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Continuation of application Ser. No.
698,499, Jan. 17, 1968, now abandoned.

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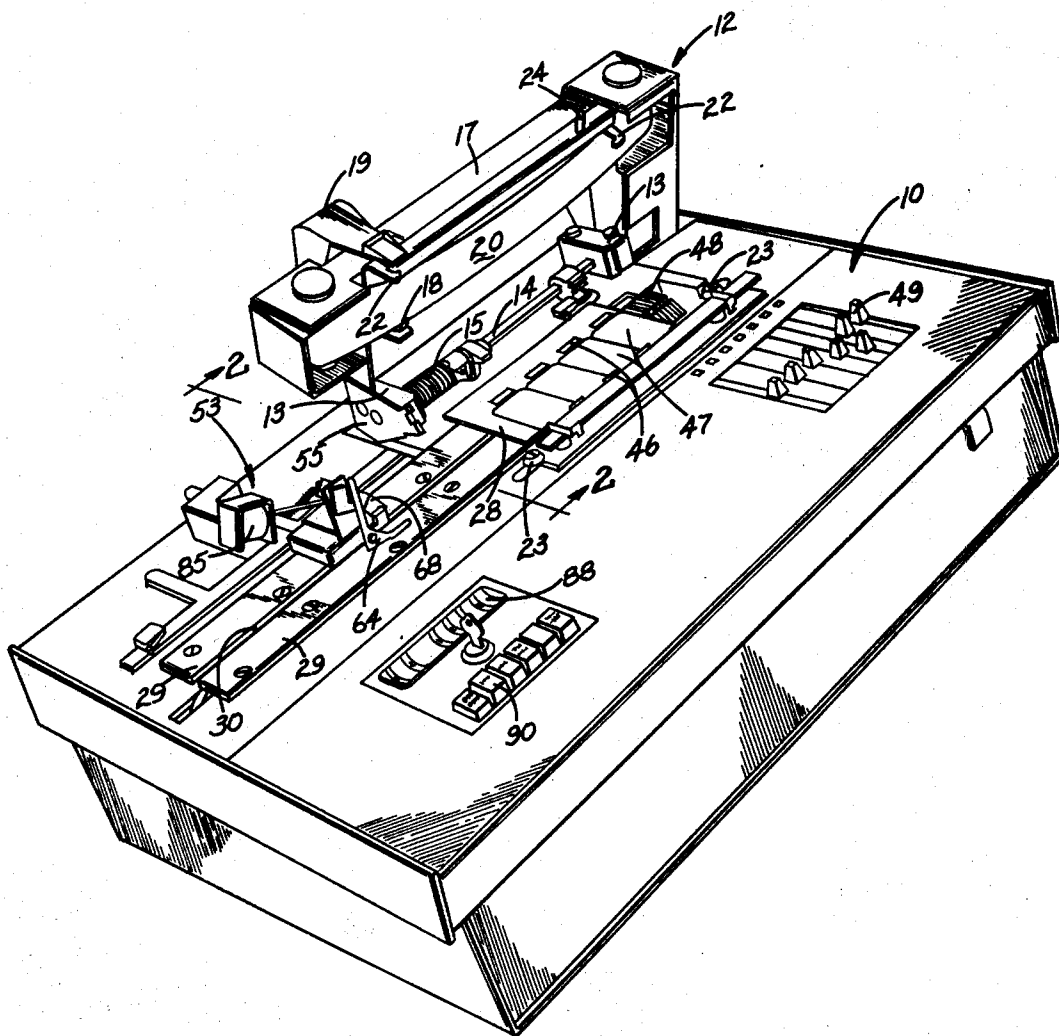
[54] **INTERLOCK MEANS FOR PRINTING DEVICES IN DATA RECORDERS AND TRANSMITTERS**
10 Claims, 12 Drawing Figs.

[52] U.S. Cl. **101/45,**
101/269, 101/285

[51] Int. Cl. **B41j 25/32,**
B41j 29/40; B41f 3/04

[50] Field of Search **101/45, 56,**
269, 274, 282, 283, 284, 285, 306; 235/61.11

ABSTRACT: A Data Recorder having a bed for holding embossed plastic or metal card printing members, with a closeable head carrying a platen for making a printing impression.



PATENTED FEB 16 1971

3,563,171

SHEET 1 OF 3

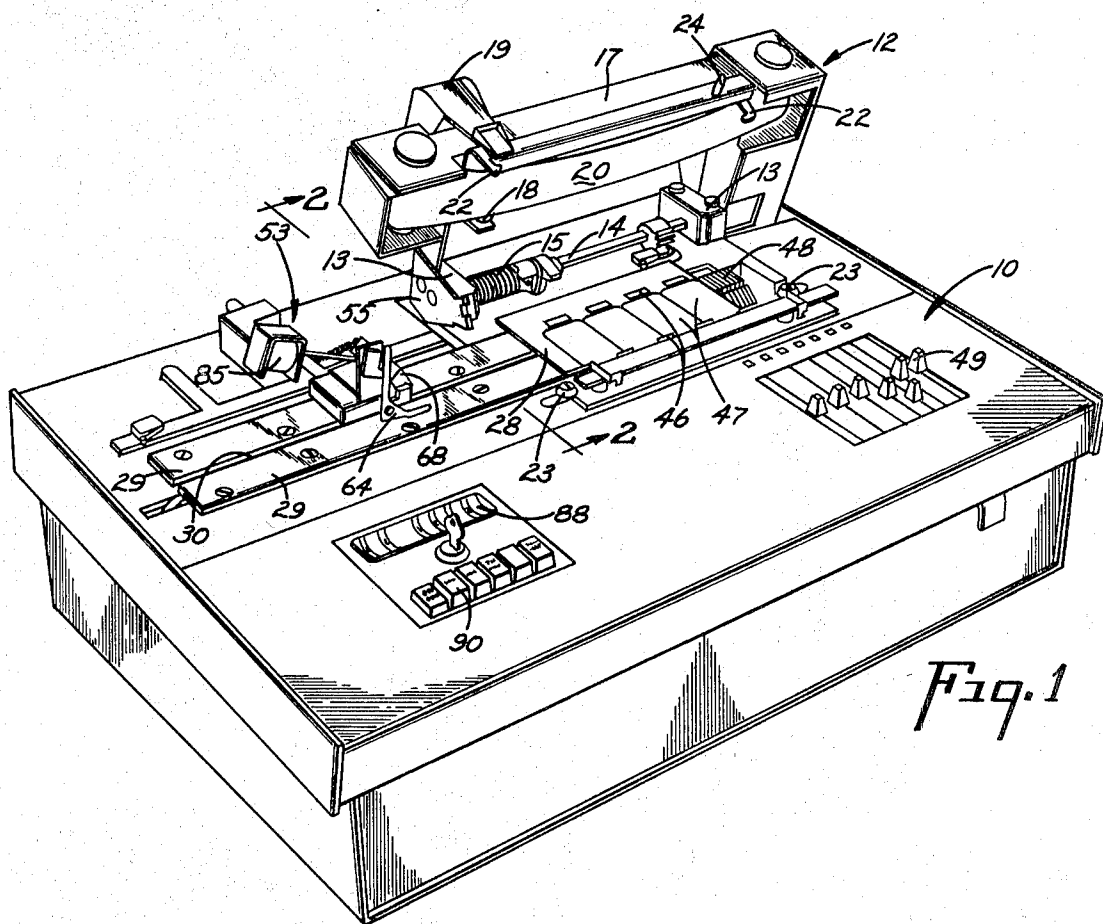


Fig. 1

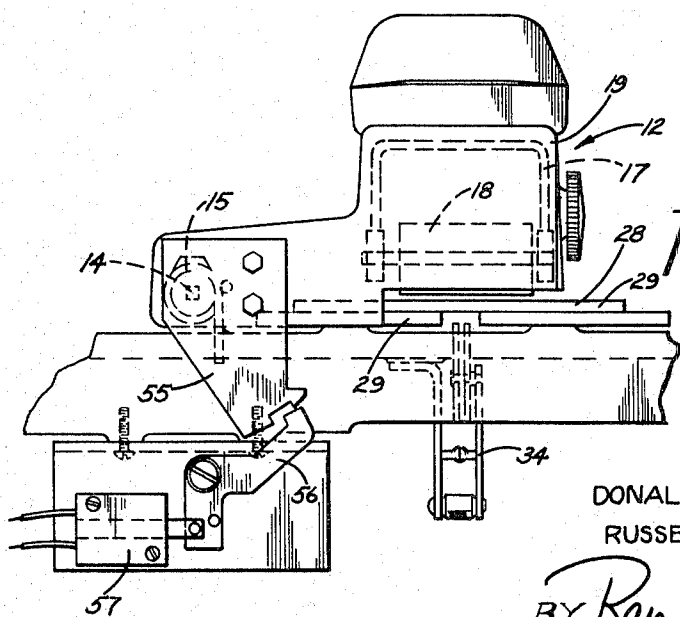


Fig. 2

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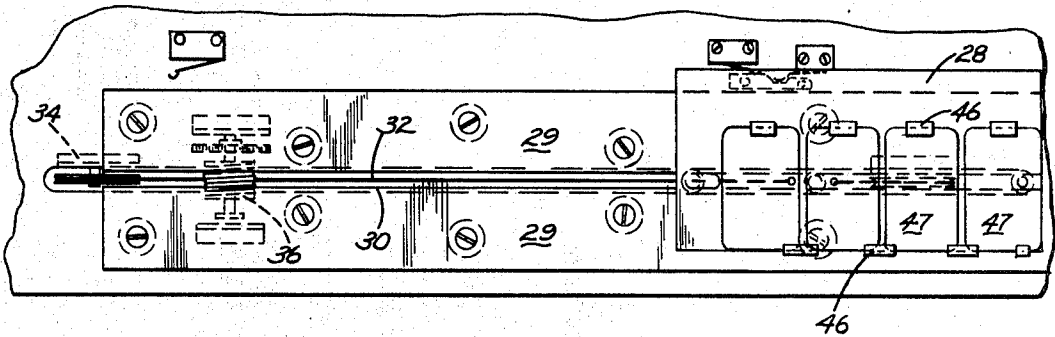


Fig. 3

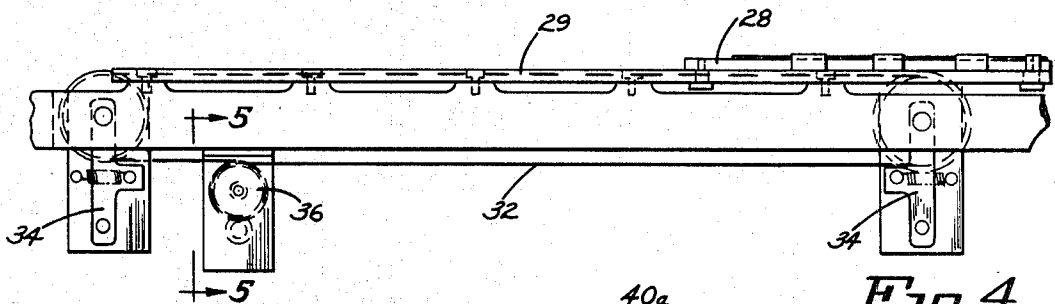


Fig. 4

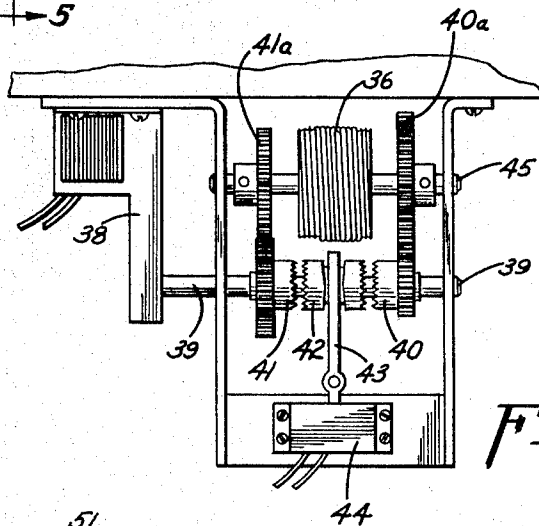


Fig. 5

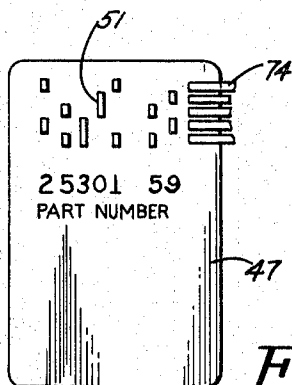


Fig. 12

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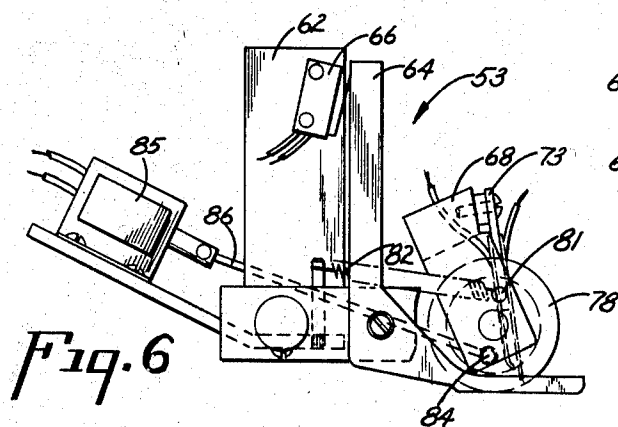


Fig. 6

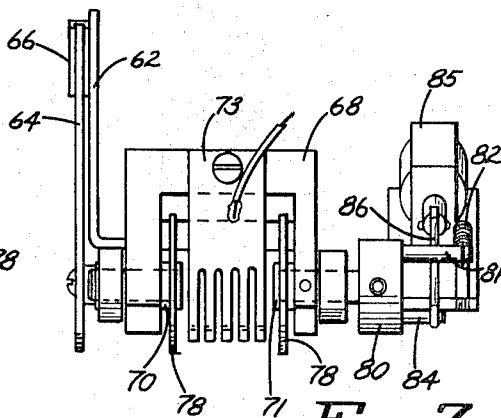


Fig. 7

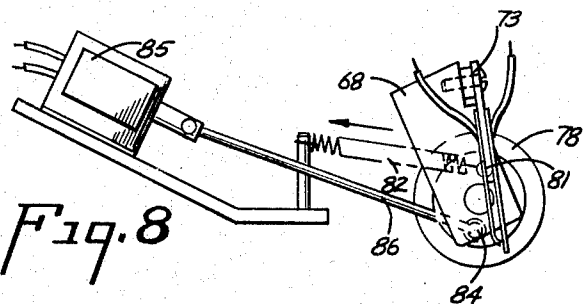


Fig. 8

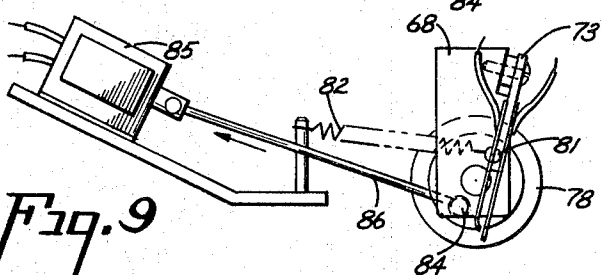


Fig. 9

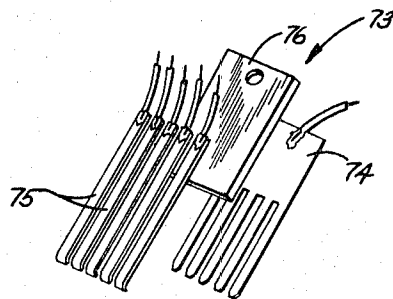


Fig. 10

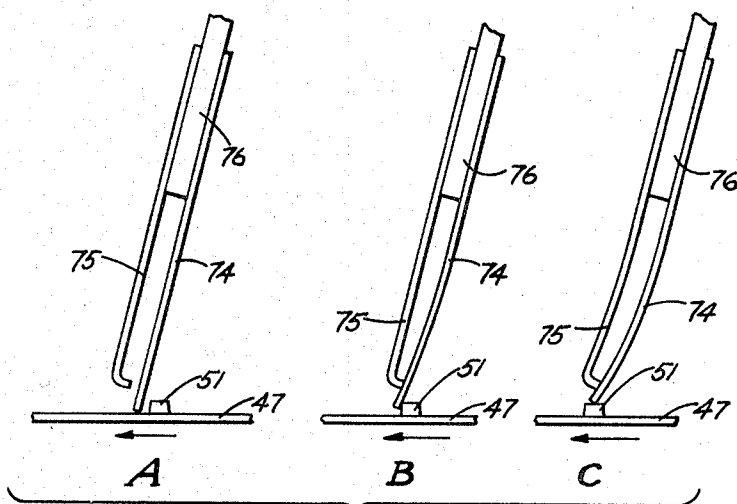


Fig. 11

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INTERLOCK MEANS FOR PRINTING DEVICES IN DATA RECORDERS AND TRANSMITTERS

This application is a continuation of application Ser. No. 698,499 filed Jan. 17, 1968 (now abandoned).

An adjacent read station is configured to mechanically sense coded embossures on the cards and translate the sensed embossures into electrical signals for transmission to a receiving station. The receiving station is capable of sending an answer back signed, indicating proper receipt of the message. The receiving station is known as a Transmission Control Unit.

A carriage moves the bed, with the embossed cards thereon, from the imprint station thru through the adjacent read station and returns. The embossed coded dater is sensed at the read station, and the data is transmitted via electrical wires to a Transmission /C Control Unit. The printing head remains locked to prevent card removal, until the transmission is completed as indicated by a positive electrical answer-back signal. On receipt of this signal, the print head opens, allowing the operator to remove the embossed plastic data cards.

SUMMARY OF THE INVENTION

An advantage of this invention is that the data encoder portion is separate from the read station, and a complete printed hard copy of the transaction is available for examination or audit by the operator, prior to read and transmission of the data placed in the recorder.

Since several separate printing plate members may be assembled in the machine and variable data wheels brought to alignment, it is important that the accuracy of the assembled material be verified before any misinformation is sent to a distant processing station, thus eliminating errors and confusion.

It is an object of this invention to provide an improved collecting and transmitting station for an in-plant system for immediately collecting data from decentralized locations at a central processing point. A plurality of remote transmitting recorders send transaction data via fixed wire, and at the same time produce a hard copy of the transaction for audit trail. A Transmission Control Unit, which is neither illustrated nor described hereinafter, because its nature is more readily described than specifically illustrated, is constructed of electronic circuitry to adapt the transmitting recorders into a particular business environment. The Transmission Control Unit may include time recorders to indicate the time of a particular message and can put out punched paper tape for computer input or feed the data directly to a computer. Such use of the output of the present invention will readily suggest itself to electronic personnel, and therefore is not included in the description of this invention.

Another advantage and object of this invention is to provide for rapid transmission of predetermined accurate information, by sensing embossed bar codes upon the card printing members.

It is further an object of the invention to permit the removal of printed copy from the data encoder for visual audit of accuracy, prior to transmission of the information; but to prevent removal of the embossed printing members of resetting of variable data, until the electrical transmission has been made from the arrangement of printing members from which the printing has been made and properly received by the Transmission Control Unit.

Thus, the imprinted source document serves as a valid record, at the point of origin of the transmission, of the data transmitted and correctly received at the Control Unit. Until a positive answer-back signal is received, the printing elements cannot be changed, nor can another document be printed.

It is a further object of the invention however, to enable only supervisory personnel to override the requirements of transmission after imprinting. A controlled means is provided to the supervisor for restoring the Recorder to its original "ready" position in the event a positive answer-back signal is not received after a prescribed number of transmission attempts by the operator.

In accordance with these and other advantages which will become apparent hereinafter, the best mode contemplated for the present invention is disclosed in the accompanying drawings.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a transmitting recorder embodying the essential features of this invention in a printing head and read head in adjacent stations with a bed carriage transport operating therebetween.

FIG. 2 is a partial elevation of an electrically operated secondary latch for the printing head, illustrated from the position of line 2-2 shown in FIG. 1.

FIG. 3 is a plan view of the bed carriage of the machine, and a broken portion of the base member top surface.

FIG. 4 is an elevation view of the bed carriage.

FIG. 5 is an illustration of a clutch drive for the carriage, to an enlarged scale, as viewed along lines 5-5 of FIG. 4.

FIG. 6 is a side elevation of the read head separated from the surrounding structure.

FIG. 7 is a front view of the read head shown in FIG. 6.

FIG. 8 is a schematic illustration of the electrical sensing apparatus of the read head in a nonread position.

FIG. 9 is the illustration of FIG. 8 activated to an active read condition.

FIG. 10 is an exploded perspective of the sensing switch of the electrical sensing apparatus.

FIG. 11 is a series of three operative steps in actuation of the switch.

FIG. 12 is a plan view of plastic card with embossments in bar code.

DESCRIPTION OF THE PREFERRED EMBODIMENT

As the description of the preferred embodiment of this invention proceeds, it will be seen that the illustrated structure provides a means for making both a printed impression and an electrical transmission output corresponding to the data which is on the bed of the printing station, which electrical output is available to a central procession device.

A complete system consists of a central Transmission Control Unit which can electronically poll a plurality of remote transmitting recorders of the type illustrated and described herein. The Transmission Control Unit is not illustrated because it is essentially electronic in nature and is adaptable to various types of businesses. The Control Unit will poll the several remote transmission recorders, and when one of the recorders indicates that data is available to be sent, the Transmission Control Unit will permit that particular transmission recorder to monopolize the Transmission Control Unit for a sufficient period of time to allow the information to be transmitted.

The illustrated preferred embodiment employs a mechanical printing machine similar to the type illustrated in U.S. Pat. No. 3,138,091 issued Jun. 23, 1964.

A base cabinet 10 provides the functions of the base of the prior device, as well as housing electric circuitry for the control and transmission of data.

A printing head 12 is carried upon pivot blocks 13, which in turn are mounted upon the base cabinet 10. A shaft 14 extends between the pivot block 13 and provides a pivot mount for the head 12 upon the blocks 13. A recoil spring 15 coiled about the shaft 14 urges the head 12 to an open position as illustrated in FIG. 1.

The head 12 is composed principally of a frame 17 upon which a roller platen 18 is mounted. Platen 18 is equipped with a handle 19 in the form of a yoke. The handle-yoke serves as a carriage riding upon the frame 17 as a track. In this way the roller platen 18 is enabled to advance and retrack along the frame 17 in a cyclic printing action. A ribbon 20 is shown in this embodiment of the invention as the source of pressure release printing material, although multiple form sets may be employed with interleaved carbon sheets if desired.

Two latch members 22 operate through an integrated system, and thereby operate in unison. The two latch members are positioned to catch under the head of adjustable round head catch members 23 when the head 12 is closed, and to hold the head in a printing relationship with the base 10. The latch system includes a release lever 24 positioned to be struck by the yoke of the handle 19 at the end of the printing stroke. Striking and actuation of the lever 24 causes latch members 22 to separate and release the head from anchorage to catch members 23.

The bed of the printing machine portion is a mobile carriage, indicated by the reference number 28 in this embodiment of the invention. Prior printing machines have employed a stationary bed. Two track plates 29, separated to define a slot 30 therebetween, serve as a base upon which the bed carriage 28 may reciprocate.

Refer to FIGS. 3 through 5 for a specific illustration of the bed carriage and the mechanical means for providing a shuttle path between a first position under the lowered printing head and a second position remote therefrom. In these views, a drive cable 32 is looped over two extreme-position spring tensioned pulley devices 34 and around a drive drum 36. The drum 36 for driving the cable 32 is seen in FIG. 5.

In FIG. 5, a reversible electric motor 38 is used as a prime power source to drive a shaft 39. Shaft 39 carries two clutch elements 40 and 41, each of which carries a spur gear portion. Elements 40 and 41 are journaled upon shaft 39 but are not driven directly by the shaft 39.

A drive element 42 is nonrotatively but slideably connected to the shaft 39 and therefore does rotate with the shaft 39. A yoke arm 43 fits a central reduced area of the drive element 42 for shifting the element 42 into engagement with a selected one of elements 40 or 41. A solenoid 44 is employed to provide power for driving the yoke arm 43.

The motor 38 is reversible, and by this means the direction of carriage movement is controlled. The carriage is driven at variable speeds according to whether it is being sensed by a sensing device, or traveling freely between stations. For this purpose, the clutch element 40 carries a small gear in driving relationship with a large gear 40a. By contrast, the clutch element 41 carries a relatively larger spur element in driving relationship to a gear 41a of substantially equal size.

The gears 40a and 41a are nonrotatively secured to a shaft 45 and therefore will transmit drive power to the drum 36, which in turn will drive the carriage 28. Engagement of the drive element 42 with the clutch element 41 will produce a high speed drive of the carriage 28, whereas engagement with the clutch element 40 will cause a slow drive of the drum 36. The direction of fast or slow movement is solely controlled by operation of motor 38.

Referring again to FIG. 1, the carriage 28 is shown equipped with retainer clips 46 for holding one or more printing devices bearing data to be printed. In the illustration four printing members 47 are illustrated. (See FIG. 12 for an enlarged plan view of one printing member 47). In most industrial applications, a plurality of separate printing members 47 will be employed in order that various data may be inserted into the machine corresponding to the nature of the transaction and the person making the transaction. Any combination, or one single card, will be used under various application circumstances.

In addition to the data which may be encoded from the printing members 47, the illustrated preferred embodiment includes settable wheels 48 which also carry data. Usually data on the wheels 48 is numerical in nature and may be set to print a count or number. The illustrated embodiment provides for a seven place number, and thereby employs seven wheels. Electrical switch and contact means are incorporated with the wheel setting mechanism for providing an electrical output corresponding to the selected number. However, such electrical equipment is not illustrated or described, for the reason that switches and contacts are well within the skill of the ordinary electrical engineer.

The wheels are set by external control handles 49, and for a more complete description of apparatus of this nature, reference is made to the prior U.S. Pat. No. 3,138,091. Although not essential to the operation of this device, that patent illustrates and describes aligning means movable into engagement with all of the wheels conjointly for accurately aligning the selected printing elements with one another prior to imprinting.

In FIG. 12 the print token 47 is shown embossed with bar embossments 51. The bar code illustrated in FIG. 12 is a widely known system using five bits of area in a vertical column, two of which are selected to be embossed. The two in combination signal a particular recognizable code. Note that in some columns the two bits actually blend into one long bar. According to this invention, after the data from the embossments 51 have been imprinted in the print station by the platen roller 18, the entire bed 28 with its burden of print tokens 47 is transported to a read head 53 for electrical-mechanical sensing. The sensing apparatus develops output signals suitable for transmission to a Transmission Control Unit in a central location. However, the full value of this invention is in the provision for printing of the data which is set up in the printing station for the operator to scrutinize before he permits the electrical transmission of that data.

In order to avoid human interference with accuracy, this invention has for one of its objects the provision of structure to prevent alteration of the data which has been set up on the machine bed, in order that the transmitted data will not vary from the printed data.

FIG. 2 illustrates the equipment which enables release of the printed copy but prevents the facile removal or alteration of the data established in the machine. A catch plate 55 is carried by the printing head 12 adjacent the pivot point mounting thereof. A latch arm 56 is spring urged into engagement with the catch plate 55.

See FIG. 2. Whenever the head 12 is completely lowered in printing relationship, catch plate 55 is rotated clockwise beyond the engagement point with the latch 56. Therefore, upon release of the latch member 22 by the release lever 24, spring 15 will urge the head to open, but opening of the head is permitted only to a minor degree. Latch 56 engages the catch plate 55 upon slight rotation of the head 12. Such slight opening of the head 12 will enable the removal of a printed form placed on the tokens for printing, but will not permit the operator to insert his fingers for changing the printing members. Interference lock means is coupled to the latch arm operating means for locking the control handles 49.

A solenoid 57, controlled by the electronic system of the invention, will release the latch 56 only after data has been electrically sensed and transmitted through the read head 53. When the Transmission Control Unit at a remote position signals receipt of such data, then solenoid 57 is activated to allow the head 12 to open fully for change of tokens 47 and reset of handles 49.

In FIG. 1, there is no ornamental cover over the read head 53, as will normally be employed in actual practice. The read head 53 is further illustrated in the FIGS. 6 through 11 shown separate from the balance of the equipment.

A stanchion 62 provides a mounting base for the apparatus of the read head. A feeler gauge 64 is pivotally carried by stanchion 62 in order to sense the presence or absence of printing members 47 on the carriage 28. If the gauge 64 drops to the bed of the carriage 28 it will fail to operate the switch 66, and hence signal the electronic system of the absence of a card and cause reversal of the carriage movement. For this reason, the individual members 47 are placed from the left end position in FIG. 3.

A swingable yoke 68 is carried on stub shafts 70 and 71. A composite switch 73 is carried by the crossarm of the yoke 68 and is directed toward the track plates 29. Switch 73 is illustrated in some detail in FIG. 10. U.S. application Ser. No. 528,446 filed Feb. 18, 1966 and entitled "Embossed Card Reader" is referred to as a source of further detailed teaching of the switch 73 and the manner of its use and operation.

The switch 73 is composed basically of a set of spring fingers united to a common electrical lead, and a set of individual fingers each provided with a separate circuit lead. Common plate 74 has a plurality of tang fingers, and individual fingers 75 provide the separate circuit contacts. The common plate 74 and the individual fingers 75 are mounted upon opposite sides of an insulating block 76. This assemblage is carried on the crossarm of the yoke 68 as illustrated in the FIGS. 6 and 7. The switch fingers are normally open and hence nonconductive. They sense the data when they are closed.

The read head further includes two roller spacers 78 carried by the stub shafts 70 and 71 for the purpose of establishing the position of the yoke 68 with respect to the surface of the printing members 47 passing thereunder. The mounting is sufficiently yieldable to enable the device to use printing members 47 of reasonable variation in thickness.

The stub shaft 71 is equipped with a drive collar 80 having an arm 81 projecting parallel to the axis of rotation of the shaft 71. A spring 82 urges the arm 81 to rotate the shaft 71 in a direction to lift the switch 73 away from the surface of the track plates 29, to a position illustrated in FIGS. 6 and 8.

Another arm 84 projects from collar 80 on the opposite side of the axis of rotation. Whenever the carriage 28 moves to carry the tokens 47 under the read head, the arm 84 is actuated. Actuation is achieved by means of solenoid 85 acting through a link 86. Activation of solenoid 85 produces the rotational position result illustrated in FIG. 9.

When in position shown in FIG. 9, the switch 73 is lowered to the level established by the roller spacers 78, and hence will be unactuated by the surface of tokens 47, but will be impinged by embossures 51. The three illustrations, A, B, and C, shown in FIG. 11 illustrate the result. Note that the FIG. 11 is three illustrations of the same finger couple. FIG. 11 is not to be interpreted as three aligned sets of separate switches. As the print token 47 moves a bit 51 toward common plate 74 as shown in FIG. 11a, the switch remains open. Then, as contact of bit 51 with plate 74 is made, the abutted finger of common plate 74 is flexed into contact with a finger 75, but the finger 75 is unflexed and remains in its original condition.

Contact is made when the position of 11b is achieved. Then, as further movement of the printing members 47 takes place, and the finger of plate 74 is further flexed, the finger 75 will be somewhat flexed. As a result, the contact point of the finger 75 will have scraped along the surface of the common plate finger 74 and polished the contact minutely. Oxidation which might otherwise form and eventually dull the sensitivity of the switch 73 is constantly buffed away in this manner.

In addition to the repetitive data which is available from the bar code on the printing members 47, and the data from the variable wheel 48, other data may be transmitted. For example, a code to indicate the length of the record to be transmitted, and the document number which is printed by the print head, is entered into the electrical system by means of six thumb wheel switches 88. These switches are wired into the electrical system which transmits its data on signal to the Transmission Control Unit at a remote central location along with the data from the printing members 47.

Transactions are entered into the system through the transmitting recorder in three forms:

Repetitive data such as production descriptions, part numbers, similar information is in the form of the bar code embossed on plastic plate 47.

Variable data such as the quantity produced, is entered from seven variable-set levers 49 which establish the position of the wheels 48.

Identification data such as record length, document number and like information is entered from the six thumb wheel switches 88. This data is nonprinting on the transaction document.

Additionally, the date and time may be electrically generated at the remote central Transmission Control Unit and entered on all output records. This is within the skill of the electronic engineer to design into the electrical equipment.

With a printing member 47 positioned, and variable lever 49 actuated to proper location, and the thumb wheel switches 88 set, a document in the form of a rectangular slip of paper is placed over the tokens 47 in the first position under the printing head and imprinted. Upon the completion of the imprinting, and release of the latches 22, the movement of the head 12 actuates electrical contacts to cause the carriage 28 to advance rapidly out of the first position to a preliminary station adjacent to the read head 53. At this time the document may be removed and examined for accuracy. If the document is accurate, it reflects the proper selection of printing members 47 and setting of the variable data in the wheels 48.

Then the operator presses a transmit switch 90 shown on the surface of the base cabinet 10 in FIG. 1. The signal from the transmit switch is sent to the remotely located Transmission Control Unit. Upon reception of a return signal from the Transmission Control Unit, indicating that the Transmission Control Unit has polled all of the transmitting recorders in the system, and has cleared the control unit to receive the data from this particular recorder, then the carriage 28 is caused to advance under the read station 53.

The read station 53 is actuated to sense the presence of the embossures 51 and to close contacts in the switch 73 according to embossment positions. These signals are transmitted to the Transmission Control Unit. Variable and identification data from the wheels 48 and the thumb wheel switches 88 is electrically encoded by the system along with the signals from the read head.

Whereas the present invention has been shown and described herein in what is conceived to be the best mode contemplated, it is recognized that departures may be made therefrom within the scope of the invention which is, therefore, not to be limited to the details disclosed herein, but is to be afforded the full scope of the invention as hereinafter claimed.

We claim:

1. A data collecting machine comprising:

a bed affording a support for a printing device bearing data and for a form in superposed relation therewith on which data is to be printed;

movable obstructing means releasably latchable on said bed for obstructing access to said printing device on said bed to prevent operator removal;

platen means operable in a printing cycle for imprinting of data from the printing device onto the form;

means for scanning said printing device in its supported position and producing output signals corresponding to the data thereon;

means for initiating a printing cycle and means for initiating a scanning cycle; and

means responsive to the completion of the printing and scanning cycles to unlatch said obstructing means and permit removal of said obstructing means for permitting access to said printing device for operator removal.

2. The invention as defined in claim 1, wherein said printing cycle precedes the scanning cycle.

3. In a data collecting system, a remote transmitting recorder comprised of:

1. a data encoder having a bed upon which removable printing member plates are placed;

2. a printing head movable between a printing position with respect to said bed, and an open nonprinting position making said bed available for installation of removable printing members;

3. lock means for holding said head to a limited opening position wherein paper printing forms may be removed from said bed, but closed to facile removal of said printing members;

4. a reader for said printing members, said reader structured to sense data on said members and to put out electrical code signals corresponding to said data;

a collecting means for collecting electrical code signals from said remote transmitting recorder and recording said signals as usable data; and

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a transmission control operated conjointly by said recorder and collecting means, said control having:

1. a first printing head release means to allow opening of said head to said limited opening position upon completion of a printing act by said printing head; and
2. operator controlled switch means for causing said bed to carry said printing member plates in a reading relationship with respect to said reader and return to said printing position.

4. In the data collecting system as defined in claim 3, the provision of means to release said printing head to a fully open position upon return of said carriage to said printing position.

5. In the data collecting system as defined in claim 3, the provision of settable data wheels mounted in alignment with said bed for encoding variable data, said wheels having a plurality of selectable imprintable data around the periphery thereof, and means for directing electrical code signals corresponding to said wheel position along with signals from said reader.

6. A data collecting machine comprising:

a bed carriage providing a support for a printing device with embossed data thereon providing a print type function; platen means mounted for relative movement with respect to the surface of said printing device for imprinting such data on a form interposed over said printing device;

first latch means for holding said platen means in a first position with respect to said bed carriage, said platen means in said first position producing a printed pressure with respect to said bed carriage which will clamp a printing device and a form to prevent removal of either from the machine;

second latch means for holding said platen means in a second position which does not clamp the form and printing device, said platen means in said second position being retracted from said bed carriage with respect to the first position a distance less than sufficient to permit facile removal of the printing device;

means for scanning said printing device, said means and said bed carriage mounted for relative movement with respect to one another and producing output electrical signals corresponding to the data carried by said printing device; means for uniting said platen means, the means for scanning, and said bed carriage into a cooperative machine wherein a printing device may be used as a data source for actuating the means for scanning the device and as a printing element in sequential relationship; and means for causing said first latch to engage as a function of platen means movement to said first position, means for causing said second latch to engage as a function of first latch release, and means to cause said second latch to release as a function of completion of both a printing and scanning operation.

7. In the improvement to a data collecting machine as defined in claim 6, a pivotally mounted printing head having a platen track, said platen adapted to travel between limits on

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said track, the printing head closable to place the platen in printing relationship to the base and said platen movable along said track for causing said imprinting;

said printing head configured to enclose said bed to the extent that a printing device is enclosed and cannot be removed, and having a first lock which clamps the head in the printing relationship, said first lock releasable by being forced out of lock position as a function of platen travel to the end of a printing traverse of said track;

a second lock which holds the head after said first lock is released, said second lock allowing the head to pivot open only an amount sufficient to release a form after said imprinting and not sufficient to remove said printing device.

8. In the improvement to a data collecting machine as defined in claim 7, a sensing device located adjacent said head for producing electrical signals corresponding to data carried by said bed, said bed shiftable away from said head into the scan field of the sensing device and return to said head, and means to release said second lock in response to said return movement.

9. A data collecting device comprising:

a bed carriage for holding an embossed printing device, said carriage having first and second terminal positions and means to drive the carriage in a path therebetween;

a printing head including a platen, means holding said head in a first position with said platen adjacent to said bed carriage path for producing a printing pressure upon a printing device of said bed carriage as the device passes thereby;

a plurality of switch fingers, means holding each finger adjacent to said bed carriage path positioned to be contacted by embossed areas on the surface of said printing device;

means for uniting said printing head, the means that hold said fingers, and said bed carriage into a cooperative machine wherein a printing device may be used as a data source for actuating the switch fingers and as a printing element in sequential relationship; and

means for withdrawing either of both said head to a second position and switch fingers away from said bed carriage to an inoperative position.

10. A data collecting device as defined in claim 9, further characterized in that:

a first lock means if provided for holding said printing head in said first position;

a second lock means is provided to allow said printing head to open after release by said first lock means only enough to space the platen from the printing device but not far enough to permit facile removal of said printing device; and

means operable as a function of bed carriage travel out of said first terminal position and return for releasing said second lock and to permit said printing head to move to said second position.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,563,171 Dated February 16, 1971

Inventor(s) Donald N. Heisner et al

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 1, line 13 "thru" should be deleted; line 16, "/C" should be deleted. Column 1, lines 5-20, embodying the above corrections, should be deleted from the specification and appear as the balance of the Abstract on the title page. Column 8, line 39, "of" should read -- or -- .

Signed and sealed this 17th day of August 1971.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

WILLIAM E. SCHUYLER, JR.
Commissioner of Patents