June 2, 1970 W. P. BARBOUR 3,515,060

INTERLOCK ASSEMBLY IN TRAVELING PLATEN ROLLER IMPRINTING MACHINES HAVING SETTABLE TYPE WHEELS

Filed Jan. 31, 1968 2 Sheets-Sheet 1

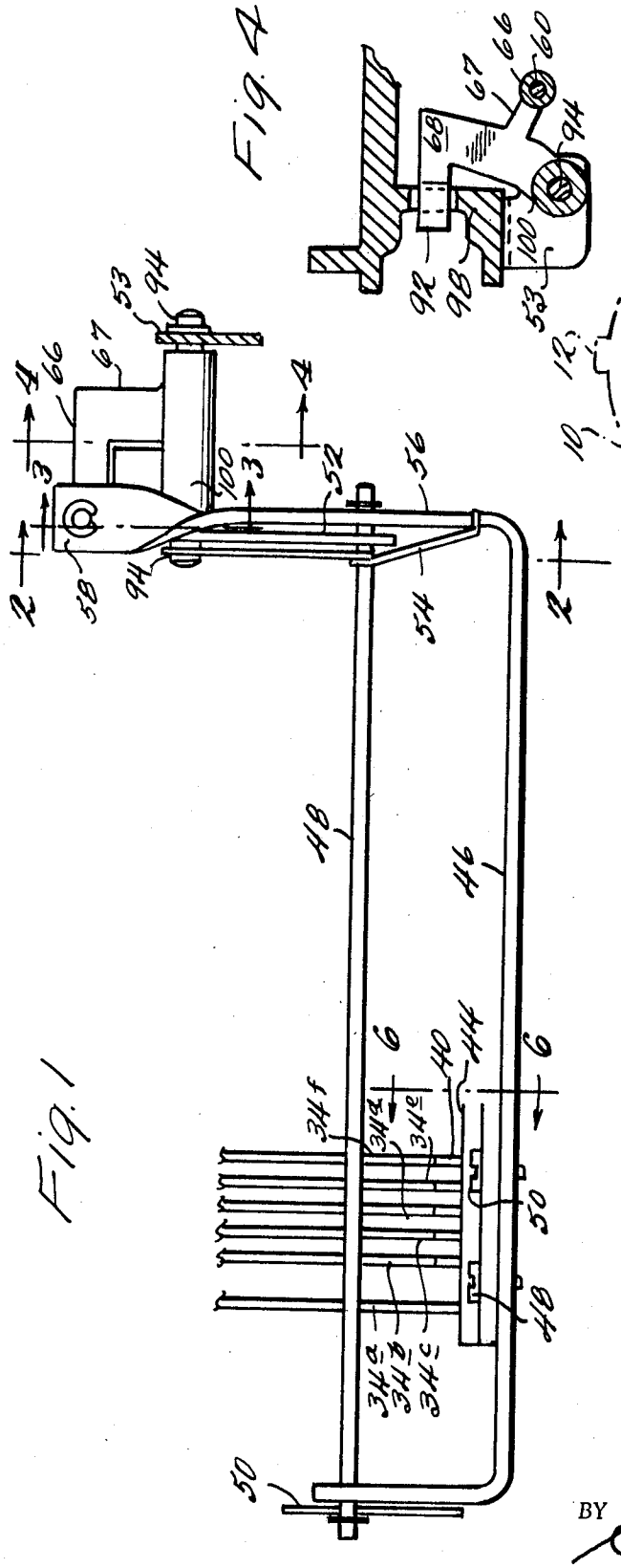

FIG. 1



FIG. 4

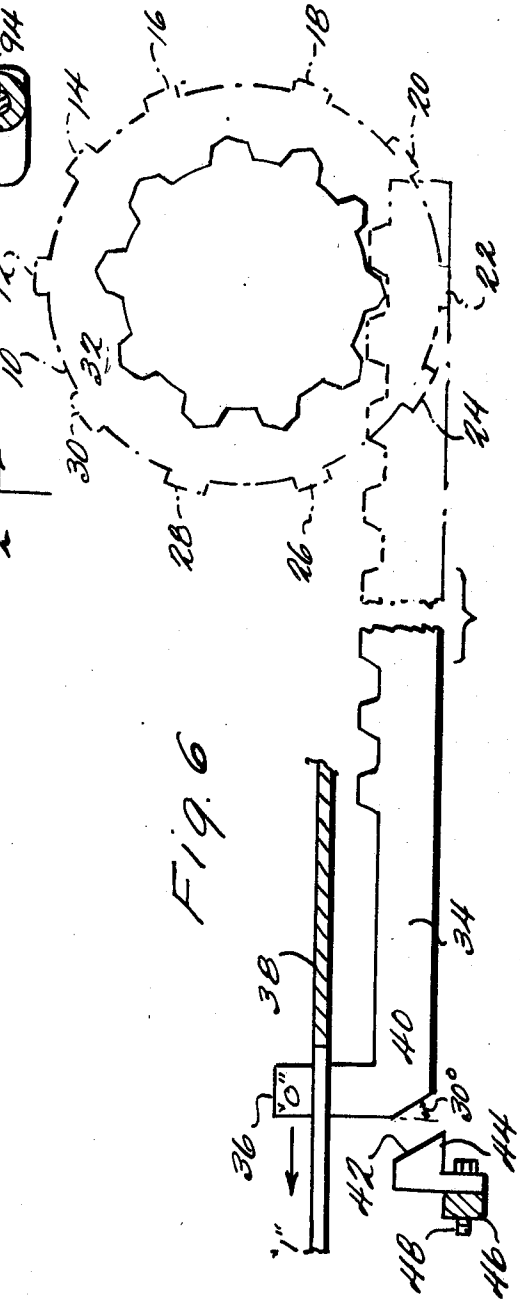

FIG. 6

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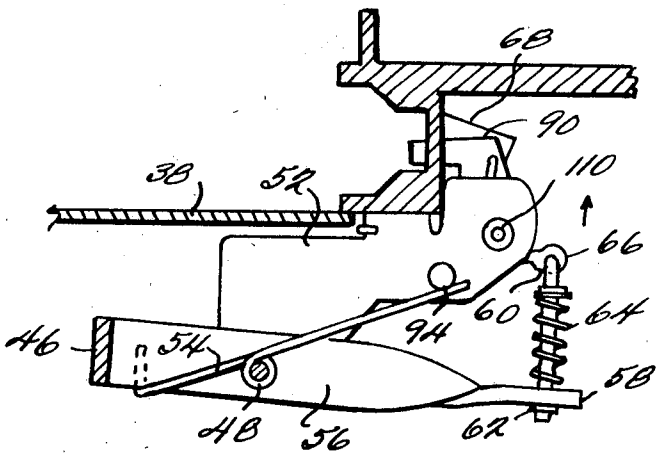


Fig. 2

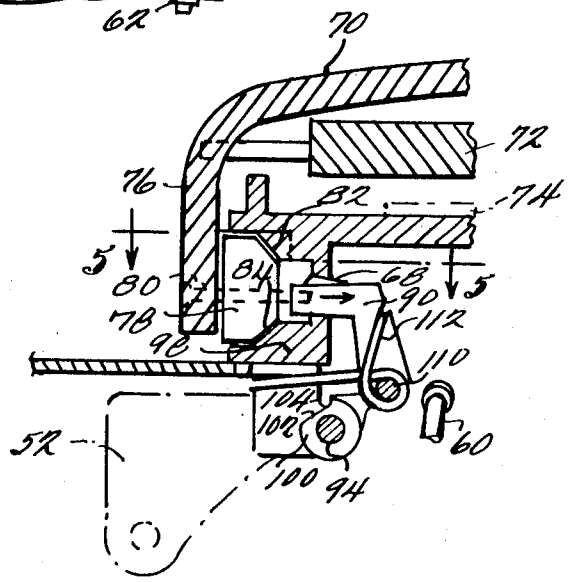


Fig. 3

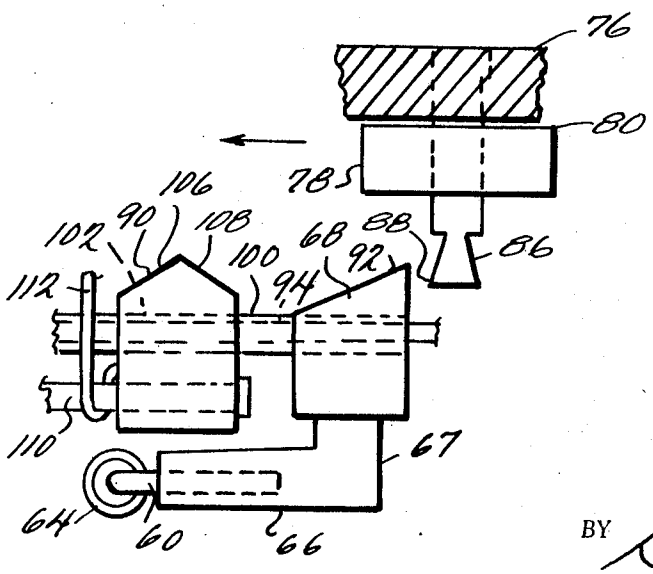


Fig. 5

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3,515,060

# INTERLOCK ASSEMBLY IN TRAVELING PLATEN ROLLER IMPRINTING MACHINES HAVING SETTABLE TYPE WHEELS

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U.S. Cl. 101—45 9 Claims

## ABSTRACT OF THE DISCLOSURE

An interlock assembly for use with imprinting devices having a source of variable data such as money amount wheels is disclosed. Between each imprinting operation all money wheels must be returned to their respective zero positions. Movement of any one of the racks respectively connected to the wheels away from the zero position tends to force a head latch into the path traveled by a shaft connected to the print head. When the head is moved from its starting position, the shaft connected thereto engages a latch release mechanism which permits the head latch to be moved into the path traveled by the shaft. However, at this time, the head has been moved past the point where the latch is moved in the path and thus the head can be moved over the print bed. The head is then moved back over the print bed toward the latch. The latch has a cammed surface which permits the head to return to the starting position. Once the head is returned to the starting position, the latch prevents the head from being moved from that position again until all racks have been returned to the zero digit wheel position. With the return of the racks to this position, the head latch is retracted to its non-latching position and the latch release mechanism so engages the latch so as to maintain it in this position until the head is moved again from the starting position.

## Background of the invention

This invention relates to an interlock assembly, and in particular, to such assemblies for use with imprinting devices having a source of variable data where the data is positioned in a print bed and where the data is printed upon a document such as a sales invoice upon movement of a printing head over the bed.

Such interlock assemblies have been employed in the prior art and one such assembly is described in the U.S. Pat. 3,279,369, granted to William A. Wight on Oct. 18, 1966 and assigned to the assignee of the present application. The interlock assembly described therein is very effective and the operational logic thereof is quite sophisticated.

In many applications, an interlock assembly is required where the operational logic does not have to be particularly sophisticated. In such applications, it is desirable that the interlock operation be as simple as possible thereby minimizing the manufacturing cost of the assembly, however, the operational logic must at the same time be sufficiently effective to prevent such operator errors as the imprinting of a money amount of a prior transaction on an invoice relating to the next transaction.

## Summary of the invention

A primary object of this invention is to provide an improved interlock assembly, the operational logic of which is quite simple but effective in preventing operator errors.

A further object of this invention is to provide an assembly of the above type wherein the cost of manufacture thereof is small.

Other objects and advantages of this invention will become apparent upon reading the appended claims in conjunction with the following detailed description and the attached drawing.



## Brief Description of the drawing

FIG. 1 is a bottom plan view of a portion of the underside of a variable data imprinter showing an illustrative embodiment of an interlock assembly of this invention.

FIG. 2 is a cross-sectional view taken along the line 2—2 of FIG. 1.

FIG. 3 is a cross-sectional view taken along the line 3—3 of FIG. 1.

FIG. 4 is a cross-sectional view taken along the line 4—4 of FIG. 1.

FIG. 5 is a top view of a portion of the assembly of FIG. 1 taken along the line 5—5 of FIG. 3.

FIG. 6 is a cross-sectional view taken along the line 6—6 of FIG. 1, including an associated rack mechanism and digit wheel shown in phantom lines.

## Detailed description of a preferred embodiment of the invention

Referring to FIGS. 1 through 6 there are shown various views of a preferred embodiment of the interlock assembly of this invention. FIG. 1 illustrates a portion of the underside of an imprinter which prints both fixed and variable data on documents such as sales invoices and the like. Further, the invention will be described in reference to an imprinter wherein the imprinter operation comprises (1) a print cycle wherein the print head moves from a starting position across the print bed to effectuate the printing of the fixed and variable data and (2) a return cycle where the head is returned in the opposite direction to the starting position without further printing. However, the invention is not limited to such imprinters.

Referring to FIG. 6 there is illustrated one digit wheel **10** of a plurality that are normally utilized on imprinters which are capable of printing variable data, such as that described in the before-mentioned U.S. patent. Disposed around the periphery of the digit wheel **10** are a plurality of print elements **12–30** which typically correspond to the Arabic numerals 0–9. Adjacent and connected to the digit wheel **10** is a gear face **32** having a plurality of teeth disposed around the periphery thereof. A rack **34** having a plurality of teeth on the upper surface thereof which engage the teeth of gear face **32**, is adapted to rotate the digit wheel **10** to any desired position and thereby set a predetermined digit into the print bed prior to the imprinting operation. Broadly speaking, the rack **34** and gear face **32** act as a setting means for the print elements **12–30** on the digit wheel **10**. The rack **32** is moved by a lever **36** which projects through the base plate **38** of the imprinting device. Indicia are provided on the upper surface of plate **38** adjacent the slot in which lever **36** moves to indicate to the operator when the predetermined digit is positioned in the print bed. Rack **34** is provided with an inclined edge **40** which typically makes an angle of 30 degrees with the vertical plane as indicated in FIG. 6, for reasons which will be described in more detail hereinafter. As shown in FIG. 6 the rack **34** is so positioned that the digit "zero" is set in the print bed. Also indicated in FIG. 6 is the distance the lever **36** must be removed in the direction of the arrow before the digit "one" will be set in the print bed. It can be further seen in FIG. 6 that before the digit "one" is positioned in the print bed, the inclined surface **40** of the rack will engage a complementary inclined surface **42** of an interlock glide or projecting member **44**. In FIG. 1 it can be seen that the interlock glide **44** is so disposed with respect to all of the racks **34***a*–**34***f* that the movement of any one of the racks away from the zero digit wheel position will effectuate an engagement

with the glide **44**. Broadly speaking, the zero digit wheel position corresponds to a predetermined position of the setting means.

Referring to FIG. 1, the glide **44** is adjustably connected to a U-shaped bale member **46** by appropriate means **48** and **50**. Thus, the glide **44** can be vertically adjusted so as to maximize the contact area between it and the racks. The U-shaped bale is pivotally mounted on a bale shaft **48** which is secured at one end thereof to a bracket **50** connected to the underside of the plate **38**. The other end of the shaft **48** is connected to an interlock bracket **52**, which is also connected in fixed relation to the base plate **38**, as best seen in FIG. 2. A wire bale spring **54** applies constant tension to the bale **46** so that glide **44** always stays in contact with any one of the racks which are moved from the zero digit wheel position. The vertical leg **56** of the U-shaped bale **46** is twisted into a flanged portion **58** at one end thereof as best indicated in FIGS. 1 and 2. Whenever any one of the racks is moved from the zero position, the bale **46** is so rotated around shaft **48** that the flanged portion **58** rises essentially vertically. A connecting link **60** having an inverted L-shape has its vertical leg inserted in a hole provided in the flanged portion **58** and a retaining ring **62** mounted on the link **60** prevents the link from slipping through the hole. Disposed around the link **60** is a compression spring **64**. The horizontal leg of the link **60** extends into and is connected to a connecting arm **66** which in turn is connected to a head latch **68**, as best seen in FIG. 5. As will now be brought out, the head latch **68** may assume two positions, the first of which is disposed in the path of the printing head to prevent passage of the head until all racks are returned to the zero digit wheel position after an imprinting operation. When the latch **68** is moved to its second or non-latching position, passage of the printing head is permitted. Because of the hereinbefore described connection of the racks **34***a*–**34***f* to the latch **68** whenever any one of the racks is moved away from the zero digit wheel position, the latch **68** will move into its first or latching position whenever the above movement occurs while the return of all racks to the zero position will return the latch **68** to its second or non-latching position. Broadly speaking, the glide **42**, bale **46**, connecting link **60**, and spring **64** form a first actuating means as defined in the claims.

As best seen in FIGS. 3 and 5, the print head **70** is diagrammatically shown, it being well known in this art that the head includes a roller platen diagrammatically indicated at **72** and various optional actuating mechanisms (not shown) to prevent the roller from moving over the print bed indicated by phantom lines at **74** during the return cycle of the imprinter operation. The head has mounted in its vertical side legs, one of which is indicated at **76** a respective pair of roller bearings one of which is indicated at **78**, the bearing **78** being mounted on a shaft **80** which is inserted into the side leg **76**. The roller bearings travel in a guide path as shown at **82** and **84** of FIG. 3. The shaft **80** extends beyond the bearing **78** as shown in FIG. 5 and is tapered as indicated at **86** around the circumference thereof. Assuming the latch **68** is in its latching position and the head **70** is moved in the direction indicated by the arrow, shaft **80** will contact the latch **68** at point **88** and thus the head will be prevented from by-passing the latch. Further, any tendency for the latch **68** to become cammed, over a long period of time, and thereby render ineffective the latching action of the latch is effectively combated because the camming of the latch surface is such as to be complementary with the tapered surface **86** of the shaft **80**. Shaft **80** acts a second actuating means as defined in the claims.

As stated above, the head latch **68** tends to move to its latching position whenever any of the racks are moved from the zero digit wheel position. However, of course, the latch cannot be permitted to move to its latching position until at least the printing cycle of the imprinter



operation is performed. Thus, latch release means **90** is provided for preventing the latch **68** from moving to its latching position until the printing cycle of the imprinting operation is performed. Before proceeding with the detailed description of the latch release **90**, the remaining details of the construction of the latch **68** will be described. As can best be seen in FIG. 4 the latch release **68** includes an inverted L-shaped portion. Disposed at the end of the shorter horizontal leg thereof is an inclined portion **92**, which permits passage of the print head by the latch during the return cycle of the imprinting operation even though the latch is in its latching position, see FIG. 5. The vertical leg of the release **68** is rotatably mounted on head latch shaft **94** which can be seen in FIG. 4. Shaft **94** is connected at one end to a vertical leg **53** of the bracket **52** which extends from member **98** and at the other end to the interlock bracket **52**, see FIG. 2, the bracket **52** being substantially U-shaped. As can be seen in FIGS. 3 and 5 a cylindrical projection **100** horizontally extends from the L-shaped portion concentric with the shaft **94**. Cylindrical projection **100** is provided with a grooved section **102** as indicated in FIG. 3, this groove engaging a latch release finger **104** extending from the latch release **90**.

The latch release **90** also includes an inverter L-shaped portion, the end of the horizontal leg being pointed as indicated in FIG. 5—that is, the end includes two inclined surfaces **106** and **108**, the slopes of which are opposite and which permit passage of the printing head during either the print or return cycle of the imprinting operation. The end of the vertical leg of the L-shaped latch release **90** is rotatably mounted upon a latch release shaft **110** which is cantilever mounted at one end thereof in interlock bracket **52** as shown in FIG. 2. A wire, latch release spring **112** connected at one end to the vertical leg of the latch release and wrapped around the shaft **110** and positioned under the member **98** as shown in FIG. 3 causes the latch release **90** to be constantly biased so that the horizontal leg thereof tends to extend into the path traversed by shaft **80**.

Thus, the latch release **90** also can assume two positions the first of which corresponds to that shown in FIG. 3 where the latch release finger **104** is engaged in the groove **102** to thereby hold the latch in its second or non-latching position. The latch **68** will be held in the position shown in FIG. 3 even though one of the racks is removed from the zero digit wheel position, which action as described hereinbefore tends to move the latch to its latching position. However, the latch release finger **104** will be disengaged from the groove **102** of portion **100** whenever the shaft **80** engages inclined surface **108** and forces the latch release **90** to assume its second or retracted position which in turn lifts finger **104** to thereby permit latch **68** to rotate forwardly into its latching position, assuming of course, that a counterclockwise moment is being applied to latch **68** because at least one of the racks **34***a*–**34***f* has been moved from the zero digit wheel position.

Having now described in detail the structure of a preferred embodiment of the invention, the operation thereof will now be discussed. Assume that the print head **70** is at the initial starting position. Prior to the imprinting operation, the operator usually places a credit card or the like on a printing anvil, the card acting as a source of constant or fixed data. Next, he moves the racks to set in the printing bed variable information such as the amount of a sales transaction. As stated hereinbefore the translational movement of any of the racks **34***a* through **34***f* results in a tendency for the latch **68** to move to its latching position in the path traveled by the shaft **80**, see FIG. 5. This force applied to the latch **68** results because of the engagement of the inclined surface **40** of the actuating rack against the inclined surface **42** of the interlock glide **44** which causes the bale **46** to move downwardly against the tension of bale spring **54**, the bale being held in this downward position as long

as any one of the racks is moved from the digit wheel position. As stated hereinbefore, the inclination of the surface **40** with the vertical is preferably approximately 30 degrees. It has been determined that this approximate inclination produces a downward force on the bale **46** of sufficient strength so as to insure the movement of the latch **68** to its latching position when it is released by latch release **90**. With the downward movement of the horizontal leg of bale **46**, the flanged portion **58** at the end of the vertical leg **56** moves upwardly as indicated in FIG. 2 to force compression spring **64** against the horizontal leg of connecting link **60**. Since the horizontal leg is connected into connecting arm **66** which in turn is connected to the vertical leg of latch **68** via portion **67** (see FIGS. 4 and 5) a force is applied to latch **68** tending to move it to its latching position.

However, latch release **90** will be in the position shown in FIG. 3 whenever the printing head is at the initial position and thus the mere movement of the racks to set the variable data in the printing bed will not cause the latch to be moved to its latching position. After the constant and variable data sources have been set in the printing bed, the first cycle of the imprinting operation commences and the head **70** is moved over the printing bed. The shaft **80** connected to the print head will not engage the latch **68** because the latch is in its retracted position; however, it does engage the inclined surface **108** of latch release **90** to thereby rotate latch release **90** clockwise as shown in FIG. 3 which in turn lifts finger **104** from groove **102** to thereby permit the movement of latch **68** to its latching position under the force of compression spring **64**.

On the return cycle of the print head, the shaft **80** connected to the head will engage first the inclined surface **106** of latch release **90** thereby retracting the release slightly. As soon as the shaft **80** passes the apex of release **90**, the release will spring forward under the control of spring **112**. The shaft **80** will next engage the inclined surface **92** of latch **68** and the latch will be slightly retracted as the shaft passes by the latch. However, the inclination of surface **92** and the outermost projection of the latch **68** is such that the amount of retraction will be less than that required for groove **102** to engage the latch release finger **104** of latch release **90**. Thus, after the print head **70** has been returned to its initial starting position, the latch **68** will be in the position shown in FIG. 5 to thereby prevent any further imprinting operation.

To effectuate the next imprinting operation, all of the racks **34*a*–34*f*** must be returned to the zero digit wheel position. Thus, it can be seen that the herein described interlock effectively prevents the imprinter operator from performing another imprinting operation which would duplicate the prior imprinting operation. With the return of all of the racks to the zero digit wheel position, the latch **68** is returned to its non-latching position. This follows since all of the racks assume the position shown in FIG. 6 thereby permitting the horizontal leg of bale **46** to rotate upwardly around the bale shaft **48**, which in turn causes flange portion **58** to move downwardly thereby pulling the connecting link **60** and the connecting arm **66** also downwardly to thereby retract latch **68** to its non-latching position, the latch being rotated about shaft **94**. With all racks returned to the zero digit wheel position, the imprinting operation can once again be performed and the steps described again will once again occur.

Thus, it can now be seen that the aforedescribed illustrative embodiment of the invention effectuates the objects and advantages claimed herein. In partciular, an interlock assembly is described which effectively and economically prevents the duplication of variable data set into the print bed of an imprinter unless all digit or print element setting means are returned to the zero digit wheel or print element position between each imprinting operation.

Numerous modifications of the invention will become apparent to one of ordinary skill in the art upon reading the foregoing disclosure. During such a reading it will be evident that this invention provides a unique interlock assembly for accomplishing the objects and advantages herein stated. Still other objects and advantages and even further modifications will become apparent from this disclosure. It is to be understood, however, that the foregoing disclosure is to be considered exemplary and not limitative, the scope of the invention being defined by the following claims.

What is claimed is:

**1.** An imprinting device comprising:

a print bed;

movable print elements positioned in said bed, all of said print elements including a common reference position;

means for setting said movable print elements in said bed;

a print head having a projecting member connected thereto and including a roller platen movable over said print bed in a first direction from a start position to effectuate an imprinting cycle and movable in the direction opposite said first direction to said start position during a return cycle of the imprinting operation;

movable latch means removably disposed in the path traveled by said projecting member for preventing the movement of the print head over the print bed when said latch means is in its latching posititon, said movable latch means permitting the passage of said printing head when retracted to its non-latching position;

latch release means removably disposed in the path traveled by said print head for holding said movable latch means in its non-latching position when said latch release means is in a first position, the holding action of said latch release means on said movable latch means being removed when said latch release means is moved to a second position;

first biasing means for normally biasing said latch release means in said first position;

first actuating means connected to said movable latch means and responsive to said means for setting the movable print elements;

second biasing means for normally biasing said first actuating means so that said movable latch means is in its non-latching position;

said first actuating means including a third biasing means for biasing said movable latch means toward its latching position against the holding action of said latch release means in response to at least one of said print elements being moved away from said common reference position;

said projecting member engaging said latch release means and moving it to its second position upon movement of said print head from its start position to effectuate an imprinting cycle whereby said latch means is moved to its latching position in response to said third biasing means to thereby prevent said print head from duplicating the said imprinting cycle;

said first actuating means in response to the biasing action of said second biasing means returning said movable latch means to its non-latching position upon the movement of all of the print elements, which were initially moved from said common reference position, back to said common reference position.

**2.** An assembly as in claim **1** where said movable latch means has disposed at the end thereof an inclined surface which permits the passage of said projecting member of said print head during the return cycle of the im-

printer operation even though said latch means is in its latching position.

3. An assembly as in claim 2 where said latch release means includes a latch release finger which is biased in a predetermined direction by said first biasing means connected between said latch release means and a fixed reference point, said movable latch means including a grooved portion which is engaged by said latch release finger when said latch release means is in its first position to thereby maintain the latch means in its non-latching position.

4. An assembly as in claim 2 where said movable latch means is substantially L-shaped, the vertical leg thereof being responsive to said first actuating means.

5. An assembly as in claim 4 where said latch release means has disposed at the end thereof two inclined surfaces of opposite slope to thereby permit the passage of the projecting member connected to said print held during both the imprinting and return cycles of the imprinting operation.

6. An assembly as in claim 1 where said first acutating means includes a U-shaped bale member, the horizontal leg thereof being biased by said second biasing means so as to be in engagement with the means for setting the print elements whenever any of said print elements are moved away from said common reference position.

7. An assembly as in claim 6 where said common reference position corresponds to the zero digit position.



8. An assembly as in claim 7 where one of the vertical legs of said U-shaped bale member has disposed approximately at one end thereof said third biasing means for actuating said movable latch means whereby the movement of one of said print elements away from the zero digit position causes said bale member to rotate thereby moving the said vertical leg thereof against said third biasing means thereby tending to move said movable latch means to its latching posititon as long as said one setting means is removed from said zero position.

9. An assembly as in claim 6 where said projecting member is tapered from the end thereof so that said movable latch means will be engaged by said projecting member at a point substantially removed from the end thereof.


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U.S. Cl. X.R.

101—269, 285