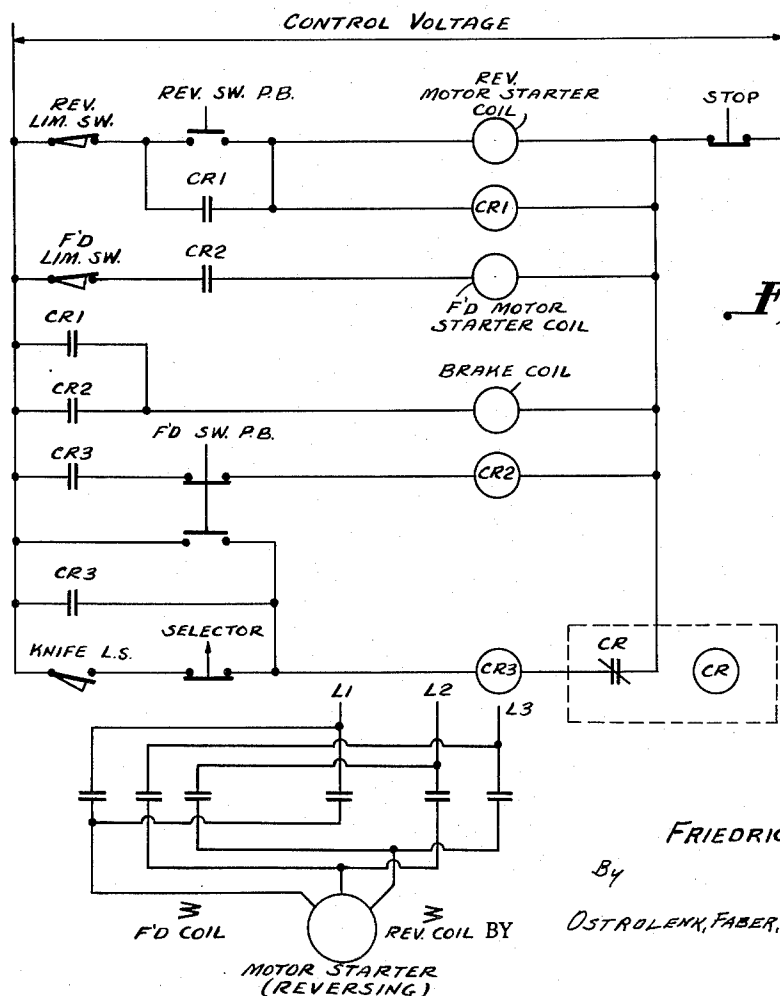


Fig. 2

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PAPER CUTTING MACHINE WITH CONTROL FOR SPACING DEVICE

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4 Claims. (Cl. 83-71)

The invention relates to a paper cutting machine, in which the backgauge is driven by an electro motor, hydraulic systems, or similar devices and in which the backgauge can be stopped by means of adjustable control signals for providing automatically controlled advances of different sizes.

To provide automatically controlled, interrupted advances of different sizes in known paper cutting machines adjustable cams are connected to the support of the backgauge or to a scale-tape moving with the backgauge or to similar devices, which operate against fixed contact-switches or cams. The position of the adjustable cams fix the wanted position of the backgauge on the table and thereby the position of the pile of paper, which is to be cut into different sized strips.

The cams control the driving elements of the backgauge and at the same time the automatic starting and stopping of the cut.

Instead of cams photo-electric cells have been used, which start the switching operation, when the light beam is interrupted.

For the execution of a program of various sized cuts in all known paper cutting machines sliding cams, discs, etc. have to be adjusted and fixed separately by hand, e.g. on a tape connected to the backgauge according to the wanted program with regard to each cutting position. For this reason the moving tape etc. with the adjustable cams must be easily accessible, which under circumstances will make the machine very complicated and unhandy.

In order to avoid single adjustments of cams or the like and to accomplish, that the complete control of the spacing device can be situated at any place at the machine, the invention provides, that at the paper cutting machines the control of the spacing device of a frequency carrier directly or indirectly connected to the backgauge and in form of a tape, wire, or the like, upon which carrier frequency markings corresponding to the wanted positions of the backgauge are recorded by means of any magnetic sound-recording- and repeating-device, when switched to "Recording," said frequency markings, when switched to "Repeat," producing pulses in the device, which serve after amplification to switch off the drive of the backgauge and to switch in the drive of the clamp-and knife-bar, and that these switching operations can be reversed and repeated as often as wanted after the completion of each cut either relative to the movement of the knife or by timing control.

When applying such magnetic frequency carriers, e.g. in form of sound recording tapes or wires of the usual trade types, it is only necessary to connect two reels or the like to e.g. the drive spindle of the backgauge, so that a sound carrier wound upon one reel is unwound and wound upon the second reel or vice versa, whether the backgauge is moved forwards or backwards. The carrier passes thereby a magnetic pulse-transmitter- and receiver of a recording and repeating device situated at any wanted position, so that according to the wanted positions of the backgauge, when the device is switched to "Recording," a frequency marking is recorded upon the carrier by shortly pressing a pushbutton or the like, which markings, when the device is switched to "Repeat," will

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then produce a pulse in the device, which is then amplified and will be used for the control.

This type of spacing control allows a high accuracy of the cutting position, as the sound carrier can be chosen to any length multiple of the backgauge travel, whereupon the speed of the sound carrier will also be a multiple of the backgauge speed. A frequency marking on the sound carrier, which represents a small point-shaped magnetic field, travels so in a time unit a longer distance than the backgauge, so that the switching accuracy for the electro motor or the stopping of the backgauge respectively and its drive and therewith the accuracy of the cutting position in comparison to the speed of the sound carrier to that of the backgauge can be increased.

FIGURE 1 shows a schematic example of a paper cutting machine with the spacing device according to the invention in the longitudinal cross-section.

FIGURE 2 is a schematic diagram of the operative connections of my invention.

According to the example the paper cutting machine consists in the usual manner of a table 1 with a longitudinal slot 2, through which the nut of the support 3 of the backgauge 4 projects downwards and through which nut a drive spindle 5 for the forward and backwards-movement of the backgauge 4 passes. The drive spindle 5 can be adjusted in the usual way by a hand-wheel 6 and is firmly connected to a moving scale type 7, which runs over a forward and backward reversing reel 8.

In the machine-frame 9 the clamp bar and the cutting knife are situated in the usual way. According to the example of the invention the drive spindle 5 for the movement of the backgauge 4 is driven by an electro motor 10 over a gear 11 in which the proportion of the transmission is chosen so that the spindle can turn with a quick or a slow movement.

On the rear end of the spindle 5 is a toothed wheel 12, which grips into the two toothed wheels 13 and 14, which can be connected by clutches, e.g. friction clutches 15 and 16, to their shafts 17 and 18. On the shafts 17 and 18 are one reel 19 and 20 each, upon one of which a magnetic sound carrier in form of a steel-wire or tape is wound, which can be wound off to the other reel. The tape 21 passes thereby a magnetic-transmitter and -receiver 22 of any magnetic-sound-recording or -repeating device with amplifier 23, which device e.g. can be housed in a cover 24 at the rear end of the machine. From the amplifier 23 the various line-wires are leading to the controls, which are favourably situated on a control-panel at the front of the table 1.

The magnetic-transmitter and -receiver 22 could be a combined one, by which, when switched to "Recording," frequency markings can be recorded upon the frequency carrier 21 and by which reversed, when switched to "Repeat," pulses are transmitted to the device and therewith to the control of the drive, and by which during the return movement of the frequency carrier 21 the recorded frequency markings can be eliminated. It is also possible to provide an additional eliminator.

The function of the described device is as following. Assumed the backgauge 4 is in its most backward position and it is intended to do automatic spacings and cuttings, which conform with certain advanced positions of the backgauge 4, then the backgauge will be advanced by switching in the electro motor 10 by means of the spindle 5, until on the scale 7 the wanted first cutting position can be read off, whereupon the motor is stopped and the fine-adjustment is done with a handwheel 6. Now the magnetic receiving device is switched in and by a pushbutton a short impulse is being produced, which over the magnetic transmitter 22 records a frequency marking upon the frequency carrier 21. Then the backgauge will be advanced to the next position and again a

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frequency marking is recorded upon the frequency carrier 21, until the whole spacing- and cutting-program is recorded. Now the backgauge 4 is moved back to its rear position. Then the magnetic device is switched to "Repeat."

When the pile of paper has been put upon table 1, the advance is switched in. When the backgauge 4 has reached the first wanted cutting position, the frequency marking on the frequency carrier produces an impulse in the magnetic device, which is being amplified and stops the backgauge and starts in the same time the operation of the clamp- and knife-bar. When the cut is finished the mentioned switching operations are reversed, the spindle 5 is again driven for further advance of the backgauge 4, where at the same time the tape 21 is further wound off the reel 19 to the reel 20, until the next frequency marking passes the magnetic receiver 23, by which the mentioned switching operations for stopping the backgauge 4 and the start of the cutting operation are repeated. When the cutting of the program is finished, the backgauge can be moved backwards and the frequency markings recorded on the frequency carrier 21 can be eliminated by operation of a switch "Eliminate." According to the invention it is possible, to have besides the frequency carrier 21 e.g. running parallel a second or several frequency carriers 21a. Upon these frequency carriers 21a other frequency markings can be recorded, if further varied program-spacings and -cuttings are wanted after the first program. Furthermore it is possible to record several programs independently from each other on only one tape, which can be used one after the other.

The control for doing program-spacings and -cuttings according to the invention allows, that the magnetic device can be situated at any place of the machine and has the special advantage, that the program can be recorded on the magnetic frequency carrier by simple operation of an impulse switch. The new control device has the further advantage, that the magnetic frequency carrier can be of any length to a multiple of the backgauge travel, so that the frequency markings of the frequency carrier have to travel during the advance a much longer distance than the backgauge itself.

In FIG. 2, as shown schematically, are the electrical connections for my novel device. This schematic represents a conventional mode of control using standard commercial components well known in the art and operated by control voltage lines (designated "Control Voltage" on FIG. 2). The operation of the circuit gives control for forward and reverse movement of the back gauge, as follows:

Pressing the reverse switch (Rev) causes the motor starter coil (designated as such) to connect the back gauge motor 10 (FIG. 1) for energization in reverse direction. Simultaneously, relay CR-1 is energized and closes a CR-1 contact, shunting the reversing switch so that the back gauge continues to move in reverse direction after the push button is released. Such motion of the back gauge continues until the reversing limit switch (Rev. Lim. Sw.) is reached by the back gauge, which shuts off motor current. However, the operator can stop the back gauge at any point in its reverse motion by pressing the stop button (Stop). At the time CR-1 relay is energized another of its contacts (CR-1) energizes the brake coil to release the brake. The brake is normally maintained engaged by a spring, an electromagnetic solenoid being used to withdraw the spring for brake release, in accordance with conventional practice.

To obtain forward motion of the back gauge, the forward movement push button switch (F'd. Sw. P.B.) is pressed. This energizes relay CR-3 which is locked in closed position by a locking contact CR-3. At this time, another CR-3 contact closes to energize relay CR-2,

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when the forward push button is released. This will be seen as occurring upon examination of the diagram, if it be understood that the forward push button, upon release, causes conduction between the two non-conducting contacts as shown on FIG. 2. One contact of relay CR-2 releases the brake by energizing the brake coil, while another CR-2 contact energizes the forward movement starting coil. Such forward movement of the back gauge can be stopped manually by pushing the stop button. It can also be stopped by energization of the relay designated CR by virtue of the control voltage coming through the two lines from the magnetic tape circuit. In such case, a normally closed contact is opened, which effects deenergization of relay CR-3. This in turn opens the circuit of relay CR-2, thus opening a CR-2 contact, permitting the brake to engage and effecting de-energization of the forward motor starting coil, thus stopping the motor. The motor can be started again, manually, by pressing the forward (or reverse) push button in a manner described above. However, automatic starting of the motor may likewise be accomplished by conventional control means which comprises a cam operated limit switch (Knife L.S.) actuated by the knife-operating crank when the knife reaches its top position. This energizes relay CR-3 to start the entire forward cycle again. The circuit may be used with either manual or automatic control, selection being made by a switch (Selector) as shown on the diagram.

What I claim is:

1. In a paper cutting machine, a movable backgauge, a lead screw directly mechanically connected to said backgauge for moving said backgauge, motive means for operating said lead screw, a control apparatus for stopping said motive means at preselected positions to stop said backgauge, said apparatus comprising a magnetic storage element and comprising an actuating means therefor, wherein said storage element carries a series of predeterminedly-spaced control signals corresponding to desired positions of stopping of said backgauge, said actuating means for said magnetic storage element being driven by said lead screw, said apparatus also comprising a pick-up head responsive to control signals on said magnetic element, and means intermediate said pick-up head and said motive means for stopping said motive means responsive to said control signals to stop said backgauge, and means for starting said motive means to effect resumption of movement of said backgauge subsequent to stopping thereof.
2. In a paper cutting machine as set forth in claim 1, said control apparatus being disposed at an end of said lead screw, said actuating means comprising rotative elements coupled to said lead screw.
3. In a paper cutting machine as set forth in claim 1, wherein the driving ratio between said lead screw and said actuating means is such as to effect a spacing of control signals of said magnetic element at a lesser distance than the corresponding distance travelled by said backgauge during the time interval between control signals.
4. In a paper cutting machine as set forth in claim 1, said control apparatus being disposed at an end of said lead screw, said actuating means comprising gear elements connected to said magnetic storage element to effect movement thereof, one of said gear elements being carried on and rotative with said lead screw.

References Cited in the file of this patent

UNITED STATES PATENTS

1,527,064	Osgood	Feb. 17, 1925
2,122,221	Valiquette	June 28, 1938
2,475,245	Leaver et al.	July 5, 1949
2,484,968	Sponaugle	Oct. 18, 1949
2,690,532	Johnson	Sept. 28, 1954