Jan. 7, 1958 N. E. HART ET AL 2,818,801

TYPE POSITIONING MECHANISM

Filed Feb. 13, 1956 3 Sheets-Sheet 1

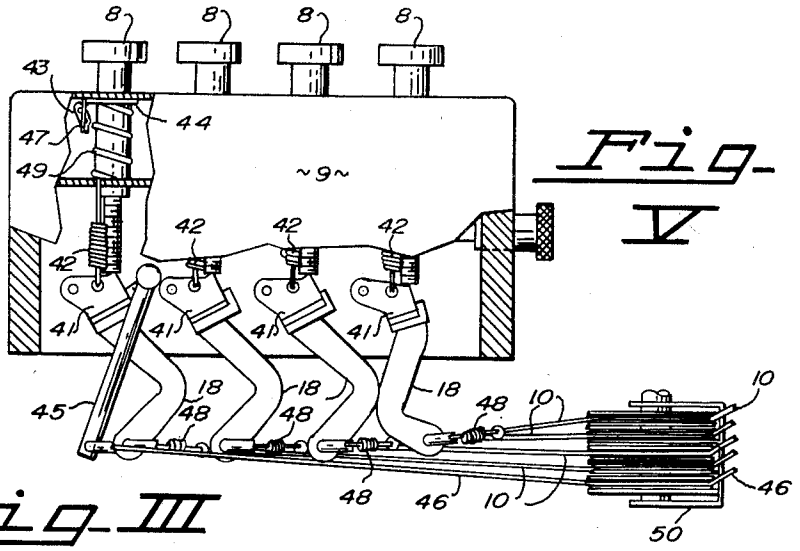

Fig. V

Fig. III

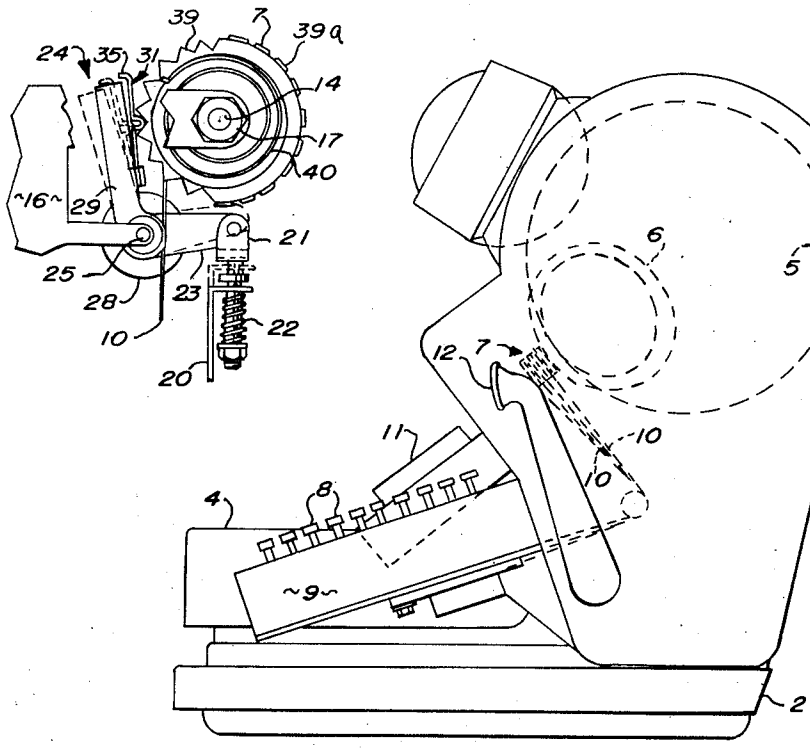

Fig. I

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Fig. IV

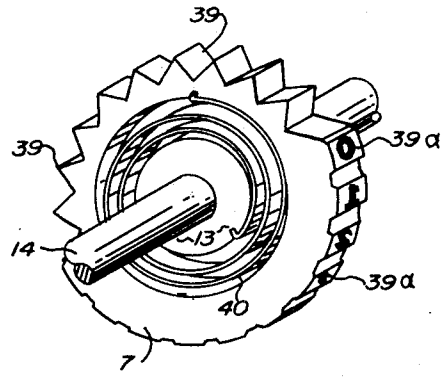
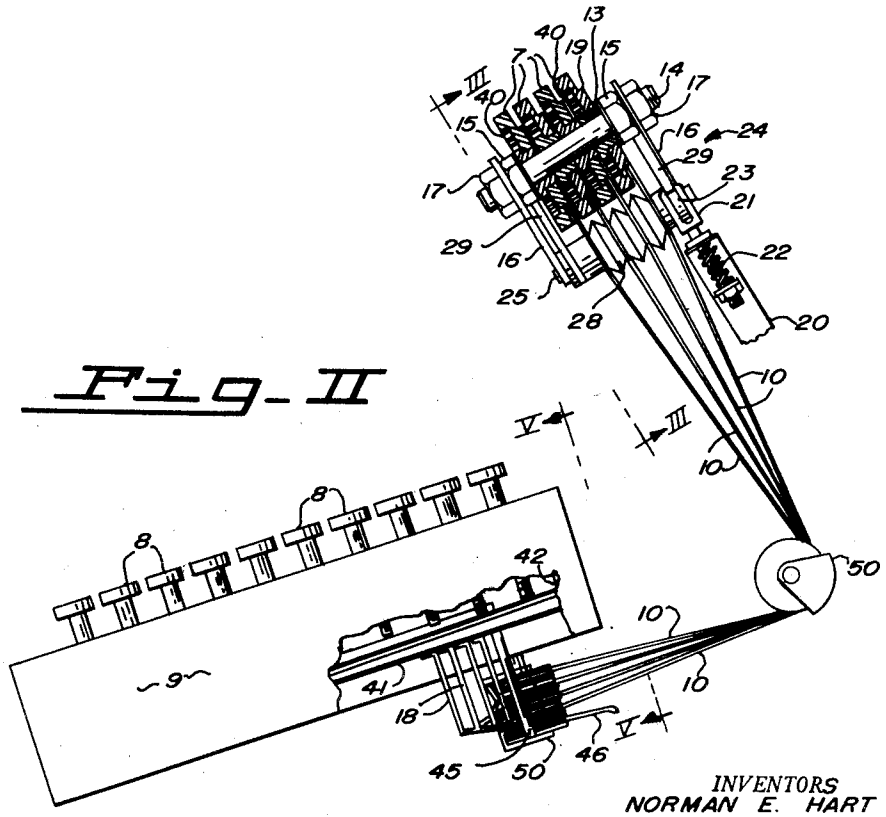


Fig. II



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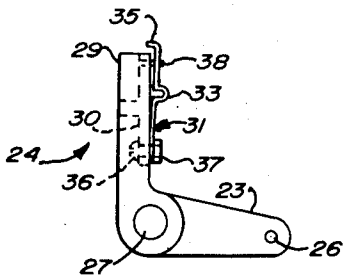

Fig. VI

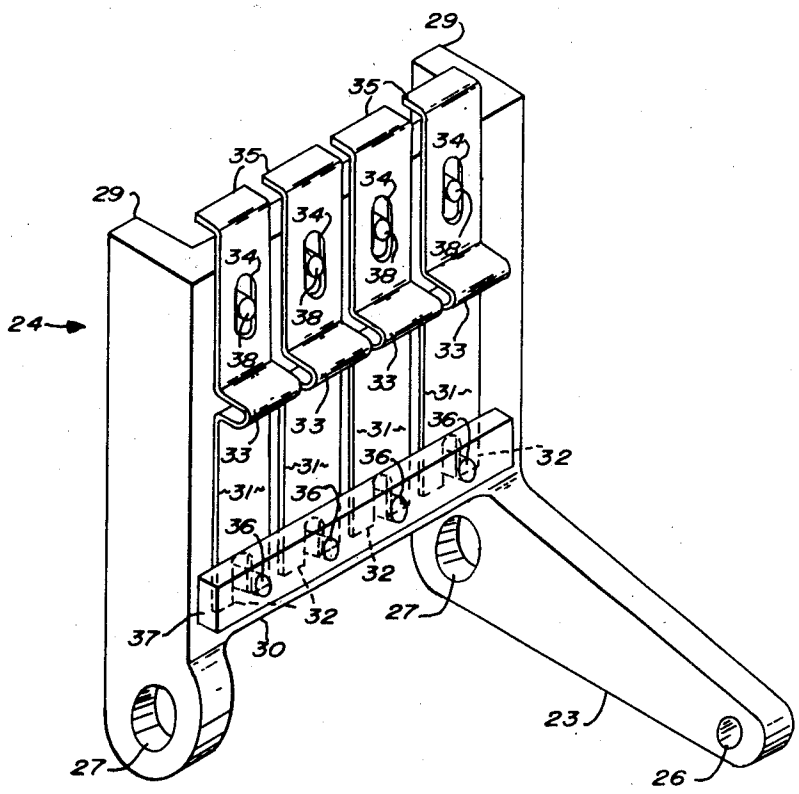

Fig. VII

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TYPE POSITIONING MECHANISM

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Application February 13, 1956, Serial No. 565,052

2 Claims. (Cl. 101—99)

This invention relates to printing devices and in particular to improved mechanism for accurately positioning a plurality of type wheels in a printing station.

Type positioning mechanism for aligning a plurality of type wheels each having a series of raised printing type and a series of notches positioned with respect to the raised printing type has usually included a driven member upon which is mounted a single centering bar that is used to align the notches in the type wheels. When the notches are of different sizes and depths and/or the axes of rotation of the type wheels and of the driven member are not parallel, as may occur in mass production manufacturing, it is impossible for the single centering bar to align the type wheels so that they may print a straight line of numerals. That is, the single centering bar cannot perfectly align the notches on a plurality of type wheels unless the bottoms of a row of equally sized notches extend in a straight line that is parallel to the centering bar.

The principal object of this invention is to provide an improved type positioning mechanism for accurately aligning a plurality of type wheels each having a series of raised printing type and a series of notches positioned with respect to the raised printing type which mechanism includes an individually adjustable pawl, mounted on a common member, for each of the type wheels so that adjustments may be made to compensate for non-parallel axes of rotation of the type wheels and of the type positioning mechanism.

Another object of the invention is to make the individually adjustable pawls of resilient material or to mount the pawls resiliently on the common member so that the pawls may automatically accommodate various sized notches in the type wheels.

Still another object of the invention is to provide means for rotating the type wheels into printing position.

Other objects and advantages will be apparent from the following description in which reference is had to the accompanying drawings.

According to the invention, a plurality of type wheels each having a series of raised printing type and a series of notches positioned with respect to the raised printing type are rotated to approximately set up the type in a printing station. A plurality of individually adjustable pawls, one for each of the type wheels, mounted on a common member are adapted to accurately align the type wheels and also to prevent their movement during the printing operation. The individual adjustment provided for each of the pawls permits each pawl to be positioned relative to every other pawl so that adjustments may be made to compensate for non-parallel axes of rotation of the type wheels and of the member. The pawls may also be made of resilient material and/or they may be resiliently mounted on the member so that they may automatically accommodate various sized notches in the type wheels.

In the drawings:

Figure I is a view in side elevation of printing weighing scale embodying the invention.

Figure II is an enlarged view, partly in section, of the keyboard and type wheels shown in Figure I.

Figure III is a fragmentary view taken substantially along line III—III of Figure II.

Figure IV is an oblique view of one of the type wheels illustrating spring means for returning the type wheel to its original position with respect to its axle at the end of a printing cycle.

Figure V is an enlarged view taken substantially along line V—V of Figure II, parts being broken away and parts shown in section.

Figure VI is a detailed view of the type positioning mechanism shown in Figure III.

Figure VII is an enlarged perspective view of the type positioning mechanism shown in Figure VI.

These specific figures and the accompanying description are intended merely to illustrate the invention but not to limit its scope.

A printing weighing scale **1** embodying the invention comprises a base **2** and a housing **3** surmounting a rear portion of the base. A platter **4** is operatively connected to a disk chart **5** by means of automatic load counterbalancing mechanism (not shown) located within the housing **3**. The chart **5**, in response to loads placed upon the platter **4**, moves raised printing characters carried on a marginal area of the chart into a printing station. The raised printing characters on the chart **5** correspond respectively to the weights of various loads placed upon the platter **4**.

A price ring **6** lying in a plane which is angular with respect to the plane of the chart **5** has raised printing characters on a beveled face which characters correspond respectively to selected prices per pound at which articles being weighed on the platter **4** are to be sold.

A plurality of adjacent type wheels **7** lie in parallel planes which are perpendicular to the plane of the chart **5**. Each of the type wheels is individually operable in response to depression of a key **8** mounted on a keyboard **9**. The keys **8** are operatively connected to the type wheels **7** by means of cords **10**, one for each type wheel **7**. The weighing scale has a computing cylinder chart of well known construction (not shown) mounted coaxially with the chart **5**. When the value of an article on the platter **4** computed at a previously set up price is indicated to the operator in the well known manner, he depresses selected ones of the keys **8** to set up the indicated value of the article on the type wheels **7**. An imprint of the weight, price, and value of the article on the platter **4** then may be recorded on a ticket **11**, which upon pivotal movement of a handle **12** moves into juxtaposition with the printing characters on the wheels **7**, price ring **6**, and chart **1** where an imprint may be made upon the ticket **11** by printing mechanism (not shown).

Referring now to Figure II, the type wheels **7** are journaled on bushings **13**, the bushings in turn being sleeved over an axle **14**. The axle **14** is threaded at both ends to receive a pair of nuts **15** which act to clamp the bushings together on the axle. The bushings cannot rotate on the axle **14** because of their being clamped by the nuts **15**. Rotation of the wheels **7** is therefore around the bushings. A pair of arms **16** is engaged around the opposite ends of the axle **14** outside the nuts **15**. The axle **14** is clamped with respect to the arms **16** by means of nuts **17** on the outer ends of the axle.

Rotation of the type wheels **7** is brought about by depression of the keys **8**, which keys are operatively connected to pivotal arms **18**. Depression of selected keys causes the pivotal arms to pull on the cords **10** which are wrapped more than halfway around hub-like shoulders **19** on the type wheels **7**. Pivotal movement of an arm **18** therefore causes the type wheel operatively connected

to that arm to be rotated to set up in printing position a type character corresponding to the key 8 which was depressed.

Referring to Figure III, a link 20 is adapted to be pulled downwardly when the handle 12 is operated. A stirrup 21 is resiliently connected to the upper end of the link 20 by means of a spring 22. The stirrup 21 is pivotally connected to a radially extending arm 23 of a member or bell crank 24 pivotally mounted on a shaft 25 extending between the arms 16. As shown in detail in Figure VII, the stirrup 21 is pivotally connected in a hole 26 in the arm 23 of the bell crank 24 and the shaft 25 is located in a pair of holes 27 in the bell crank 24. Also carried by the shaft 25 are guides 28 for the cords 10.

The bell crank 24 also includes a pair of arms 29 which are spaced apart by an integrally formed body portion 30 upon which are mounted four spring pawls 31, there being an individual pawl 31 for each of the type wheels 7. Each of the spring pawls 31 has a notched end 32, a type wheel-centering finger 33, a slot 34, and a bent end 35. Screws 36, one for each of the pawls 31, extend through the body portion 30 of the bell crank 24 and through notches in the notched ends 32 of the pawls and are threaded into an elongated nut 37 which is common to all of the screws. The nut 37 presses all of the notched ends 32 of the pawls 31 against the body portion 30 of the bell crank and holds the pawls in place. Pivotal movement of the pawls 31 about the axes of the screws 36 is limited by means of pins 38 that are mounted on the body portion 30 of the bell crank and that protrude through the slots 34 in the pawls. Only the notched ends 32 of the spring pawls 31 are fixed in place so that the bent ends 35 of the pawls are free resiliently to move back and forth toward or away from the body portion 30 of the bell crank 24, the body portion 30 being recessed, as shown in Figure VI, beyond the point where the nut 37 holds the pawls 31 to permit such movement.

When the link 20 is pulled downwardly as the arm 23 of the bell crank 24 is operated (from the position shown in dash lines to the position shown in solid lines in Figure III), the stirrup 21 rocks the arm 23 on the shaft 25 and causes the pair of arms 29 of the bell crank to rock also. When the bell crank 24 is rocked toward the type wheels 7, the fingers 33 on the individual spring pawls 31 engage in certain of a series of notches 39 which extend around approximately one half of the periphery of each of the type wheels. The fingers 33, because of the resiliency of the pawls 31 and because of the manner in which the pawls are mounted, automatically find the bottom of their respective notches to accommodate notches of various sizes, any finger which happens to find a shallow or small notch being bent back toward the recessed body portion 30 of the bell crank 24. The series of notches on each of the type wheels are accurately positioned with respect to raised printing type 39*a* which extend around approximately one half of the periphery of each of the type wheels. The fingers 33 on the pawls align or center the type wheels 7 in their printing positions and prevent movement of the type wheels during the printing operation, which takes place in response to operation of the handle 12, causing the type wheels to print a straight line of numerals even though the notches 39 are of various sizes and depths. Hence, close tolerance in the forming of the notches 39 in the type wheels 7 is not necessary. The spring 22 is provided to prevent damage by pawls to the wheels 7 when the link 20 overtravels.

Each type wheel 7 has a spiral spring 40 enclosed in a recess in the type wheel with one of its ends connected to the bushing 13 and the other end connected to the type wheel. The springs are provided to resiliently urge the wheels toward their original positions to maintain the cords 10 under tension. Thus, except when held by the pawls 31, the wheel positions always correspond with the depressed keys.

Another important feature of the improved type positioning mechanism is the fact that each spring pawl 31 is individually adjustable to accommodate non-parallel axle 14 and shaft 25 axes. Heretofore, an ordinary centering bar could not perfectly align the notches in a plurality of separate wheels unless the bottoms of the notches extended in a straight line that was parallel to the single centering bar. In the present structure, if after assembly in the factory or after servicing in the field, the type wheels 7 do not print a straight line of numerals because of a non-parallel relationship between the axes of the axle 14 and the shaft 25, any one or all of the screws 36 may be slightly loosened and any one or all of the pawls 31 thereafter may be shifted toward or away from the screws 36. The pawls 31 may be manually shifted by grasping their bent ends 35 with a pair of pliers. The exact location of the pawls 31 is determined by trial and error printing until the type wheels 7 print in a straight line.

There is thus provided type positioning mechanism having an individual pawl, mounted on a common member, for each of the type wheels 7 which individual pawl resiliently and automatically finds the bottom of the notch in the wheel mated therewith, thus, automatically compensating for different sizes and depths in the notches in the wheel, and which individual pawl is adjustable relative to every other pawl to accommodate non-parallel axle 14 and shaft 25 axes.

Referring now to Figure V, the keys 8 are arranged on the keyboard 9 in four columns. One column is provided for each type wheel 7. Bars 41 mounted in the keyboard 9 are adapted to be operated by the keys in the column overlying the bar. Depression of a key will pivot its bar on an axis parallel to its length through an arc corresponding to the key selected. The arm 18, fixed to the bar, pulls on the cord 10 connected to the arm and thereby rotates the type wheel on the opposite end of the cord according to the key depressed. The bars 41 are urged toward the keys by means of springs 42. When the keys are depressed, latch bars 43, one for each column of keys, catches a collar 44 on each depressed key to hold them down until a latch releasing arm 45 operatively connected, by means of a cord 46, to printing mechanism which in turn is driven by the handle 12 releases all of the depressed keys. The latch bars 43 are urged toward the keys with which they cooperate by means of springs 47, one for each bar 43.

To prevent damage to the cords 10 should the keys be punched with too much force, a tension spring 48 is inserted between each cord 10 and the corresponding arm 18 so that the sudden impacts will be absorbed by the springs 48. If such springs were not provided and a key was punched too hard, its wheel would spin beyond the selected position. Although it would return to the selected position after having passed it, the overshooting of the wheels could cause damage to the spiral spring 40 and the cords 10.

In operation, when the value of an article on the platter 4 has been determined, proper keys 8 are punched by the operator to set up the type on the wheels 7 so that the value of the article will be printed on the ticket 11 along with the weight and the price at which the article sells. One key in each column is depressed. The depressed keys are held in such depressed positions by the latch bars 43 until the handle 12 is operated and the pawls 31 engage in the notches 39 to align and lock the wheels 7. After the pawls are engaged, the cord 46 operates the latch releasing arm 45 to cause the latch bars 43 to release the collars 44 and return the keys to their non-depressed positions by means of springs 49 around the keys. The wheels remain held in position by the pawls 31 until an imprint of the characters has been made upon the ticket 11. When the latch releasing arm 45 causes the keys 8 to be released, the bars 41 are urged to their original positions by the springs 42. This may cause the arms 18 to create a small amount of slack in

the cords **10**. Shrouds **50** prevent the cords from slipping from the pulleys around which they pass when there is slack in the cords.

When the handle **12** is returned to its original position, the pawls **31** release the wheels **7**, and the spirial springs **40** return the wheels to their original positions. The slack in the cables is taken up when the wheels return to their non-operated positions. An imprint has now been made on the ticket **11** of the weight, price, and value of the article on the platter **4**, and the scale is ready for subsequent operations.

The embodiment of the invention herein shown and described is to be regarded as illustrative only, and it is to be understood that the invention is susceptible to variation, modification, and change within the spirit and scope of the subjoined claims.

Having described the invention, we claim:

1. In a printer, in combination, a plurality of rotatably mounted printing members which are adapted to be selectively positioned, a bell crank mounted to pivot about an axis, a plurality of resilient pawls, a finger on each pawl, means including fasteners for so individually and adjustably mounting the pawls on the bell crank that each pawl is slidable in a plane to locate the fingers relative to said fasteners and radially relative to said axis, means carried by the bell crank for limiting pivotal movement of the pawls about the axes of the fasteners, and means for pivoting the bell crank cyclically, whereby the fingers are moved into cooperative relationship with the printing members to accurately align the printing members during a printing operation.

2. In a printer, in combination, a plurality of pivotally mounted printing members, means for selectively positioning the printing members to approximate printing position, a final type positioning member mounted to pivot about an axis, a plurality of pawls, a finger on each pawl, means for so individually and adjustably mounting the pawls on the final type positioning member that each pawl is slidable in a plane to locate the fingers relative to said mounting means and radially relative to said axis, and means for operating the final type positioning member after the printing members have been positioned approximately, whereby the fingers are moved into cooperative relationship with the printing members to accurately align the printing members for printing.

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