May 17, 1955 F. R. WERNER 2,708,498

SENSING DEVICE FOR RECORD MATERIAL

Filed Nov. 3, 1948

2 Sheets-Sheet 1

FIG. 1

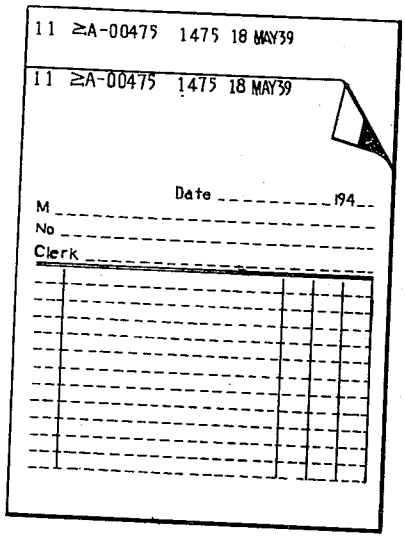


FIG. 2

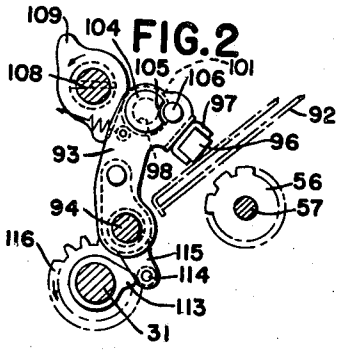


FIG. 3

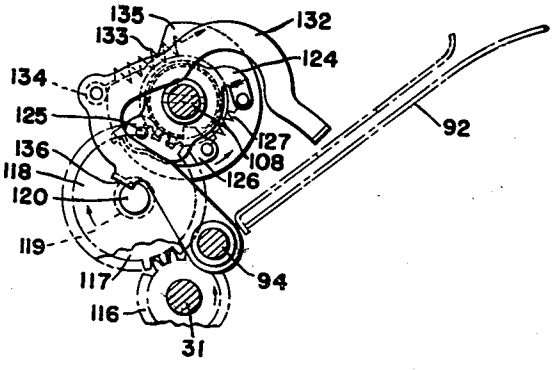
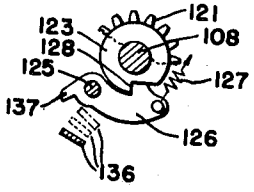


FIG. 4



INVENTOR
FRANK R. WERNER

BY Karl Ernst
Henry Sikorski

HIS ATTORNEYS

May 17, 1955 F. R. WERNER 2,708,498

SENSING DEVICE FOR RECORD MATERIAL

Filed Nov. 3, 1948

2 Sheets-Sheet 2

FIG. 5

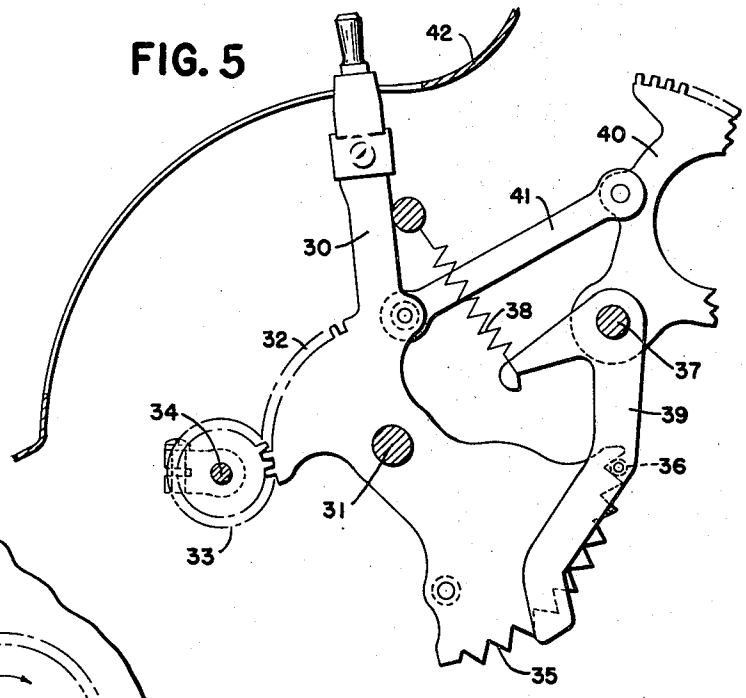


FIG. 6

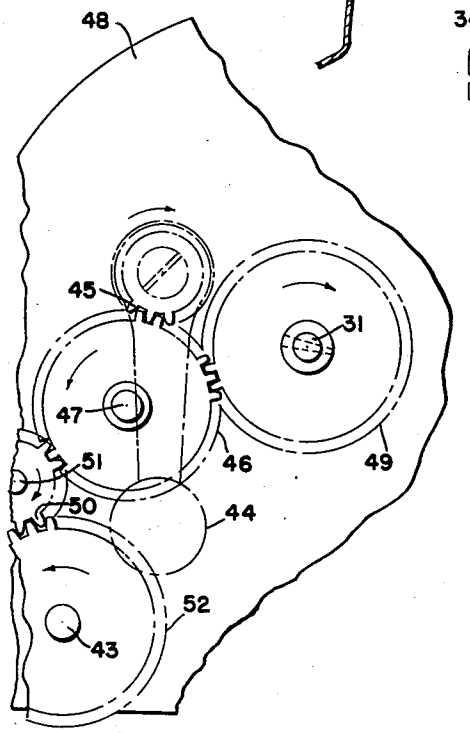
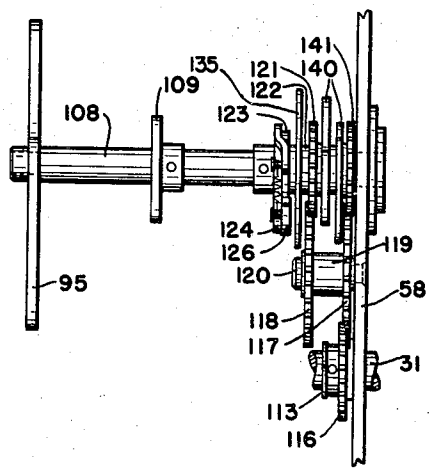


FIG. 7



Inventor

FRANK R. WERNER

By Earl Berest

His Attorney

United States Patent Office 2,708,498 Patented May 17, 1955

2,708,498

SENSING DEVICE FOR RECORD MATERIAL

Frank R. Werner, Dayton, Ohio, assignor to The National Cash Register Company, Dayton, Ohio, a corporation of Maryland

Application November 3, 1948, Serial No. 58,114

2 Claims. (Cl. 192—125)

The invention relates to improvements in printing mechanisms for cash registers, calculating machines, and the like.

The principal object of the invention is to provide an improved printing mechanism for cash registers and calculating machines.

Another object of the invention is to provide an improved sensing mechanism to sense for the presence or absence of record material on the support therefor.

With these and incidental objects in view, the invention includes certain novel features of construction and combinations of parts, a preferred form or embodiment of which is hereinafter described with reference to the drawings which accompany and form a part of this specification.

Of said drawings:

Fig. 1 is a facsimile of an insertable sales slip upon which printed records are made by the machine.

Fig. 2 is a detail side elevation of the slip printing hammer mechanism.

Fig. 3 is a detail side elevation of the sensing device for the slip printing and feeding mechanism.

Fig. 4 is a detail view of the clutch mechanism shown in Fig. 3.

Fig. 5 is a detail side elevation of an amount setting lever, showing the type of machine to which the present invention is shown applied, and includes a connection for setting the type carriers.

Fig. 6 is a detail side elevation of the operating mechanism for the machine.

Fig. 7 is a detail front elevation of the driving connections for operating the slip feeding and printing means.

General description

The machine to which the present invention is shown applied is illustrated in connection with the machine shown and described in United States Patent No. 2,209,763, issued to Ernst Breitling on July 30, 1940.

The invention embodies a novel slip-printing mechanism in which impressions are made on an insertable slip, which is supported in a suitable supporting means in the machine. The printer is arranged to print in duplicate on the insertable slip, and a feeding mechanism is provided to space the insertable slip after the first impression has been made. In order to prevent unnecessary operation and smudging of the printing hammer, a sensing means is provided for sensing for the presence or absence of a slip on the slip support. The novelty in the sensing mechanism lies in the fact that, after the machine begins to operate, a clutching mechanism may be disabled by the sensing means itself for disabling the operating means for the printing mechanism.

Detailed description

The machine to which the present invention is shown applied is provided with a series of setting levers **30** (Fig. 5) pivotally mounted on a cam shaft **31**. Each lever **30** is provided with a series of teeth **32**, meshing with

a pinion **33**, secured to a shaft **34**, which shaft extends into the printer section of the machine and by means of which type carriers are positioned commensurate with the setting of the lever **30**.

The lever **30** shown in Fig. 5 is shown for adjusting the type carriers through the shaft **34**. Other levers similar to the lever **30** are provided, each of which is provided with teeth **32** meshing with pinions **33**, which pinions are connected to nested sleeves for setting up type carriers in the printer.

The lever **30** is provided with alining notches **35**, engageable by a stud **36** on a lever **39**, pivoted on a shaft **37** and held in the position shown by a spring **38**. As the lever **30** is adjusted for setting up an amount, the stud **36** ratchets in and out of the notches **35**. As fully described in the above-mentioned Breitling patent, means are also provided for locking the stud **36** in a notch **35** during the machine operation to prevent manipulation of the lever **30** during a machine operation.

Connected to the lever **30** by a link **41** is an indicator setting segment **40**, whereby an indicator is set commensurate with the position of the lever **30**, as fully described in the above-mentioned patent. The upper end of the lever **30** projects through a slot in the cabinet **42**, which cabinet encloses the entire machine.

Operating mechanism

The machine may be operated by means of an electric motor, as shown and described in the above-mentioned Breitling patent, or by means of an operating handle **44** (Fig. 6). In addition to the cam shaft **31**, mentioned above, a second cam shaft **43** (Fig. 6) is provided, and both of the cam shafts may be operated by the operating handle **44**. The operating handle **44** is clutched to a pinion **45** in the usual manner. The pinion **45** meshes with an intermediate gear **46**, rotatably mounted on a stud **47** on the right side frame **48**. The intermediate gear **46** meshes with a gear **49**, secured to the cam shaft **31**. The intermediate gear **46** also meshes with a pinion **50**, rotatably mounted on a stud **51**, carried by the right side frame **48**. The pinion **50** meshes with a gear **52** secured to the before-mentioned cam shaft **43**.

Clockwise rotation of the operating handle **44** rotates the intermediate gear **46** counter-clockwise (Fig. 6) to rotate the gear **49**, together with the shaft **31**, clockwise as viewed in Fig. 6 and counter-clockwise as viewed in Fig. 2. Also, counter-clockwise rotation of the intermediate gear **46** (Fig. 6) through the intermediate pinion **50** rotates the cam shaft **43** counter-clockwise as viewed in Fig. 6.

Type setting mechanism

Secured to the shaft **34**, and to each one of the nested sleeves, is a type setting gear (not shown). Meshing with the teeth of the said gear is a type wheel **56** (Fig. 2) for setting up data to be printed on an insertable slip. There are a type-setting gear and a type wheel **56** provided for each lever **30** of the machine, the number of type carriers depending upon the item entry capacity of the machine, as is fully illustrated in said Breitling patent.

Slip-printing mechanism

The machine is provided with mechanism to print on an insertable slip, illustrated in Fig. 1. To provide a support for the slip in the machine, a supporting table **92** (Figs. 2 and 3) is provided, which projects through a slot in the cabinet of the machine. The table **92** is suitably mounted on brackets in the machine to guide and support the insertable slip in proper alinement with the type wheels and the printing hammer.

Slip-printing hammer mechanism

The slip-printing hammer mechanism is illustrated in

Fig. 2. The slip-printing hammer **93** (Fig. 2) is pivotally mounted on a stud **94**, carried by the left side frame **58** of the machine and by an auxiliary frame (not shown). The hammer **93** is provided with a platen **96**, carried by a channel bar **97** supported on the hammer **93**. The hammer **93** comprises two arms and a connecting bar.

Carried between the two arms of the hammer **93** is a shaft **98**, supporting a roller **101**.

Mounted on a shaft **108** is a cam **109**, having two nodes for cooperation with the roller **101**. The shaft **108** and the cam **109** are rotated counter-clockwise by a gear train, hereinafter described, connecting the shaft **108** to the cam shaft **31**. Counter-clockwise rotation of the shaft **108** (Fig. 2) causes the cam **109** to engage the roller **101** and thereby rock the printing hammer **93** to impinge the record material and the ribbon, hereinafter described, against the type carriers to take an impression on the insertable slip. After the first impression has been made, a feeding mechanism line-spaces the insertable slip, whereupon the second node of the cam **109** rocks the hammer to impinge the record material and the ribbon against the type carriers.

In order to hold the printing hammer **93** in its normal position when the machine is at rest, to prevent accidental or fraudulent operation of said printing hammer, a cam **113** is secured to the shaft **31**. When the machine is at rest, the node of the cam **113** is engaged by a roller **114**, mounted on an arm **115**, secured to the hammer **93**. When the machine is at rest, the hammer **93** is locked in its home position, since it is impinged between the roller **101** and the roller **114** and therefore cannot be moved either accidentally or fraudulently.

The printer-operating cam **109** is driven from the main shaft **31** by a train of gears and a clutch mechanism, by means of which the cam **109** can be disconnected from the main shaft **31** in a manner hereinafter described. The train of mechanism for driving the cam **109** includes a gear **116** (Figs. 2, 3 and 7), secured to the shaft **31**. The gear **116** meshes with an intermediate gear **117**, which is connected to a second intermediate gear **118** by a hub **119**. The intermediate gears **117** and **118**, together with the hub **119**, are rotatably mounted on a stud **120**, mounted on the left side frame **58**. The intermediate gear **118** meshes with a pinion **121**, freely rotatable on the beforementioned shaft **108**. Secured to the pinion **121** by means of a hub **122** is a clutch disk **123** (see also Fig. 4). Secured to the shaft **108** is an arm **124** (Figs. 3 and 7) provided with a stud **125**, on which a clutch pawl **126** (see also Fig. 4) is pivotally mounted. A spring **127** normally maintains the pawl in engagement with a notch **128**, formed in the clutch disk **123**. The spring **127** is stretched between a stud on the clutch pawl **126** and an ear formed on the arm **124**.

When the shaft **31** and the gear **116** are rotated during the operation of the machine, the gear **116** rotates the intermediate gears **117** and **118** and the pinion **121** to rotate the clutch disk **123** counter-clockwise (Fig. 4). Counter-clockwise rotation of the clutch disk **123** carries the clutch pawl **126** therewith, which, through the stud **125**, carries the arm **124** also counter-clockwise. The arm **124**, being pinned to the shaft **108**, rotates said shaft and the hammer-operating cam **109** counter-clockwise (Fig. 2) to operate the printing hammer **93** in the manner hereinbefore described.

The object of providing the clutch **123—126** in the train of mechanism for driving the operating cam **109** is to provide a means for disconnecting the cam **109** and thereby disabling the operation of the printer hammer **93** when no slip is on the slip table.

Slip feeler mechanism

At the very beginning of the machine operation, a slip feeler **132** (Fig. 3), pivotally mounted on the beforementioned stud **94**, is rocked clockwise to sense for the presence or absence of a slip on the table **92**. A spring **133** normally tends to rock the slip feeler in said clockwise direction but is restrained in the home position, shown in Fig. 3, by a roller **134** thereon being held in engagement with a cam **135** by the spring **133**. The cam **135** is secured to the hub **122** (Fig. 7), on which the clutch disk **123** is also secured. Therefore, when the clutch disk **123** is rotated by the cam shaft **31**, through the gear **116**, the intermediate gears **117** and **118**, and the pinion **121**, the cam **135** rotates counterclockwise (Fig. 3). At the beginning of the counterclockwise rotation of the cam **135**, its low part permits the spring **133** to rock the feeler **132** to sense for the presence or absence of a slip on the table **92**. If no slip is present on the table, the slip feeler **132** receives its maximum movement, in which event a flange **136** (Fig. 4) on the slip feeler **132** moves into the dot-and-dash line position illustrated in Fig. 4, wherein the flange is in the path of a tail **137** on the clutch pawl **126**. Upon continued counter-clockwise rotation of the clutch pawl **126**, the tail **137**, coming into contact with the flange **136**, causes the clutch pawl **126** to rock clockwise, whereupon the clutch pawl **126** becomes disengaged from the notch **128** on the clutch disk **123**, therefore arresting any further rotating movement of the printer cam **109**. The arresting of the cam **109** takes place before the cam is effective to operate the printing hammer, and therefore, when no slip is present on the table **92**, the printing hammer will not be operated.

If, when the slip feeler **132** is released to the action of the spring **133**, the feeler engages a slip which is present on the table **92**, the flange **136** is arrested in the dotted-line position illustrated in Fig. 4, in which position the flange **136** is arrested before coming into the path of the tail **137**, and therefore the clutch pawl **126** is not disengaged from the notch **128** and the printing cam **109** is permitted to operate to take the two impressions on the inserted slip in the manner described above.

While the form of mechanism shown and described herein is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form or embodiment disclosed herein, for it is susceptible of embodiment in various other forms.

What is claimed is:

1. In a machine of the class described having a driving shaft, a driven shaft, a notched member on one shaft, and a pivoted pawl on the other shaft engaging the notched member to couple the two shafts together, in combination with a support for record material, a feeler to sense the presence or absence of record material on the support, a flange formed directly on the feeler, said flange movable into the path of movement of the pawl, when the feeler senses the absence of record material, to withdraw the pawl from engagement with the notched member to thereby uncouple the driven shaft from the driving shaft, a cam to normally maintain the feeler out of the path of movement of the record material, and means operable under control of the cam to actuate the feeler.

2. In a machine of the class described having a driving shaft, a driven shaft, a notched disk on the driving shaft, a pivoted pawl on the driven shaft normally held in engagement with a notch in the notched disk to couple the driven shaft to the driving shaft, and a support for record material, in combination with a pivoted feeler, the free end thereof being movable to sense for the presence or absence of record material on the support, a flange formed on the pivoted feeler movable into the path of movement of said pawl to withdraw the pawl from engagement with said notch to thereby uncouple the driven shaft from the driving shaft, a cam to normally maintain the feeler out of the path of movement of the record material, and a spring to actuate the pivoted feeler under control of the cam.

(References on following page)

References Cited in the file of this patent

UNITED STATES PATENTS

1,529,903	Mojonnier	Mar. 17, 1925
1,555,596	Miller	Sept. 29, 1925
1,795,509	Robertson	Mar. 10, 1931
1,906,304	Barrett	May 2, 1933
2,021,327	Phinney	Nov. 19, 1935
2,042,719	Lindgren	June 2, 1936
2,044,754	Lawrence	June 16, 1936
2,208,050	Posenski	July 16, 1940
2,210,021	Breitling	Aug. 6, 1940
2,224,714	Walker	Dec. 10, 1940
2,235,844	Nelson	Mar. 25, 1941
2,275,653	Rost	Mar. 10, 1942
2,335,949	Lewis	Dec. 7, 1943
2,349,660	Hughes	May 23, 1944
2,350,703	Ryan	June 6, 1944

FOREIGN PATENTS

408,907	Great Britain	Apr. 19, 1934
430,371	Great Britain	June 18, 1935