

March 12, 1963

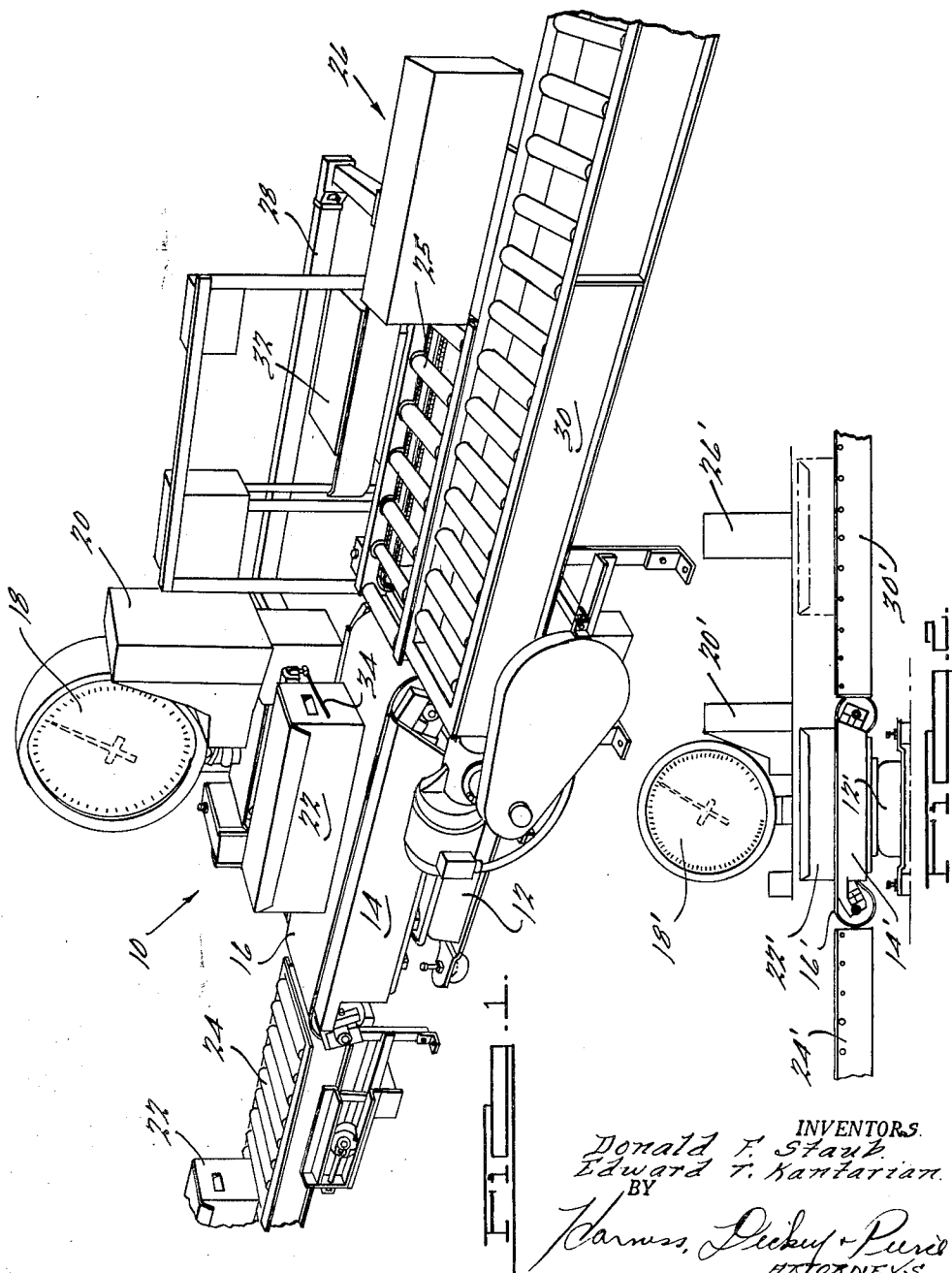
D. F. STAUB ETAL

3,080,813

REMOTELY SET MARKING SYSTEM AND APPARATUS THEREFOR

Filed Nov. 22, 1960

9 Sheets-Sheet 1



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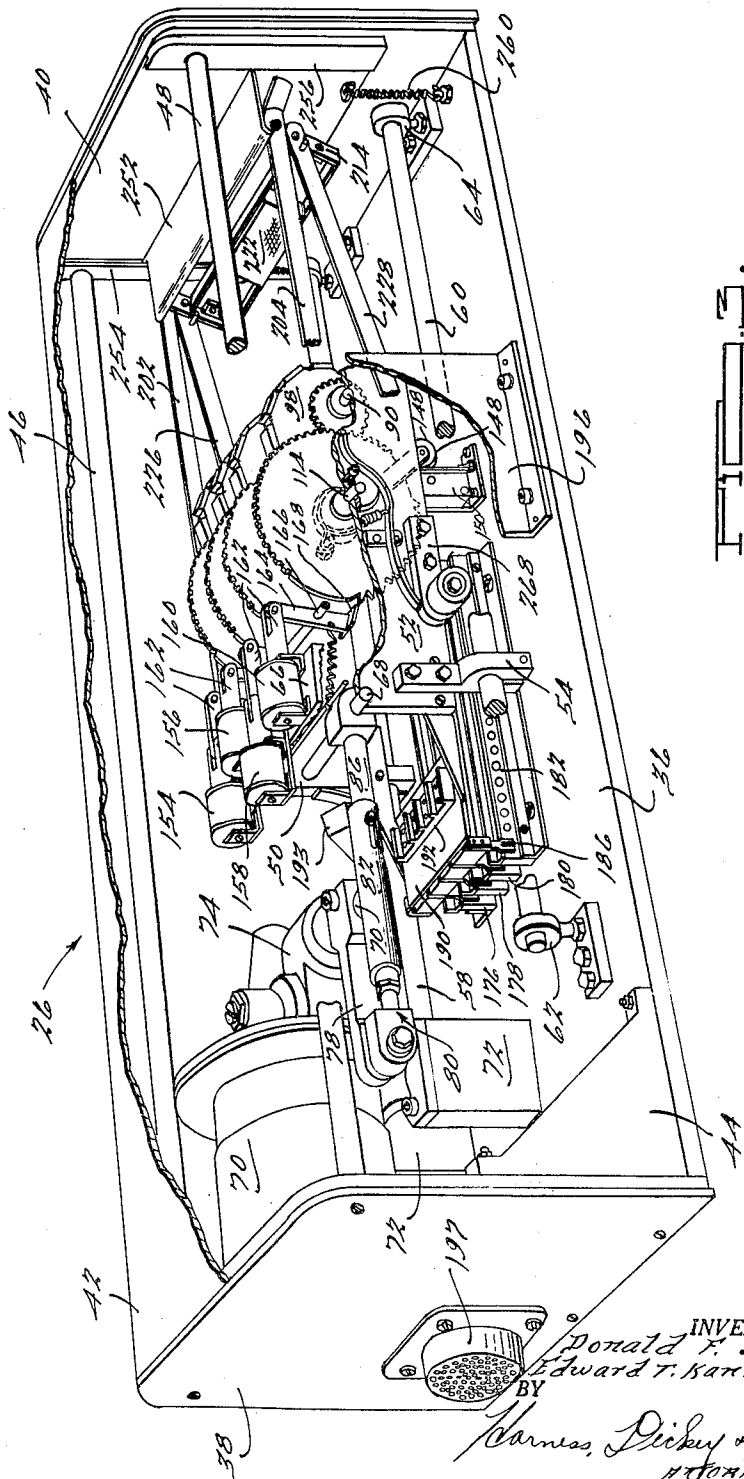
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9 Sheets-Sheet 2



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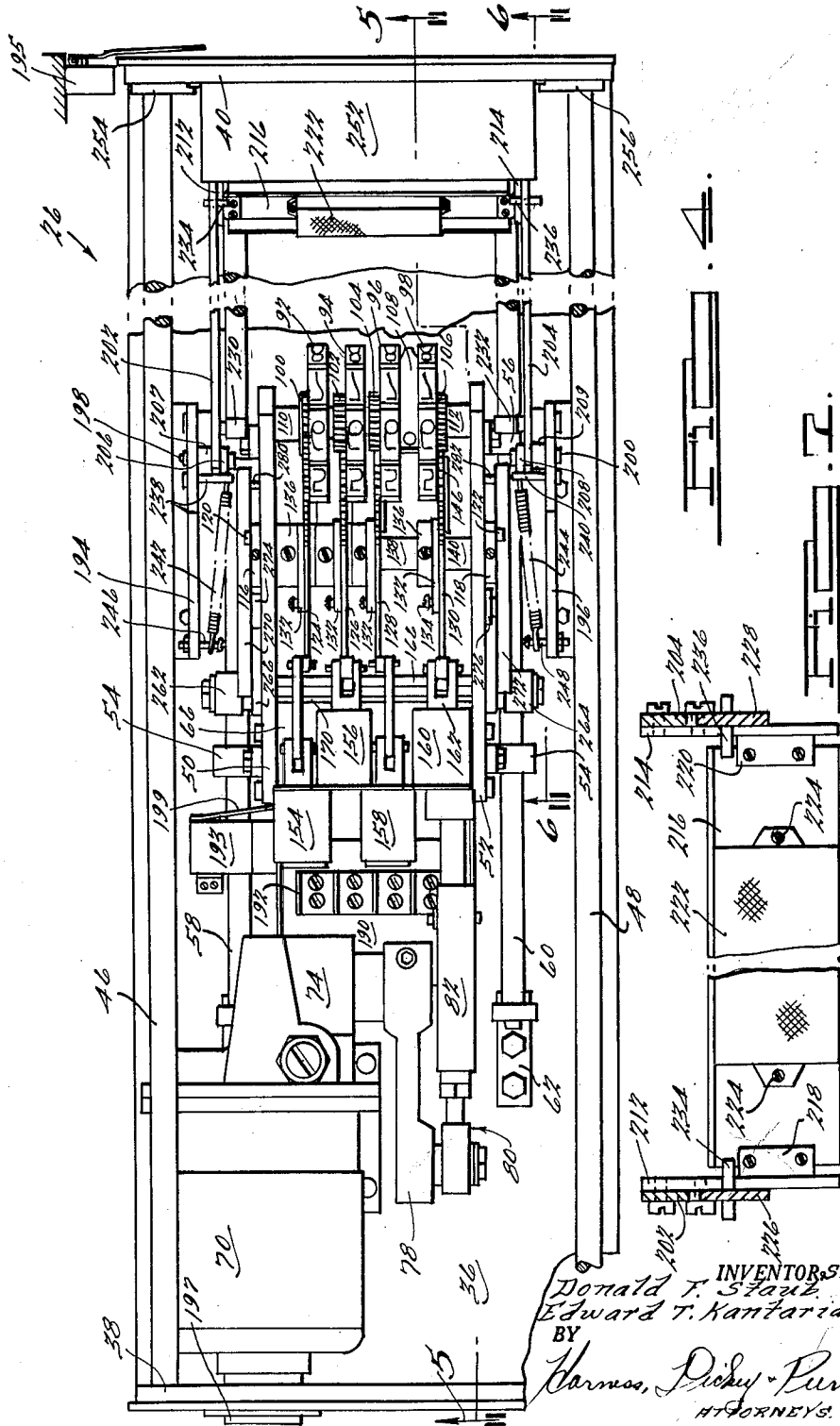
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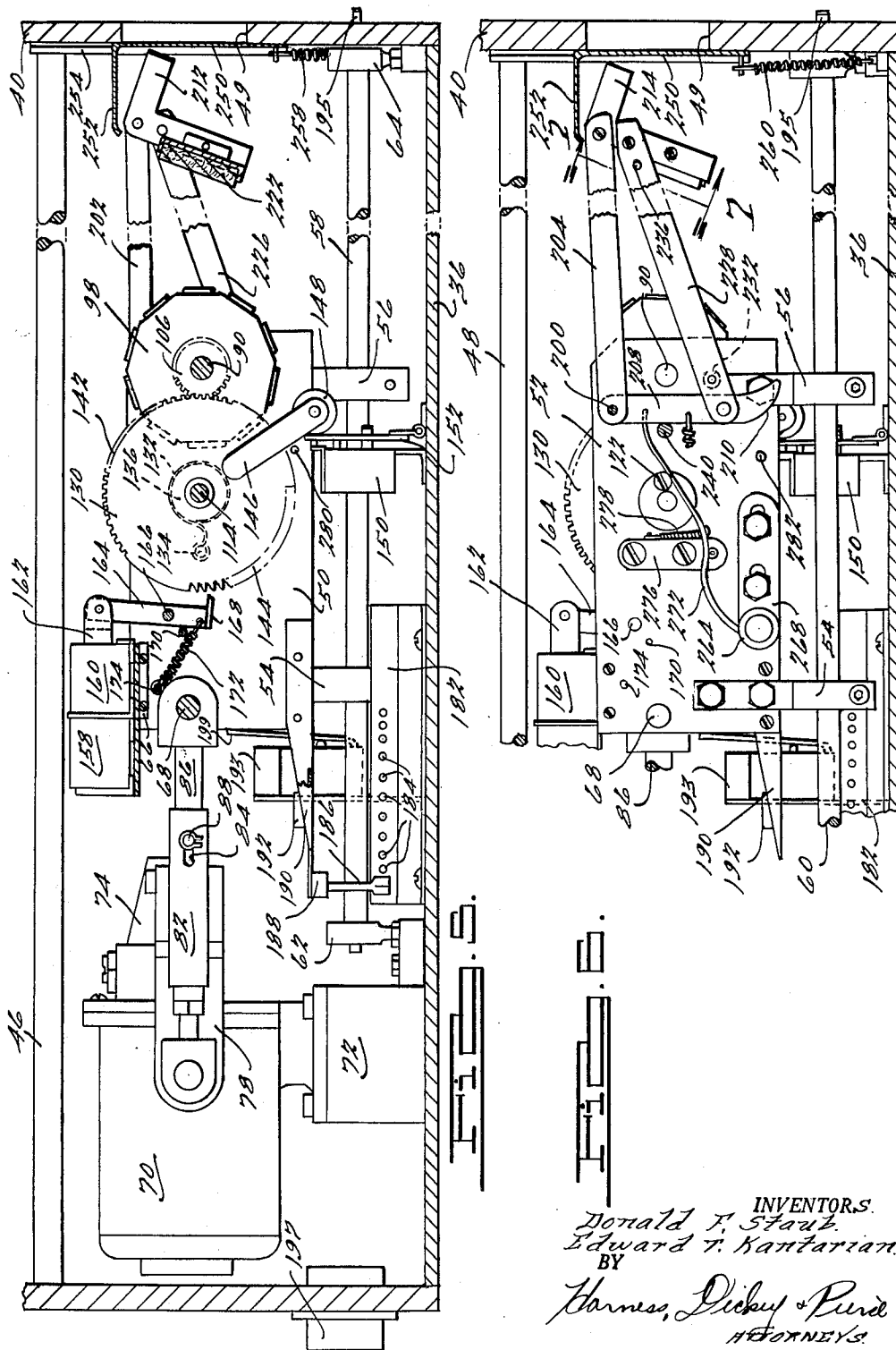
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9 Sheets-Sheet 4



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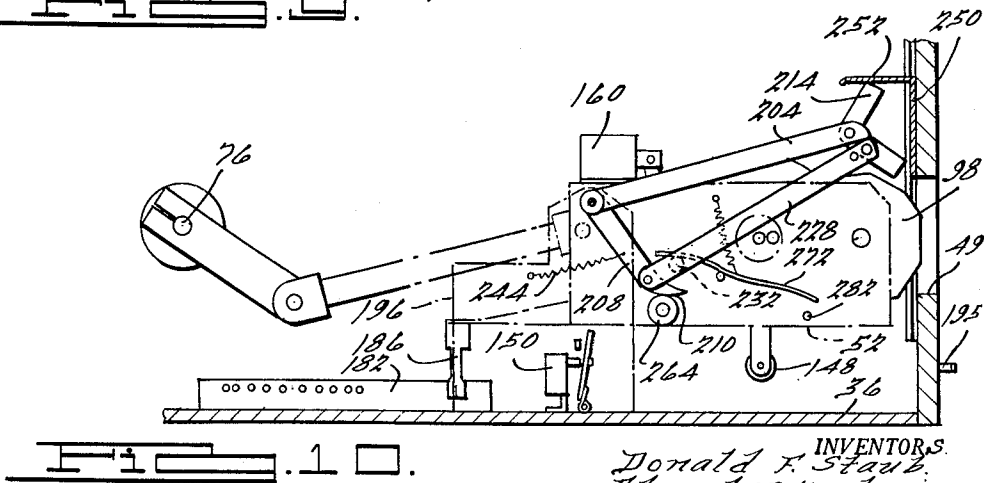
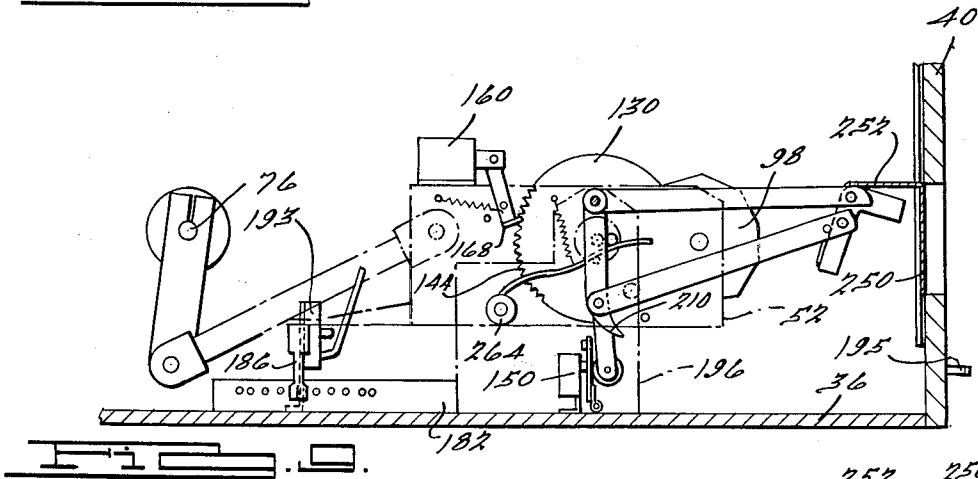
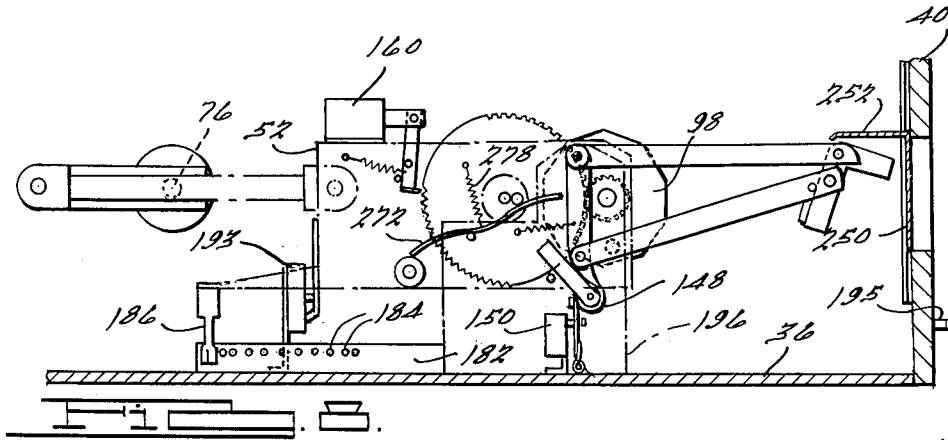
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9 Sheets-Sheet 5



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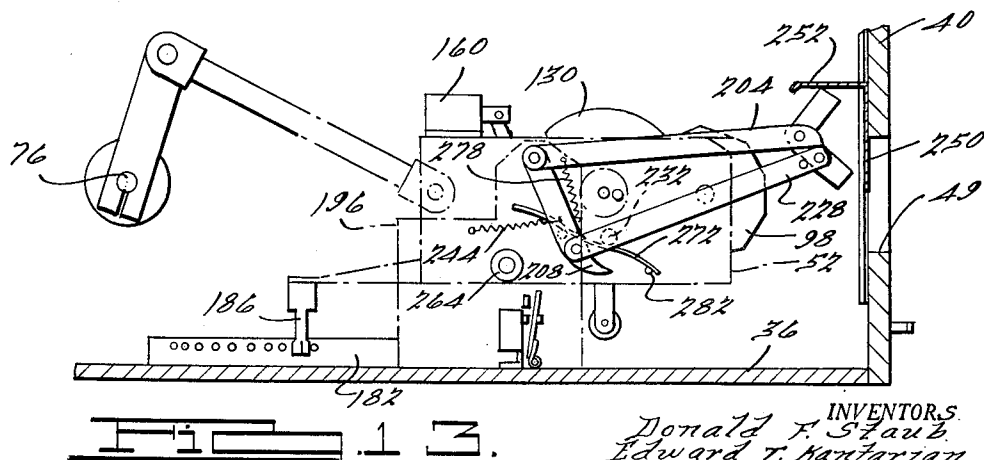
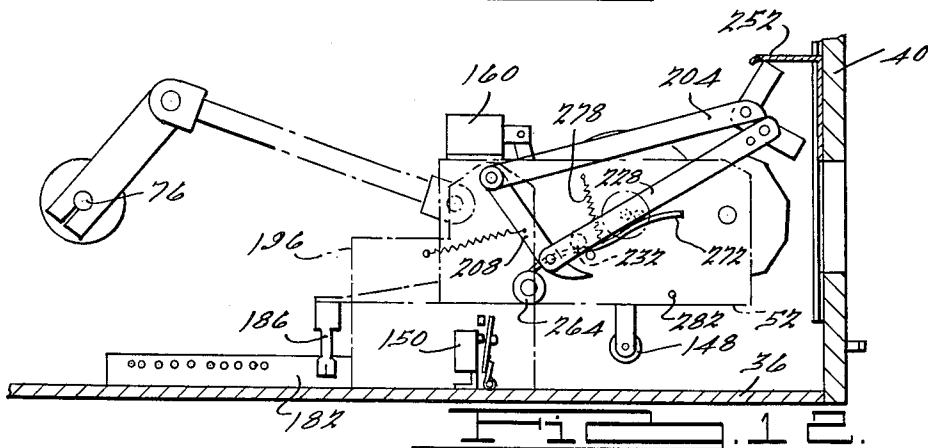
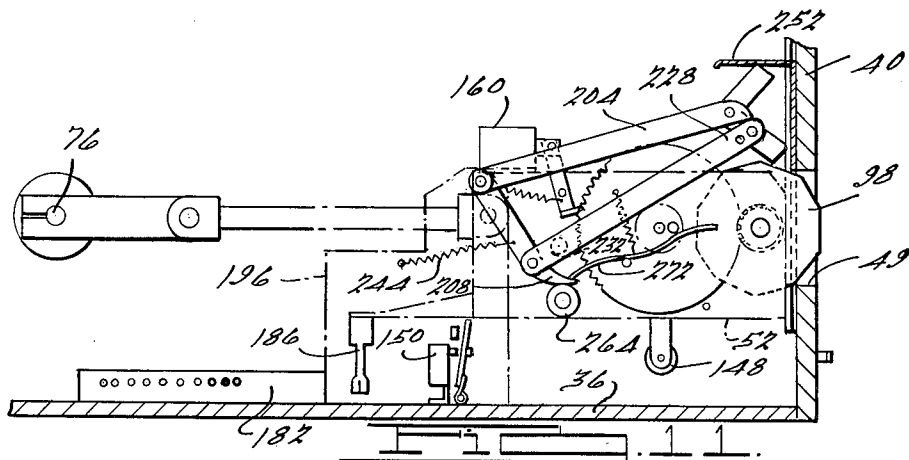
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9 Sheets-Sheet 6



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9 Sheets-Sheet 7

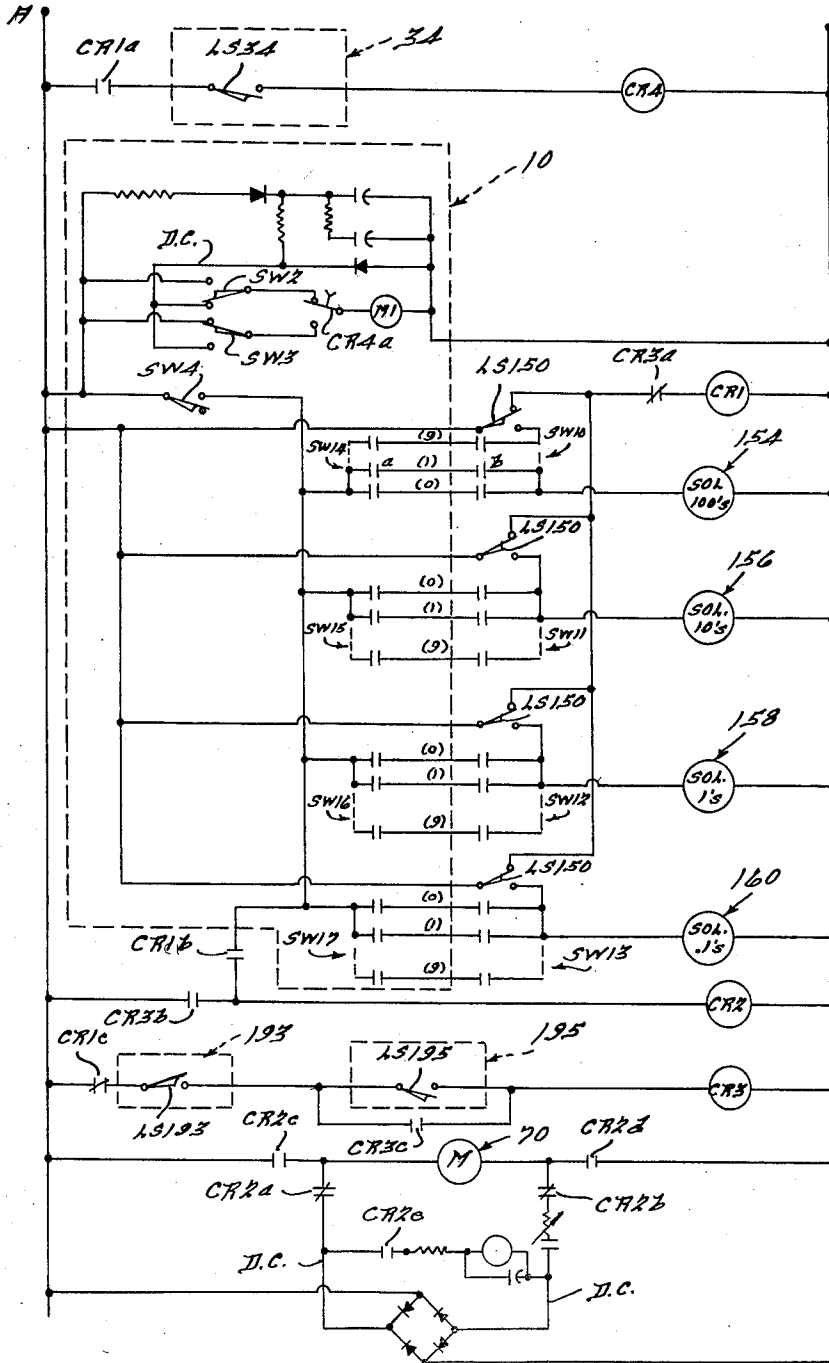


FIG. 14.

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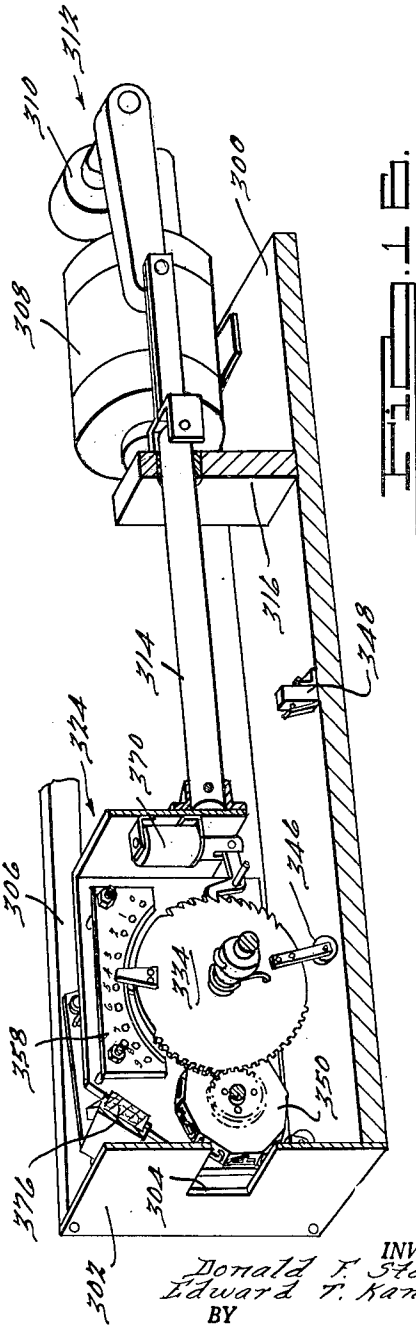
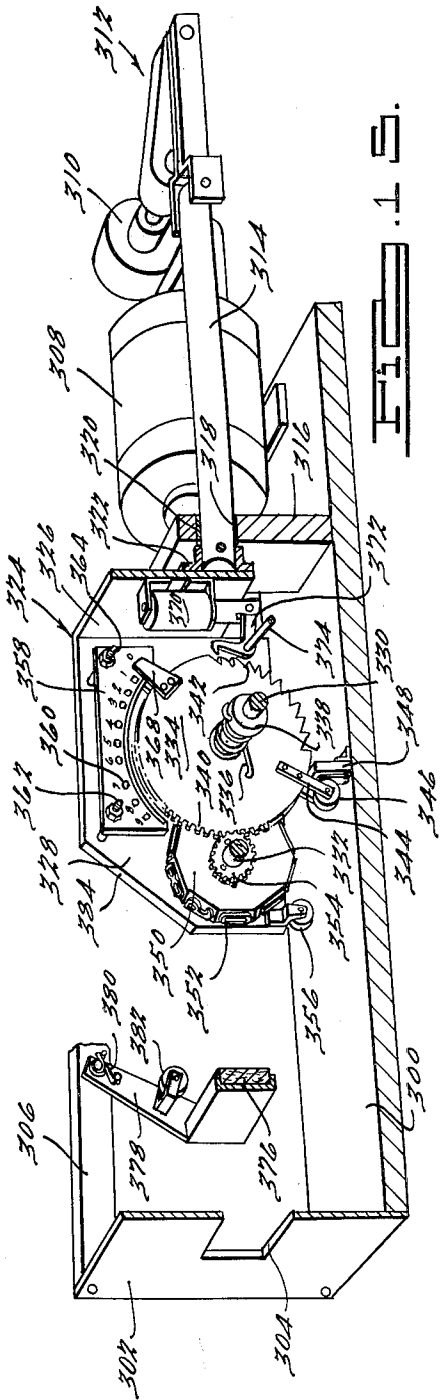
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9 Sheets-Sheet 8



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9 Sheets-Sheet 9

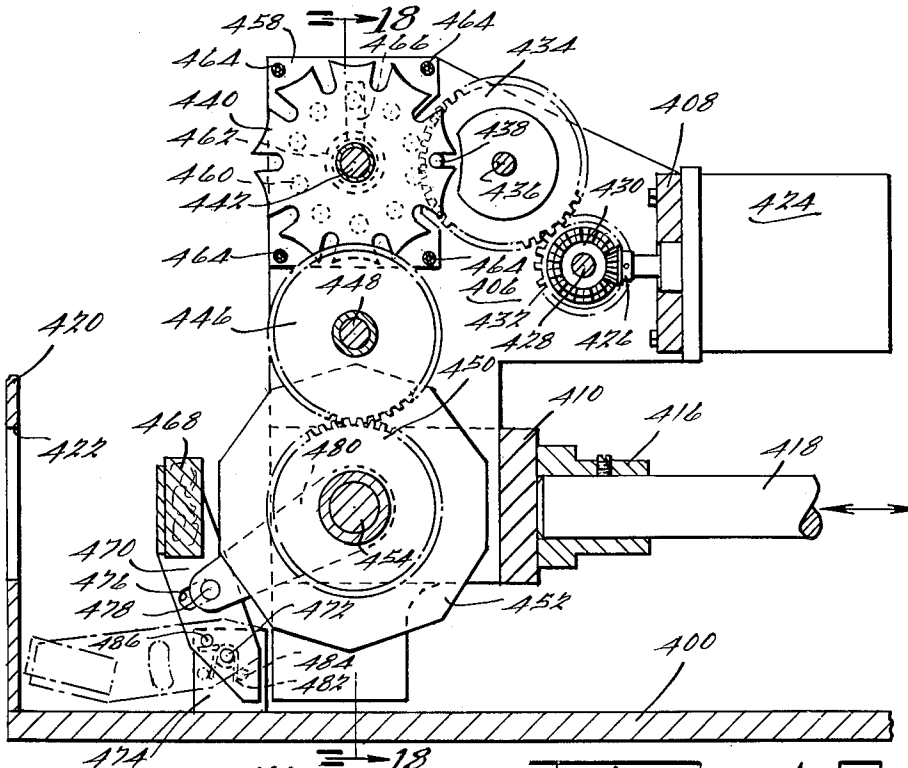


FIG. 17.

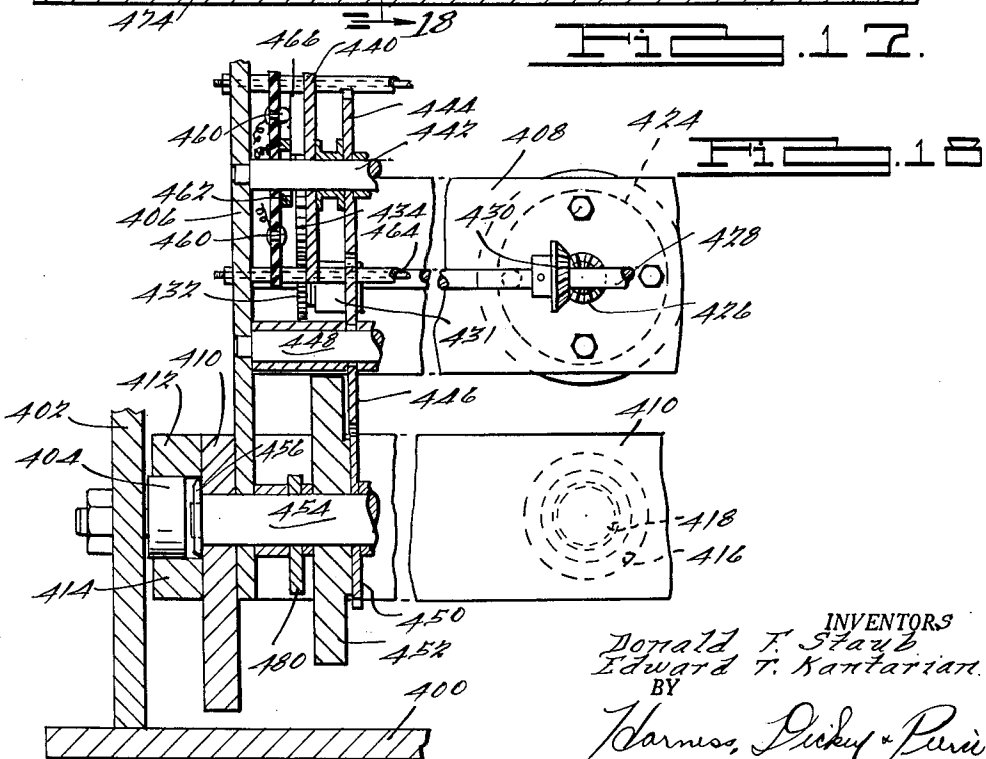


FIG. 18.

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REMOTELY SET MARKING SYSTEM AND APPARATUS THEREFOR

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22 Claims. (Cl. 101-43)

The present invention relates to a unique system for determining characteristics of an article and directly marking upon such article indicia representing the determined characteristics thereof, and in addition, novel remotely set marking apparatus for use in conjunction with this system and forming a part thereof.

This invention, in its broader aspects, is concerned with the provision of a system comprising two remotely located fixed stations, conveyor means for transporting an article to the first station, sensing and recording means at the first station for determining and recording or holding information representing characteristics of an article thereat, conveyor means for transporting this article to the second station, and marking means at the second station for directly marking upon the article indicia representing the information recorded at the first station. As will be apparent, the practical applications of such a system are virtually unlimited in number. For example, the present invention may be embodied in a system for determining the weight of an article and directly marking upon such article indicia, such as printed numbers, representing the weight thereof. The system disclosed herein is directed to just such an application, but is not limited thereto. Instead of weight, other determinable characteristics may be readily accommodated by the present system, such as, for example, height, length, width, volume, color, electrical resistance, electrical capacitance, pressure, temperature, and so on, as will be appreciated.

The present invention is also characterized by the provision of a novel remotely set marking apparatus, several exemplary embodiments of which are disclosed herein. This marking apparatus, while having primary application in the system of the present invention, also has independent utility in any application requiring the use of a marking apparatus capable of being remotely set and operated. Generally speaking, the present apparatus operates in response to information recorded on multiple position electrical switches, independently of the manner in which these switches are set, to directly mark upon an article before it indicia representing such information. In the embodiments disclosed herein such indicia are marked upon an article by printing operations, however, as will be appreciated, other alternate marking operations may be performed, such as, for example, wood burning, etching, embossing, stenciling, and so on.

As noted above, for exemplary purposes the present system and marking apparatus as disclosed herein are embodied in a system for determining and printing upon an article the weight thereof. Insofar as this particular application is concerned, most well known presently available equipment for performing this function does not directly mark indicia upon articles, but uses the intermediary of a paper tape or the like. Thus, these devices print the indicia upon a paper tape which then must be affixed to the article. For obvious reasons, the use of an intermediary such as paper tape greatly complicates the marking procedure, increasing both the costs involved as well as the time required to mark a single article. Furthermore, most known equipment is relatively complex in design and in most cases is rather large and bulky. In addition, the flexibility of these devices is extremely limited since they are designed for the single purpose of marking indicia only upon a paper tape or the like, and not directly upon various types and sizes of articles.

2

With regard to equipment which is capable of directly marking an article, one very significant disadvantage usually exists. For example, such equipment generally does not include information recording means, and therefore is not capable of remote operation. Therefore, in a weighing application the article must be marked while it is still resting on the delicate platform of the weighing scale. When marking is effected by stamping the article with a rubber stamp or the like, the delicate apparatus within the weighing scale is given a severe jolt during the marking operation, thus greatly reducing the accuracy and operating life thereof. Furthermore, such equipment lacks flexibility in application because the marking must always be done at the weighing scale, and this is often not feasible where awkward types and sizes of articles are being processed.

It is therefore a primary object of the present invention to provide an extremely flexible system for determining characteristics of an article and directly marking thereon indicia representing the determined characteristics thereof, which system is unique in design, comprising in combination with sensing and recording means a novel remotely located marking apparatus operable in response to the information recorded by the recording means to mark an article with indicia representing such information.

Another object of the present invention resides in the provision of a novel marking apparatus of extremely sturdy and compact construction for directly marking upon an article indicia representing information remotely determined and recorded upon multiple position electrical switch means, which apparatus is extremely flexible in the number and type of applications to which it is suited.

Yet another object of the present invention involves the provision of a unique marking apparatus for printing or otherwise marking directly upon an article information determined and recorded at a remote location, which apparatus has an extremely quick response time and is so constructed that it may be mounted in practically any position to directly mark articles of varying sizes, types and shapes.

Yet a further object of this invention relates to the provision of a novel system comprising in combination means defining a fixed sensing station, means for transferring articles to the sensing station, sensing and recording means at the sensing station for determining and recording characteristics of the article thereat, a remotely located marking station, means for transporting an article from the sensing station to the marking station, and means at the marking station for marking upon an article thereat indicia representing the information recorded at the sensing station. A related object resides in the provision of means for locking the sensing and/or recording means until the information sensed and recorded thereby has been transferred to the marking means and used to set the latter for marking such information upon the article whose characteristic is represented thereby, and means for re-setting and releasing the sensing and/or recording means after the marking means has been set.

Another object thereof resides in the provision of a unique system for automatically printing directly upon articles indicia representing the determined characteristics thereof, which system includes a printing apparatus of extremely novel and efficient design. A related object is concerned with the provision of an extremely practical embodiment of such a system for determining and printing upon an article the weight thereof.

It is a further object of this invention to provide a fully automatic printing apparatus of novel construction utilizing a plurality of printing wheels, wherein there are provided unique means for setting and for inking the printing wheels in an extremely fast and efficient manner.

These and other objects of the present invention will be-

come apparent from consideration of the present specification taken in conjunction with the accompanying drawings, in which there are shown several embodiments of the invention by way of example, and wherein:

FIGURE 1 is a perspective view of a weighing system embodying the principles of the present invention;

FIGURE 2 is a front elevational view of a slightly modified weighing system embodying the principles of this invention;

FIGURE 3 is a perspective view partly in section of a first embodiment of a remotely set marking apparatus embodying the principles of the present invention;

FIGURE 4 is a top plan view of the embodiment shown in FIGURE 3, with the cover removed;

FIGURE 5 is a longitudinal sectional view taken substantially along line 5—5 in FIGURE 4;

FIGURE 6 is a fragmentary longitudinal sectional view taken substantially along line 6—6 in FIGURE 4;

FIGURE 7 is a fragmentary transverse sectional view taken substantially along line 7—7 in FIGURE 6;

FIGURES 8 through 13 are diagrammatic views illustrating the sequence of operation of the first embodiment;

FIGURE 14 is a schematic wiring diagram illustrating one type of electrical circuit which may be utilized in a system of the present invention;

FIGURES 15 and 16 are diagrammatic perspective views partly in section of a second embodiment of a remotely set marking apparatus embodying the principles of the present invention, illustrating the structure and sequence of operation thereof;

FIGURE 17 is a diagrammatic longitudinal sectional view of the essential structure of a third embodiment of a remotely set marking apparatus constructed according to the principles of the present invention; and

FIGURE 18 is a fragmentary transverse sectional view taken substantially along line 18—18 in FIGURE 17.

Referring to the drawings, FIGURES 1 and 2 illustrate two practical embodiments of the system of the present invention. It is the basic function of these embodiments to determine the weight of successively presented filled cartons or containers, and then to directly print upon each container the weight thereof. One specific application of such a system would be in a meat packing plant, wherein cartons filled with different types and/or weights of meat must be weighed and properly marked with such weight for determining the selling price of each carton, and the like. Of course, it will be appreciated that there exist many other similar applications for which the present system would be readily adapted.

Referring to FIGURE 1, there is illustrated a conventional weighing scale 10 comprising a base 12 having suspended thereon a weighing platform 14 across which a conveyor belt 16 travels. Weighing scale 10 is also provided with a visual read-out indicator 18 as well as electrical read-out means 20, the latter being provided with a plurality of multiple position electrical read-out switches adapted to be set to represent the weight of an article on the scale, as will be more fully described hereinafter. The read-out switches are thus used as recording means. A carton or box 22 is shown disposed on the weighing platform 14 of the scale, in a position to be weighed. At one side of the weighing scale 10 there is disposed a suitable conventional conveyor 24, which may be either power driven or gravity operated, for transmitting cartons 22 or the like to the weighing scale. At the opposite side of the weighing scale there is provided a second conveyor 25 of a generally similar type. At the far end of conveyor 25 there is provided in alignment with the weighing scale a remotely set marking apparatus, generally indicated at 26. The marking apparatus 26, in itself, forms a part of the present invention, and three embodiments thereof will be fully described hereinafter. To electrically interconnect the marking apparatus and weighing scale there is provided a suitable conduit 28 through which the required interconnecting circuitry may pass.

On one side of conveyor 25 and parallel thereto there

is provided a further conveyor 30 of ordinary construction adapted to receive cartons or the like pushed transversely from conveyor 25 by means of a suitable ram device 32. While the three conveyors are illustrated as being of the power type, such is not essential, and if desired they may be gravity operated, or even have belts thereon instead of rollers, the particular transporting means utilized in this invention not being limited to any specific conveyor construction.

Generally speaking, the operation of this particular system is as follows. A filled carton 22 will travel along conveyor 24 until it reaches weighing scale 10, whereupon conveyor belt 16 will engage the bottom of the carton to transport it onto the weighing platform 14. When the carton is properly centered upon the weighing platform a limit switch, such as at 34, will be tripped by the carton to stop the movement of the conveyor belt 16. The weighing scale then senses the weight of the filled carton, indicating it usually upon indicator 18 and recording it electrically upon a plurality of multiple position electrical read-out switches forming a part of read-out means 20, as will be more fully described hereinafter. The read-out means 20 will then be locked until marking wheels in the marking apparatus 26 are set, whereupon the carton will be transported off the weighing scale by conveyor belt 16 and into an abutting relationship with the marking apparatus 26 by conveyor 25. While the carton 22 is being so transported, the scale and read-out means may be reset to zero, ready to receive the next carton. The marking apparatus will then mark upon the end of carton 22 the weight thereof, after which the marking apparatus will be reset to zero. The ram device 32 will then push the carton onto the conveyor 30 which will transport it to wherever desired. In the meantime the next carton will have been transported onto the weighing scale to repeat the cycle. This description is, of course, only general at this point, for purposes of introduction, and will be thoroughly amplified hereinafter.

Referring to FIGURE 2, there is illustrated a slightly modified embodiment of the present system. The respective parts of this system which are identical to those in the previous embodiment are indicated by like reference numerals primed. This embodiment differs only in that ram device 32 and conveyor 25 have been omitted and conveyor 30 displaced transversely into longitudinal alignment with conveyor 24 and conveyor belt 16. In addition, the marking apparatus has been mounted above conveyor 30 for marking upon the top of a carton 22, rather than upon the end thereof. Thus, in this embodiment a straight line flow of cartons may be achieved, with a resultant simplification of the material handling apparatus. Alternately, the marking apparatus may be positioned in the same plane as the carton to be marked, for marking upon the sides of the carton rather than the top or end thereof. As will be appreciated, the marking apparatus is so constructed that it may be mounted in any desired position, depending on the size and shape of the article to be marked and the type of material handling apparatus which is used. The operation of the embodiment illustrated in FIGURE 2 is exactly the same as the operation of the embodiment illustrated in FIGURE 1.

In FIGURES 3 through 7 there is illustrated in detail a first embodiment of a marking apparatus 26 forming a part of the present invention. The over-all function of marking apparatus 26 should be apparent in light of the above description of the entire system of the present invention. Broadly speaking, the first embodiment comprises a plurality of printing wheels mounted upon a reciprocating carriage for reciprocation to a position wherein the printing wheels project from one end of the marking apparatus housing to print upon an article thereat whatever information the printing wheels have been set to print. In this embodiment the apparatus is so arranged that the printing wheels are actually set to the proper position by the advancing movement of the carriage on which they are rotatably mounted. This is

achieved basically by allowing the printing wheels to turn while the carriage advances, and then locking each one when it has turned or rotated sufficiently to present the desired indicia to be printed, as will become apparent.

The first embodiment of the present invention comprises a generally rectangular base plate 36 having end walls 38 and 40 extending upwardly therefrom and adapted to receive in flush engagement a cover 42 to define a housing for the marking apparatus. To reinforce the structure there are provided a reinforcing bracket 44, between end wall 38 and base plate 36, and a pair of reinforcing rods 46 and 48 between end walls 38 and 40. Forward end wall 40 is provided with a rectangular opening 49 through which the printing wheels may pass to print indicia upon an article disposed adjacent the outer face of the end wall.

Disposed within the housing is a carriage defined by mounting plates 50 and 52, each having a pair of downwardly extending bearing members 54 and 56 slidably mounted upon supporting rods 58 and 60, respectively, each of which is supported upon base plate 36 by means of a pair of mounting members 62 and 64 at each end thereof. To reinforce the carriage there is provided a horizontal mounting bracket 66 affixed to mounting plates 50 and 52 and extending therebetween at the upper edge thereof. Also disposed between mounting plates 50 and 52 is a driving shaft 68 which may be held in place for rotation by means of a pair of split rings affixed to the outer ends thereof.

At the rearward end of the housing there is provided an electric motor 70, secured to base plate 36 by means of mounting block 72 and provided at one end with a gear reducing drive 74 having projecting therefrom a horizontal drive shaft 76. Rigidly secured to drive shaft 76 is a crank arm 78 having pivotally secured to the outer end thereof a connecting rod 80 including a hollow sleeve 82 having a slot 84 therein. Disposed within sleeve 82 is a compression spring (not shown) and a driving member 86 rigidly secured at its outer end to driving shaft 68. The compression spring within sleeve 82 is maintained in compression by the abutment thereagainst of one end of driving member 86, the latter being provided with a laterally extending pin 88 extending through slot 84 and being held in place by a pair of split rings. As will be appreciated, when electric motor 70 is energized the rotation of crank arm 78 will cause the carriage to reciprocate upon supporting rods 58 and 60. The compression spring within sleeve 82 serves as shock absorbing means so that when the carriage is fully advanced and the printing wheels are urged against a carton, the drive linkage will yield sufficiently to provide the proper force for printing without overstressing any of the parts thereof.

Considering in greater detail the structure associated with the reciprocating carriage, there is rotatably mounted between mounting plates 50 and 52, upon a shaft 90, a plurality of printing wheels 92, 94, 96 and 98. Each of the printing wheels is of polygonal shape in elevation and in this embodiment is provided with 10 flat sides about the circumference thereof, these 10 sides having affixed thereto in consecutive order printing type for printing numerals 0 through 9. The type may be secured to the printing wheels in any suitable manner, preferably by means of a detachable connection so that the replacement of worn out type and substitution of type for different indicia will be readily facilitated. Each of the printing wheels 92 through 98 is provided with a driving gear, 100, 102, 104 and 106 respectively, rigidly secured thereto. The shaft 90 is rigidly secured to mounting plates 50 and 52 in a non-rotatable manner, and the associated driving gears and printing wheels are rotatably mounted thereon. Between driving wheels 96 and 98 is provided a forwardly extending element 108 rigidly secured at one end upon shaft 90 and provided at the outer end thereof with suitable printing type representing a decimal point. This arrangement, is, of course, op-

tional as the decimal point may be provided in any other position on shaft 96 or omitted entirely, depending on the particular application in which the apparatus is to be used. To center the driving gears and printing wheels on shaft 96 there is provided a pair of spacers 110 and 112.

Also disposed between mounting plates 50 and 52 is a second shaft 114 mounted for non-rotating movement by means of collars 116 and 118 which are secured to the opposite ends of shaft 114 by means of set screws and to mounting plates 50 and 52, respectively, by means of machine screws 120 and 122, respectively. Rotatably mounted upon shaft 114 are a plurality of driving wheels 124, 126, 128 and 130. Each of the driving wheels is spring biased in the clockwise direction, as seen in FIGURE 5, by means of a flat coil spring 132, secured at one end to its associated drive wheel by means of a machine screw 134 and at the other end to a collar 136 fixedly mounted on shaft 114 by means of a set screw. Proper spacing of the respective elements on shaft 114 is provided by means of suitable spacers, such as at 138 and 140.

Each of the driving wheels 124 through 130 are identical, and may be best seen in FIGURE 5 wherein driving wheel 130 is clearly illustrated. Each of the driving wheels is provided with a plurality of gear teeth 142 about a portion of the circumference, as shown, these teeth intermeshing with the teeth on the associated driving gear to drive the latter and the printing wheels secured thereto. The toothed portion 142 on each driving wheel should be at least as long in arcuate length as the maximum angular displacement of each driving wheel, as will be more apparent hereinafter. Each driving wheel is also provided with a second toothed portion 144 opposite toothed portion 142, but of substantially the same arcuate length. The teeth on portion 144, are not gear teeth, but are ratchet teeth. Radially projecting from each driving wheel and rigidly secured thereto in any suitable manner is a follower arm 146 having pivotally secured to the outer free end thereof a roller follower 148.

Affixed to base plate 36, by means of screws or the like, are a plurality of limit switches 150, each of which is provided with a trip arm 152 disposed in the plane of rotation of one of the roller followers 148 and adapted to be activated thereby. Thus, as best seen in FIGURE 5, when the carriage is in the fully retracted position each roller follower 148 is urged against its associated limit switch 150 by the torsional force in the clockwise direction of each of the respective coil springs 136. As will be apparent, when the carriage advances the coil springs will continue to maintain the roller followers in contact with the limit switches so that the drive wheels will rotate, to thereby rotate the printing wheels. Similarly, when the carriage is retracted from the advanced position, the engagement of roller followers 148 with their respective limit switches 150 will cause the respective printing wheels to rotate in the opposite direction, to be reset.

In order to lock the driving wheels during the forward advancing movement of the carriage, there are provided a plurality of solenoids 154, 156, 158 and 160, each of which is rigidly secured to mounting bracket 66 in longitudinal alignment with one of the driving wheels. Each of the solenoids is provided with a reciprocating plunger 162 having a bifurcated free end portion for receiving in a pivotal relationship a downwardly extending link 164. Each of the links 164 is pivotally supported upon a transversely extending shaft 166, secured at its outer ends to mounting plates 50 and 52 respectively. At the lower terminal end of each of the links 164 there is provided a pawl 168 adapted to engage the ratchet teeth 144 on the associated driving wheel, to arrest the rotational movement of the latter. Since the solenoids are normally not energized the pawls 168 are normally retracted away from the ratchet teeth on the driving wheels, the retracted position of pawls 168 being limited by a

transversely extending stop member 170 which abuts the rear edge of links 164 in the manner illustrated. To maintain the links and pawls in this retracted position, there are provided a plurality of tension springs 172, one for each link 164, these springs being secured at one end to a link 164 and at the other end to a transversely extending mounting rod 174. Both stop member 170 and mounting rod 174 may be secured at the outer ends thereof to mounting plates 50 and 52 in any suitable manner. As will now be apparent, means are provided for stopping the rotational movement of the printing wheels during the advancing movement of the carriage. This is achieved with respect to printing wheel 98, for example, by energizing solenoid 160 at the point in time during the advancing movement of the carriage when the type representing the indicia to be printed by printing wheel 98 is in the horizontal forwardly projecting position. In other words, the printing wheel is allowed to rotate or index until the proper type is presented for printing, at which time the solenoid is actuated to arrest the rotation or indexing movement to set the printing wheel.

Consideration will now be given to the manner in which the solenoids are activated at the proper time to set the printing wheels. Generally speaking, each solenoid serves to set a single printing wheel so that the proper numeral for printing is displayed, in this embodiment the numeral representing one digit in the number representing the weight of the article being marked, as determined by the weighing scale. Of course, any other type of symbol or indicia may also be printed, if desired. Basically, each solenoid forms part of a series circuit comprising two 10-position switches, one position for each digit of the printing wheel. Each of the 10-position switches has each of its 10 contacts electrically interconnected to the corresponding contact in the other 10-position switch. Thus, the first position contacts in each of the switches are electrically interconnected, the second position contacts are interconnected, the third position contacts are interconnected, and so on. Accordingly, current will flow in a circuit comprising these interconnected switches, only when both switches are set to the same position. For each printing wheel and solenoid there is provided a separate such circuit, and in each such circuit one of the switches is located within the marking apparatus while the other forms part of the read-out means 20, the latter switch being, in effect, a readout switch. Thus, for each digit in the numeral to be printed there is provided a separate such circuit. In operation, the scale operates to set the readout switch to a position which represents the numeral which the corresponding printing wheel should print. Then the carriage within the marking apparatus starts its advancing movement, during which time the corresponding 10-position switch therein scans each of its consecutive 10 contacts as each of the numerals on the associated printing wheel are consecutively presented for printing. When the 10-position switch within the marking apparatus reaches the position which is the same as the position of the corresponding readout switch, the circuit containing the solenoid for the associated printing wheel is closed, thus energizing the solenoid to set the printing wheel to the desired position, with the numeral presented for printing being represented by the position of the associated readout switch. For example, considering the setting of only a single digit, if the weight of the article on the scale was determined to be 9 lbs., then the weighing scale would set the readout switch to the 9th position. The printing wheel would then be rotated through its consecutive positions while at the same time causing the 10-position switch within the marking apparatus to scan its consecutive positions, the circuit being so arranged that when this latter switch reaches its 9th position the circuit will close to cause the solenoid to set the printing wheel, now in a position ready to print the numeral 9. This principle of operation is identical to that of the

second embodiment of the marking apparatus, and is very similar to that of the third embodiment thereof. Of course, any number and kind of indicia may be marked by all of these embodiments.

In the first embodiment, rotation of the printing wheels is effected by the advancing movement of the carriage. Accordingly, the apparatus is so arranged that the advancing movement of the carriage also causes the multiple position switches therein to simultaneously scan their consecutive positions. Thus, there are provided a plurality of multiple contact switch elements 176, 178, 180 and 182, for printing wheels 92 through 98, respectively. Each of the switch elements is formed of a suitable non-conducting material and is rigidly secured to base plate 36 in substantially longitudinal alignment with the printing wheel with which it is associated. Since the apparatus associated with each printing wheel is identical, only that associated with printing wheel 98 will be discussed here. Switch element 182 is provided with a plurality of contacts 184, in this embodiment 10 in number, or one for each numeral on printing wheel 98.

For each switch element there is provided a downwardly extending contact element or brush 186 affixed at its upper end to a block 188 of suitable insulating material secured to a transversely extending bracket 190 supported, by means of suitable screws, between mounting plates 50 and 52. As can be seen, the advancing movement of the carriage will cause brush 186 to scan consecutive contacts 184. In this embodiment, these contacts 184 are so arranged on switch element 182 that brush 186 engages the rearmost contact 184 when numeral 0 is presented for printing, the second from the rearmost contact when numeral 2 is presented, the third from the rearmost contact when numeral 3 is presented, and so on until the brush engages the most forward contact, at which time numeral 9 will be presented for printing. In this regard, it will be observed that the spaces between adjacent contacts 184 are greater toward the center of the row of contacts than they are at the end of the row. This spacing is to compensate for the fact that, because of the manner in which the printing wheels are rotated, there occurs a greater angular displacement of the printing wheels per unit of distance traveled by the carriage at the ends of its stroke than at the center of its stroke, as should be readily apparent. Alternate multiple position switch constructions may, of course, be used. For example, switch elements 176 through 182 may be replaced by a single horizontally disposed flat plate, formed of insulating material and provided with a plurality of longitudinally disposed rows of contacts, one row for each printing wheel. Brushes 186 would then be slightly modified to properly engage these contacts. Such an arrangement would function in exactly the same manner as the one illustrated.

In FIGURES 3 through 7 the wiring of the apparatus has been omitted so that the various details of construction may be more clearly illustrated, however the circuitry required will be discussed in detail hereinafter. To facilitate the actual wiring of brushes 186 with their corresponding solenoids there is provided a terminal bracket 192, mounted on the upper surface of bracket 190. In addition, adjacent the rearward vertical edge of mounting plate 50, there is provided a limit switch 193 secured to base plate 36 by a suitable bracket and provided with a trip arm 199 adapted to engage the rearward vertical edge of the mounting plate. Limit switch 193 is held in an open position when the carriage is in its fully retracted position, and is adapted to close when the carriage starts its forward movement. There is also provided another limit switch 195 adjacent the forward face of end wall 40, which limit switch may be mounted upon any suitable support member. Limit switch 195 is normally open, and is adapted to be closed by the abutment thereagainst of an article or carton to be marked, when the latter is positioned adjacent opening 49. If desired,

limit switch 195 may be mounted within the marking apparatus housing, such as upon base plate 36 with a plunger projecting through a suitably located aperture in end wall 40 to be engaged by an article in a position to be marked. An electrical socket 197 is provided in end wall 38 to provide means for electrically interconnecting the marking apparatus with the remainder of the system.

At this point the general operation of the marking apparatus should be apparent. However, in order that the printing wheels may actually print indicia upon an article or carton there must be provided means for inking the printing wheels, and in this embodiment this inking is achieved in a very unique manner. Thus, there are provided a pair of vertically extending brackets 194 and 196 disposed parallel to and spaced from mounting plates 50 and 52, respectively, and secured to base plate 36 by means of screws or the like. Brackets 194 and 196 have mounted thereon pivot pins 198 and 200 respectively to which are pivotally secured generally horizontally extending links 202 and 204 respectively. There are also pivotally supported upon pivot pins 198 and 200 generally downwardly extending cam links 206 and 208, respectively. Also mounted upon pivot pins 198 and 200 are suitable spacers 207 and 209. Each of the cam links has a cam surface 210 along the rearward lower edge thereof, as best seen in FIGURE 6. Pivotally secured to the outer free ends of links 202 and 204 are inverted L-shaped brackets 212 and 214 respectively, each having a generally horizontally extending leg portion and a depending leg portion. As best seen in FIGURE 7 there is positioned between the depending legs of the two L-shaped brackets a channel-shaped member 216, secured to the L-shaped brackets by means of angle brackets 218 and 220. Detachably secured to the rearward face of channel member 216 is an ink pad 222 of conventional construction. Ink pad 222 may be mounted by means of screws 224 to facilitate convenient removal and replacement when the ink pad becomes worn out. Also pivotally secured to L-shaped brackets 212 and 214 are links 226 and 228 which are pivotally secured at their opposite ends to cam links 206 and 208, respectively. On the inside surface of link 226 there is provided a roller follower 230 and on the inside surface of link 228 there is provided a roller follower 232, for purposes as will become apparent hereinafter. Links 226 and 228 are also provided adjacent their forward ends with stop pins 234 and 236, respectively, adapted to engage the rearward edge of the depending leg of L-shaped brackets 212 and 214, respectively. To limit the downward pivotal movement of the articulated linkage supporting the ink pad, brackets 194 and 196 are provided with stop pins 238 and 240, respectively, adapted to abut the rearward surfaces of cam links 206 and 208, respectively. To urge the cam links into this position there are provided a pair of tension springs 242 and 244 secured at one end to links 206 and 208, respectively, and at the other end to mounting screws 246 and 248, respectively, on brackets 194 and 196, respectively, as best seen in FIGURE 4.

As will be appreciated, FIGURES 3 through 7 illustrate this embodiment in the fully retracted position. Since this is the normal inoperative position of the apparatus, it is desirable that means be provided to keep opening 49 closed to prevent dirt and other undesirable contaminants from passing therethrough when the marking apparatus is not being used, as well as between printing strokes. For this purpose there is provided a closure plate 250 provided with an inwardly extending flange portion 252 at the upper edge thereof and mounted for vertical movement along the rearward face of end wall 40 by means of channel members 254 and 256. As will be more fully described hereinafter, closure plate 250 is raised above opening 49 by the abutment of the horizontally extending legs of the L-shaped brackets 212 and 214 against flange 252 when the ink pad is raised out

of the way. To bias the closure plate 250 and flange 252 downwardly against the L-shaped brackets, there are provided a pair of tension springs 258 and 260, each attached at its lower end to base plate 36 and at its upper end to closure plate 250. As will be appreciated, both springs 258 and 260, and springs 242 and 244 serve to quickly lower the closure plate and ink pad when the carriage is fully retracted. This function is particularly significant when the apparatus is rapidly cycling, to prevent any lost motion in the ink pad articulated linkage arrangement.

This embodiment is provided with a very unique cam arrangement for raising and lowering the ink pad 222. For operating the ink pad during the advancing stroke of the carriage there are provided a pair of roller followers 262 and 264 rotatably mounted upon mounting plates 50 and 52, respectively, by means of adjustable brackets 266 and 268, respectively. Roller followers 262 and 264 are adapted to engage cam surfaces 210 on cam links 206 and 208, respectively, during the advancing movement of the carriage, to raise the ink pad out of the way of the printing wheels after they have been inked thereby. As can be seen, brackets 266 and 268 are mounted for axial adjustment on the carriage so that the raising of the ink pad may be properly timed. The specific manner in which the articulated linkage associated with the ink pad is operated will be more fully described hereinafter.

To prevent wear and tear on the ink pad, as well as on the printing wheels, additional means are provided for lowering the ink pad assembly in such a way that it does not re-ink the printing wheels. To this end, there are provided a pair of identically shaped cam elements 270 and 272, mounted for pivotal movement upon mounting plates 50 and 52, respectively, by means of brackets 274 and 276 respectively, as best seen in FIGURE 6. Cam elements 270 and 272 are spring biased in the counter-clockwise direction, as seen in FIGURE 6, by means of tension springs 278, secured at their lower ends to the respective cam elements and at their upper ends to the respective brackets 274 and 276. The heads of machine screws 120 and 122 serve as stop means to prevent further counter-clockwise rotation of the respective cam elements. To limit the clockwise rotational movement of the cam elements there are provided a pair of stop pins 280 and 282, secured to mounting plates 50 and 52, respectively.

The sequence of operation of this first embodiment may be most easily understood by reference to FIGURES 8 through 13, wherein the apparatus is diagrammatically illustrated in consecutive positions during its normal operating cycle. The description in conjunction with these figures will be limited to the operation of the apparatus from the mechanical standpoint, the necessary circuitry required being more fully described hereinafter. In addition, the operation of only one printing wheel will be considered, to simplify the explanation.

In FIGURE 8 the apparatus is illustrated in the fully retracted position, wherein brush 136 is positioned just beyond the rearmost contact 134, limit switch 193 is held open, solenoid 160 is not energized, cam elements 270 and 272 are in their fully counter-clockwise position, limit switch 150 is held unactivated by roller followers 143, printing wheel 98 is presenting numeral 9 for printing, and the ink pad and the closure plate 250 are in their fully lowered positions.

For purposes of explanation, assume that the weight to be printed by printing wheel 98 is 4 lbs., and that the apparatus has its operating cycle initiated, causing shaft 76 to start rotating in the counter-clockwise direction. As described above, a weight of 4 lbs. will have caused the read-out means 20 of the weighing scale to set the read-out switch in the circuit of printing wheel 98 to its 4th position, so that when the carriage in the marking apparatus has advanced to the point where the brush 136

engages the 4th contact the solenoid will be energized to arrest the rotational movement of the driving wheel to set the printing wheel with the numeral 4 presented for printing. This is the position of the apparatus as indicated in FIGURE 9. As seen in this figure the carriage is still advancing, however, limit switch 193 has been closed, solenoid 160 has been energized by the engagement of brush 186 with the 4th position contact to cause pawl 163 to engage the ratchet toothed portion 144 on driving wheel 130 to arrest the rotational movement of the latter and set printing wheel 98 so that the numeral 4 is presented for printing. Limit switch 150, the ink pad, and the closure plate have not as yet been changed.

The advancing movement of the carriage continues until all of the brushes 186 have traversed all 10 contacts on each of the switch elements 182, at which time all of the printing wheels will be set to the proper position in the same manner as was printing wheel 98. At this point, just prior to inking, the forward movement of the carriage stops with all of the limit switches 150 now in their activated positions and the roller followers 262 and 264 positioned just rearward of cam surfaces 210, the ink pad and closure plate still being in the fully lowered position and the cam elements 270 and 272 still being in their fully counter-clockwise position.

The carriage will remain in this intermediate at-rest position until the limit switch 195 is closed by the abutment thereagainst of an article or carton to be marked. The carriage will then continue its forward advancing movement, and is shown in FIGURE 10 in a position just prior to the end of its stroke. Roller followers 262 and 264 have engaged cam surfaces 210 to raise the ink pad linkage arrangement in the manner illustrated, L-shaped brackets 212 and 214 having been elevated and rotated counter-clockwise to raise closure plate 250 out of the way of opening 49. In addition, roller followers 230 and 232, on links 226 and 228, respectively, have abutted the lower rearward surface of cam elements 270 and 272, respectively, to rotate the latter in the clockwise direction, as shown. During the travel of the carriage from the intermediate at-rest position (whereat all the printing wheels were set) to the position illustrated at FIGURE 10, the printing wheels were advanced into contact with the ink pad 222, whereby they became sufficiently inked for printing an article or carton disposed adjacent end wall 40 in alignment with opening 49. As is apparent from FIGURES 9 and 10, the ink pad 222 rotates in the counter-clockwise direction as it is raised, and this rotating motion greatly assists in the inking operation by virtue of the fact that the ink pad is, in effect, rolled across the printing type on the printing wheels, rather than directly impacted thereagainst.

The carriage then advances to the fully advanced or printing position, as shown in FIGURE 11, wherein the printing wheels are projected through opening 49 so that the numeral indicia thereon may be printed upon a carton disposed against end wall 40 in alignment with the opening 49, or in other words, disposed at the printing station. It should be noted that during the displacement of the carriage from the position indicated in FIGURE 10 to the position indicated in FIGURE 11, the roller followers 230 and 232 have passed all the way beneath cam elements 270 and 272, respectively, to allow the latter to return to their fully counter-clockwise positions. The purpose of this is to get the roller followers in a position wherein they can engage the upper surface of the cam elements during the retracting movement of the carriage.

The printing operation having been completed, the carriage then begins to retract, as shown in FIGURE 12. The ink pad 222 is maintained out of engagement with the printing wheels during their retracting motion, to prevent the re-inking thereof, by the engagement of roller followers 230 and 232 upon the upper surface of cam elements 270 and 272, respectively. Thus, as can be seen,

roller followers 230 and 232 prevent cam links 206 and 208 from remaining in engagement with roller followers 262 and 264, which would cause the undesirable re-inking of the printing wheels.

As the carriage continues to move in the rearward direction roller followers 230 and 232 pass over the pivoting points of cam elements 270 and 272, respectively, causing the latter to pivot in the clockwise direction into abutment with stop pins 280 and 282, respectively. Once the cam elements have so pivoted, the roller followers 230 and 232 assume a downward direction of travel on the cam elements, thus lowering the ink pad 222 and closure plate 250.

The carriage continues its rearward movement until it reaches the fully retracted position, as illustrated in FIGURE 8. In approaching this position first limit switches 150 are deactivated by roller followers 148, at which time the solenoids are de-energized to allow the printing wheels to be reset, and finally when the fully retracted position is reached limit switch 193 is opened. During this last movement coil springs 132 cause all of the printing wheels to be reset to the starting position. In addition, the roller followers 230 and 232 have passed over the forward ends of the cam elements to allow the latter to pivot to their fully counter-clockwise positions, by means of springs 278.

Having described the mechanical sequence of operation of the marking apparatus, attention will now be directed to the sequence of operation of the entire system, particular reference being given to the electrical control circuit thereof, schematically shown in FIGURE 14. Although the present invention is of broader scope, as noted above, the embodiment of the system disclosed herein is directed to a weighing system utilizing any one of a number of commercially available weighing scales of the type having an electrical digital read-out means. As is well known in the art, weighing scales of this type are provided with a plurality of multiple position read-out switches, each switch being adapted to be set to a position corresponding to and representing a single digit of the weight of the article being weighed. Generally speaking, such weighing scales are provided with an electric motor for mechanically setting the read-out switches to represent the weight sensed or determined by the weighing scale. For exemplary purposes the present invention is disclosed in conjunction with a Toledo scale, and accordingly, the circuit disclosed in FIGURE 14 incorporates the circuitry already existing in Toledo scales of this type. As can be seen in FIGURE 14, the circuitry enclosed by the dotted line indicated at 10 is generally the circuitry already existing in this commercially available scale, including its read-out means, and hence in itself forms no part of the present invention.

Considering generally the components shown in FIGURE 14 there are shown limit switch 34, solenoids 154 through 160, limit switches 150, limit switch 193, limit switch 195, and motor 70, all of which components have been described hereinabove. In this embodiment, it will be assumed that the weighing scale has a capacity of 999 lbs., in which case solenoid 154 will control the hundreds digit, solenoid 156 will control the tens digit, solenoid 158 will control the units digit, and solenoid 160 will control the tenth's digit. As described above, switch elements 182 having contacts 184 thereon, in combination with brushes 186 constitute multiple position electrical switches, and for purposes of description will be designated as switches SW10 through SW13, for solenoids 154 through 160, respectively. The multiple position read-out switches disposed within the weighing scale are generally designated at SW14 through SW17 and are electrically interconnected with switches SW10 through SW13, respectively. Each of these eight multiple position switches has at least 10 positions thereon, one for each digit from 0 to 9, and as can be seen, each pair of switches are connected together in the manner described earlier. Accordingly, each conductor connect-

ing one of the contacts of a read-out switch to the corresponding contact of corresponding switch in the marking apparatus will control the value of a single digit, these values being indicated as (0) through (9), some of them being omitted for purposes of clarity. The motor located within the weighing scale and electrical read-out means for setting the readout switches is indicated at M1.

Thus, there is shown in FIGURE 14 a schematic wiring diagram of an exemplary circuit which may be used in the system of the present invention. An analysis of this circuit will be helpful in gaining an understanding of the sequence of the entire system, as well as of the marking apparatus. When it is desired to operate the present system A.C. power is applied across terminals A and B by means of an ordinary on-off switch (not shown), the printer carriage being in its fully retracted position in this time. The power across terminals A and B first causes a control relay CR1 to pull in, thus closing switches CR1a and CR1b and opening switch CR1c. The closing of CR1a then places control relay CR4 under the control of limit switch 34, which limit switch is mounted upon the weighing scale and adapted to be closed when a container is properly positioned upon the weighing platform of the scale. As noted earlier, limit switch 34 also may be used to stop the movement of conveyor belt 16 when a container is properly positioned for weighing. Thus, when a part is transported onto the weighing platform 14 of the weighing scale 10, limit switch 34 will be closed to thereby cause CR4 to pull in, the latter causing switch CR4a to move from the normally held-up position to the down position, to start scale motor M1 by applying power thereacross through switch SW3. The motor M1 is disposed within read-out means 20 on the weighing scale, and is used to set multiple position switches SW14 through SW17 so that they will represent the weight determined by the scale. As the motor begins to rotate it causes switch SW2 to change position and connect itself to the A.C. line instead of the D.C. line as indicated, this having no effect as yet.

As motor M1 rotates it causes the multiple position read-out switches SW14 through SW17 within the read-out means 20 to be set to positions corresponding to and representing the pounds determined by the scale. After these switches are set, switch SW3 is caused to change position to connect the D.C. line to the motor M1, braking it to a stop. As motor M1 stops it trips switch SW4, causing it to close. Switches SW2 and SW3 and SW4 may be tripped by a suitably timed cam arrangement driven by motor M1, these details of construction not forming a part of the present invention but being a well-known part of commercially available weighing scales of the type described.

Since CR1b is already closed, the closing of SW4 serves to energize the multiple position switches SW10 through SW17 and to cause control relay CR2 to pull in, thereby opening switches CR2a and CR2b, and closing switches CR2c, CR2d and CR2e, to start motor 70. The starting of motor 70 starts the advancing movement of the carriage in the marking apparatus to set the printing wheels and to close limit switch 193. Since the motor M1 has already set switches SW14 through SW17 by closing the contacts representing the value of the respective digits, as soon as the corresponding contacts are closed on switches SW10 through SW13 by the advancing movement of the carriage and brushes 186, the respective solenoids will be energized to set the respective printing wheels. For example, assume that the numeral to be printed by printing wheel 92, controlled by solenoid 154, is 1. Motor M1 will set switch SW14 so that the contacts representing the numeral 1, indicated at a, will be closed. Thus, when brush 186 engages the contact 84 which corresponds to the position of printing wheel 92 when the numeral 1 is presented for printing, the con-

tacts indicated at b in FIGURE 14 will be closed, thereby putting power across solenoid 154 to set the printing wheel in that position. Each of the printing wheels are independently set in exactly the same manner. After each printing wheel is set the limit switch 150 associated therewith is tripped by the continued movement of the carriage, thus establishing a hold circuit for each solenoid so that the continued advancing movement of the carriage and brushes 186 will not open the circuit through which power flows to each solenoid. When the last limit switch 150 is tripped CR1 will drop out, thus opening CR1a and causing CR4 to drop out. When CR4 drops out CR4a then connects back to SW2, still connected to A.C. power, so that motor M1 is energized to complete its cycle by resetting switches SW14 through SW17 and returning SW3 to the A.C. line. As this portion of the cycle is completed motor M1 causes SW4 to be opened and SW2 to drop back to the D.C. line to brake motor M1 to a stop.

Since both SW4 and CR1b are now open again, CR2 will drop out, thus disconnecting the A.C. power from motor 70 and applying D.C. across it to brake it to a stop. At this point the printing apparatus is in its fully set intermediate at-rest position just prior to inking. This position, as discussed above, is intermediate of the positions illustrated in FIGURES 9 and 10. In addition, the weighing scale and the read-out means are fully reset. Note, however, that they are not reset until all the printing wheels are set, they being in a locked position up to that point.

Since the marking apparatus is set very rapidly, the time consumed by the cycle to this point is just slightly longer than the time it took the weighing scale to determine the weight of the article or carton thereon. The carton to be printed is then transported from the weighing platform of the weighing scale to the marking station at the marking apparatus, thus releasing and opening limit switch 34. When the carton to be printed abuts the forward face of end wall 40 of the marking apparatus it trips and closes limit switch 195. Since CR1c and limit switch 195 are now closed, control relay CR3 is caused to pull in, thereby opening switch CR3a and closing switches CR3b and CR3c, the latter acting as a hold circuit to keep CR3 energized when limit switch 195 is open again, i.e. when the printed carton is transported away from the marking station. The closing of CR3b causes CR2 to pull in and thereby restart motor 70. The printer carriage then resumes its forward motion, inks the printing wheels, prints on the carton presented at opening 49 indicia representing the weight thereof, and then, by virtue of the crank action, starts its return stroke. As the carriage moves in the rearward direction roller followers 148 trip their respective limit switches 150 thus de-energizing the respective solenoids. The tripping of limit switches 150, however, does not cause CR1 to be pulled in because it is locked out by CR3a, which is now open. The carriage continues its rearward movement until it strikes and opens limit switch 193, in the fully retracted position. The opening of limit switch 193 causes CR3 to drop out, in turn causing CR2 to drop out. The dropping out of CR2 disconnects the A.C. from motor 70 and applies D.C. thereacross to brake it to a stop. The dropping out of CR3 also unlocks CR1, thereby causing it to pull in and reset the circuitry for the next weigh and print cycle. When the printed container is transported away from the marking apparatus, limit switch 195 is again opened. At this point the entire system is fully reset and ready to repeat its cycle upon the closing of limit switch 34 on the scale.

As noted above, the circuitry is described solely for exemplary purposes, to show how the system of the present invention might be applied in conjunction with a Toledo scale, and particularly with the internal circuit therein. However, the marking apparatus of this invention is of much broader scope, and as will be appreciated,

15

is adapted to operate in response to a plurality of multiple position switches, regardless of the manner in which these switches are set. For example, the present apparatus could be controlled by a manually operated controller having therein at least a single multiple position switch, although in most applications a plurality of such switches would be used, one for each marking wheel. In such an application, the operator of the controller would set the respective switches to any of the positions desired, thus causing the remotely located marking apparatus to mark an article with indicia representing the information the operator set the switches to represent. Other applications will, of course, be apparent to those familiar with the art.

A second embodiment of the marking apparatus of the present invention is diagrammatically illustrated in FIGURES 15 and 16. This embodiment is generally similar in principle of operation to the above described first embodiment and thus is described and illustrated only diagrammatically. In the drawings there is illustrated, for purposes of clarity, only the apparatus necessary to set and operate a single printing wheel, it being apparent that any number of printing wheels may be provided for by simply an obvious duplication of parts. Thus, there is illustrated a base plate 300 provided at the forward end thereof with an upwardly extending end wall 302 having an aperture 304 therein. A portion of one of the longitudinal supporting members 306 is illustrated, attached to the rearward face of end wall 302. At the opposite end of base plate 300 and secured thereto is an electric motor 308 having a suitable gear reduction unit 310 for driving a crank assembly, generally indicated at 312, to which is pivotally secured a connecting rod 314. If desired, connecting rod 314 may be provided with suitable shock absorbing means to perform the function of the telescopic connecting rod arrangement of the first embodiment. Intermediate the ends of base plate 300 there is provided an upwardly extending transverse partition 316 having therein an opening 318 in which is disposed a bearing bushing 320 for slidably receiving connecting rod 314 for reciprocal movement.

Rigidly secured to the free end of connecting rod 314, as by means of connecting member 322, is a carriage 324. Carriage 324 is provided with an end wall 326 and side walls 328, only one of which is shown. Between side walls 328 there extend shafts 330 and 332, both of which are mounted in a non-rotatable manner to the side walls. Rotatably supported on shaft 330 is a driving wheel 334 having attached thereto a coil torsion spring 336, which is at its other end is secured to a non-rotatable collar 338 on shaft 330. Spring 336 serves to urge the driving wheel 334 in a counter-clockwise direction as seen in FIGURES 15 and 16. Driving wheel 334 is very similar in construction to the driving wheels of the first embodiment, and is provided with a gear toothed portion 340, a ratchet toothed portion 342, and a downwardly extending radial arm 344, at the lower end of which is pivotally secured a roller follower 346 adapted to engage a limit switch 348 on base plate 300. Rotatably secured to shaft 332 is a printing wheel 350 having thereon about the periphery thereof type 352 for printing a plurality of indicia. Fixedly secured to printing wheel 350 is a gear 354 which meshes with the gear toothed portion 340 on driving wheel 334. The forward lower edges of side walls 328 are provided with roller members 356 which ride on the upper surface of base plate 300 to facilitate the longitudinal movement of carriage 324.

As can be seen, rotation of the crank assembly 312 by motor 308 will cause carriage 324 to move forwardly longitudinally along base plate 300 until the forwardly facing type 352 on printing wheel 350 is projected through opening 304 to print upon an article thereat, at which time continued rotation of the crank assembly will cause carriage 324 to return to the fully retracted position, il-

16

lustrated in FIGURE 15. As in the first embodiment, the advancing movement of the carriage will cause driving wheel 334 to rotate or index by virtue of the urging of roller follower 346 against limit switch 348 by spring 336. This embodiment, however, differs from the first embodiment in that instead of a longitudinally disposed switch element there is provided a circumferentially disposed switch element 358 having thereon a plurality of equally spaced contacts 360 and being supported above driving wheel 334 by means of transversely extending mounting rods 362 and 364. Driving wheel 334 is provided with a brush member 368 for scanning the contacts 360 in exactly the same manner as brush 186 scans contacts 184, the circuitry for the two embodiments being identical. When the contact 360 which corresponds to the contact on the read-out switch in the electrical read-out means of the scale is reached, a circuit is closed energizing a solenoid 370 mounted upon end wall 326. The plunger of solenoid 370 is provided with a pawl member 372 pivotally secured thereto, the pawl member being pivotally supported upon a transversely extending mounting rod 374 so that it will engage ratchet teeth 342 when the solenoid is energized. Thus, as in the first embodiment, the energizing of solenoid 370 will cause the rotational or indexing movement of driving wheel 334 and hence printing wheel 350, to be arrested, to thereby set the printing wheel so that the indicia thereon presented for printing corresponds to the weight sensed by the weighing scale and recorded on the read-out switches therein.

In this embodiment the setting of the printing wheels is effected during the advancing movement of the carriage just as in the first embodiment. Thus, upon the initial advancing movement of the carriage brush 368 will start scanning contacts 360 until the proper contact is reached, at which time solenoid 370 will set the printing wheel. When all of the printing wheels have been set the apparatus will come to rest just prior to the inking operation, as in the first embodiment. As soon as an article to be marked has been transported to the printing position the circuit is activated to cause the carriage to continue its advance, thereby inking the printing wheels and causing them to print upon the article the desired indicia, after which the carriage retracts.

In this embodiment, it will be noted that a different inking arrangement is used. Thus, there is provided a suitable ink pad 376 secured between the lower ends of a pair of pivoting links 378, the upper ends of links 378 being pivotally secured to supporting members 306, only half of this structure being shown. Links 378 are biased in a downward direction by means of torsion springs 380 and are provided with roller followers 382 adapted to engage a cam surface 384 on the front edge of side walls 328. As can be seen, inking is achieved by the direct abutment of the type 352 against the ink pad 376, whereupon the latter is raised out of position by the engagement of roller followers 382 upon cam surfaces 384. During the retracting movement of the carriage, ink pad 376 is lowered in the same manner it is raised, and thus, unlike the first embodiment, will re-ink the type. While this is not particularly desirable, it does serve to reduce the complexity of the structure necessary to support the ink pad. In FIGURE 16 the apparatus is illustrated in the advanced position with the printing wheel 350 partially projecting through aperture 304 ready to print the numeral 4.

This second embodiment, of course, is capable of being utilized in all applications in which the first embodiment may be used, such as those disclosed above. In addition, the circuitry for the two embodiments may be identical, as is readily apparent. In this regard, suitable limit switches similar to limit switches 193 and 195 of the first embodiment would be mounted upon partition 316 and adjacent end wall 302, respectively, to be responsive to the forward movement of the carriage and the positioning of an article for printing, respectively, for the same purpose as in the first embodiment.

In FIGURES 17 and 18 there is illustrated a third embodiment of a marking apparatus embodying the principles of the present invention. In this embodiment the setting of each printing wheel is effected by means of a Geneva wheel mechanism which is driven through an electrically operable clutch mechanism by a suitable electric motor. Generally speaking, when it is desired to set the printing wheels, the electric motor is energized to thereby cause the Geneva mechanisms to index the respective printing wheels through their consecutive positions. Through the use of circuitry similar in principle to that utilized in the above described embodiments, each Geneva wheel causes a plurality of contacts to be scanned while it is indexing, and when the contact is engaged which corresponds with the contact in the corresponding read-out switch in the weighing scale, a circuit is completed which disengages the electric clutch to thereby set the Geneva wheel and the printing wheel driven thereby to a position wherein the proper indicia is presented for printing. Thus, in this circuit an electrical clutch is energized instead of a solenoid, as in the previously described embodiments.

Referring more particularly to FIGURES 17 and 18, it will be noted that for purposes of clarity only a portion of this embodiment is diagrammatically shown, specifically that apparatus which is concerned with the setting of a single printing wheel. Thus, there is provided a base plate 400 longitudinally supporting a pair of elongated longitudinal support members 402, only a portion of one of which is shown. Rotatably secured to the inner side of support members 402 are a plurality of rollers 404 positioned in a horizontal line therealong. It is the function of these rollers 404 to support for longitudinal movement the carriage which, in this embodiment, comprises a pair of parallel disposed mounting plates 406, only one of which is shown.

Mounting plates 406 are maintained in a parallel relationship by means of a transversely extending rear support member 408 extending therebetween. In addition, there is provided a U-shaped member 410, the legs of which are secured to the outer lower sides of mounting plates 406 to further hold them in position. The outer side of the legs of U-shaped member 410 are provided with a pair of parallel disposed longitudinally extending members 412 and 414 defining a channel therebetween adapted to receive in rolling engagement rollers 404. The transversely extending portion of U-shaped member 410 is provided with a coupling member 416 into which is rigidly held a connecting rod 418, as by means of a conventional set screw or the like. Connecting rod 418 is provided at its opposite end, as through suitable shock absorbing means, with a conventional crank mechanism (not shown) for reciprocating the carriage, the latter being supported for substantially frictionless movement upon rollers 404. At the forward end of base plate 400 there is provided a vertically extending end wall 420 having an aperture 422 therein through which the printing wheel may be projected for printing upon an article disposed adjacent the forward surface thereof.

Rigidly secured to transverse member 408 is a suitable electric motor 424, the drive shaft of which extends through an opening in transverse member 408 and is provided with a bevel gear 426. Electric motor 424 serves to rotate a shaft 428 disposed between mounting plates 406 by means of a bevel gear 430 rigidly secured to shaft 428 and engaging bevel gear 426.

Operatively associated with shaft 428 is an electrically operable clutch means 431 which, when not energized, serves to interconnect a driving gear 432 with shaft 428 to be driven thereby. When clutch means 431 is energized it serves to disconnect driving gear 432 from shaft 428 to prevent further rotation of the gear by the shaft. Inter-meshing with gear 432 and adapted to be driven thereby, is a Geneva drive wheel 434 which is rotatably mounted

upon a transversely extending shaft 436, disposed between mounting plates 406.

Geneva drive wheel 434 is provided with a suitable drive pin 438 for driving a conventional Geneva wheel 440, mounted for rotation upon a shaft 442 disposed between mounting plates 406. Also rotatably mounted upon shaft 442, for rotation with Geneva wheel 440, is a gear 444 which meshes with an idler gear 446 rotatably supported upon a transversely extending shaft 448 disposed between mounting plates 406. Idler gear 446, in turn engages, to thereby drive, a gear 450 rigidly affixed to a printing wheel 452. Both gear 450 and printing wheel 452 are mounted for free rotation upon a shaft 454 extending transversely through the legs of U-shaped member 410 and mounting plates 406 and held in position by means of a threaded nut or the like 456. As can thus be seen, when electric motor 424 is energized and electric clutch means 431 is not energized, the rotation of the motor drive shaft will be transmitted into an indexing movement of the printing wheel 452 by virtue of the Geneva wheel mechanism. The energizing of clutch means 431, however, will cause the printing wheel 452 to be set, even though the electric motor 424 may continue to rotate. As will be appreciated, any number of printing wheels and associated driving mechanisms may be provided, simply by duplicating the apparatus illustrated. In any case, however, only a single motor 424 would be required, since a separate clutch means would be provided for each printing wheel.

As noted earlier, the principle by which the printing wheels are set is generally the same as that for the preceding embodiments. Thus, there is provided a switch element 458 having affixed thereto a plurality of contacts 460, disposed in a circular pattern. Switch element 458 is also provided with a circular contact 462 of annular configuration. As will be appreciated, switch element 458 is equivalent to switch elements 182 and 358 in the previously described embodiments. Switch element 458 is supported adjacent and parallel to Geneva wheel 440 by means of four transversely extending support rods 464, mounted at their opposite ends to mounting plates 406. On the side of Geneva wheel 440 adjacent switch element 458, there is provided a contact or brush member 466 which is adapted to always engage annular contact 462, and to scan contacts 460 during the indexing movement of the Geneva wheel. Thus, during the indexing movement of the Geneva wheel brush member 466 will electrically interconnect annular contact 462 with consecutive contacts 460, so that when the brush member 466 contacts the contact 460 corresponding to the position of the read-out switch in the weighing scale a circuit will be energized to cause clutch means 431 to disengage gear 432 from shaft 428 to thereby set the printing wheel 452.

For inking the printing wheel after it has been set there is provided an ink pad 468, supported between a pair of upwardly extending links 470, the lower ends of which are pivotally secured to base plate 400 by means of pivot pins 472 projecting from lugs 474 mounted on the base plate. Only half of this linkage arrangement is illustrated since the other half is identical in all respects. Links 470 are provided with transversely extending slots 476 through which project pins 478 disposed upon the outer ends of a pair of arms 480 rotatably secured upon shaft 454 adjacent the opposite ends thereof. Links 470 are biased toward the upstanding position, illustrated in solid lines, by means of torsion springs 482. Each torsion spring 482 at one end abuts a suitable pin 484 on lug 474 and at the opposite end a pin 486 mounted upon the link 470, as best seen in FIGURE 17.

Inking is achieved when the carriage is advanced by the abutment of the printing wheel upon the ink pad 468. Further advancing movement of the carriage, however, causes pins 478 to engage the far ends of slots 476 to pivot links 470 in a counter-clockwise direction, as seen

in FIGURE 17, to a position wherein the ink pad 468 is out of the path of travel of the printing wheel 452. This latter position is illustrated in phantom lines in FIGURE 17. When the carriage retracts the ink pad 463 is lifted to its original position by means of springs 482 and the action of pins 478. Thus, in FIGURE 17 the apparatus is illustrated with the carriage in its fully retracted position.

As will be appreciated, in this embodiment, as illustrated, the printing wheels must be set either before or at the beginning of the advancing movement of the carriage. However, other modes of operation should be readily apparent. For example, an inking arrangement such as that utilized in the second embodiment might be provided, in which case the carriage could be retracted to a more rearward position than illustrated in FIGURE 17. In such a modification, the printing wheels could then be set during the advancing movement of the carriage, rather than before it, in the same manner as in the preceding embodiments. This might be effected, for example, by causing the forward movement of the carriage to trip a limit switch to thereby energize electric motor 424 to start the setting operation. In any case, circuitry suitable for this embodiment will be apparent to one skilled in the art having an understanding of the principles and operation of the circuitry described in detail above with respect to the first and second embodiments. Actually, the above circuitry could be somewhat simplified for this embodiment since once the multiple position switches are set they stay set upon continued forward motion of the carriage, and since in this embodiment it is not necessary that the printing wheels be reset for each cycle, due to the fact that they are adapted for continuous full rotation. Of course, provision would have to be made for the fact that there is a second motor (424) in this embodiment, in addition to the one necessary for reciprocating the carriage, and for the fact that no limit switches similar to limit switches 150 in the first embodiment are utilized. As will be apparent, however, the timing of the operation of motor 424 is not particularly critical since once the printing wheels are set, continued operation of the motor will in no way effect this setting because all the electric clutch means will have been energized to disconnect the motor from the printing wheels.

In summary, there has been disclosed herein a novel marking system embodying the principles of the present invention, as well as several modifications thereof. In addition, there has been disclosed in detail three embodiments of a novel marking apparatus which may be utilized in conjunction with the above system, but which, in themselves, also constitute a part of the present invention. As has been noted, the practical applications of the present invention are practically limitless, the weighing system disclosed herein being only exemplary of such applications. The flexibility of the present system and marking apparatus is also apparent. In this regard, even greater flexibility may be achieved by providing the marking apparatus herein with replaceable or interchangeable marking wheels and switch elements, whereby any number of indicia may be marked by each of the marking wheels, depending on the particular application contemplated. While the present disclosure is concerned with an application of the present invention in conjunction with a Toledo weighing scale, it is to be recognized that there are other commercially available weighing scales having electrical read-out means which are also ideally suited to use with the present invention. In addition, completely different type equipment for determining other characteristics of an article, also having electrical read-out means, are readily available. The present invention is ideally suited for use in conjunction with any such equipment. In this regard, probably the main consideration that should not be overlooked is that some commercially available equipment is not provided with

internal means for locking and holding the information determined and recorded thereby. The Toledo scale disclosed herein is an apparatus generally of this type, and thus it was necessary to so design the circuitry that the information recorded upon the read-out switches would be held or locked in position until the marking wheels of the marking apparatus had been set. Similar consideration must be given to other similar equipment. Sensing and recording equipment which is provided with internal locking means may be embodied in the system of the present invention through the use of circuitry which is much simpler than that disclosed herein. In any case, such adaptations are well within the knowledge of one skilled in the art having an understanding of the principles of the present invention.

Thus, there is disclosed in the above description and in the drawings several exemplary embodiments of the present invention which fully and effectively accomplish the objects thereof. However, it will be apparent that variations in the details of construction may be indulged in without departing from the sphere of the invention as herein described, or the scope of the appended claims.

What is claimed is:

1. A system for determining the weight of an article and directly marking on such article indicia representing the determined weight thereof, comprising: a fixed sensing station having means thereat for sensing and recording information representing the weight of an article positioned at said station; means for transporting an article to said station; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set; and operating means responsive to said recording means and controlled by the information recorded thereby for setting said marking means and operating said marking means to cause it to mark upon said article indicia representing the determined weight thereof.

2. A system for determining characteristics of an article and directly marking on such article indicia representing the determined characteristics thereof, comprising: a fixed sensing station having means thereat for sensing and recording information representing characteristics of an article positioned at said station; means for transporting an article to said station; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set; and operating means responsive to said recording means and controlled by the information recorded thereby for setting said marking means and advancing said marking means into contact with said article to mark upon the latter indicia representing the determined characteristics thereof, said marking means being set in response to the advancing movement thereof.

3. A system for determining characteristics of an article and directly marking on such article indicia representing the determined characteristics thereof, comprising: a fixed sensing station having means thereat for sensing and recording information representing characteristics of an article positioned at said station; means for transporting an article to said station; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set; a Geneva wheel mechanism for indexing said marking means from one of said predetermined positions to another; and operating means including clutch means operable in response to said recording means and controlled by the information recorded thereby to stop the indexing of said marking means to set same, and means for operating said marking means to cause it to mark upon said article indicia representing the determined characteristics thereof.

4. A system for determining the weight of an article and directly marking on such article indicia representing

21

the weight thereof, comprising: a fixed sensing station having a stationary weighing scale thereat for weighing an article positioned at said station; means for transporting an article to said station; recording means including multiple position electrical switch means operably associated with said stationary weighing scale and adapted to be positioned thereby to record the weight of said article; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set; and operating means including an electrical circuit having said switch means therein, responsive to said recording means and controlled by the position of said switch means for setting said marking means and operating said marking means to cause it to mark upon said article indicia representing the weight thereof.

5. A system for determining the weight of an article and directly marking on such article indicia representing the weight thereof, comprising: a fixed sensing station having a stationary weighing scale thereat for weighing an article positioned at said station; means for transporting an article to said station; recording means including multiple position electrical switch means operably associated with said stationary weighing scale and adapted to be positioned thereby to record the weight of said article; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on the way said marking means is set; and operating means including an electrical circuit having said switch means therein, responsive to said recording means and controlled by the weight recorded thereby for setting said marking means and advancing said marking means into contact with said article to mark upon the latter indicia representing the weight thereof, said marking means being set in response to the advancing movement thereof.

6. A system for determining the weight of an article and directly marking on such article indicia representing the weight thereof, comprising: a fixed sensing station having a stationary weighing scale thereat for weighing an article positioned at said station; means for transporting an article to said station; recording means including multiple position electrical switch means operably associated with said stationary weighing scale and adapted to be set thereby to record the weight of said article; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on the way said marking means is set; a Geneva wheel mechanism for indexing said marking means from one position to another; and operating means responsive to said recording means and controlled by the weight recorded thereby for setting said marking means and operating said marking means to cause it to mark upon said article indicia representing the weight thereof, said operating means including an electrical circuit having said switch means therein and clutch means operable by said electrical circuit to stop the indexing of said marking means to set same.

7. Means for directly marking articles with indicia representing certain information recorded at a remote location, comprising: a fixed sensing station having means thereat for sensing information representing characteristics of an article positioned at said station; recording means at said fixed sensing station including multiple position electrical switch means responsive to and operable by said sensing means to be so positioned as to represent information sensed by said sensing means; means for transporting an article to said fixed sensing station; a marking station spaced from said sensing station and having means thereat for marking an article thereat, said marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark said article with any one of a plurality of indicia depending on how said marking means is set; means for transporting an article from said sensing station to said marking station; and operating

22

means responsive to said recording means and controlled by the information recorded thereby for setting said marking means and operating said marking means to cause it to mark upon an article thereat indicia representing the determined characteristics thereof, said operating means including an electrical circuit having said switch means therein.

8. Remotely set means for directly marking articles with indicia representing certain information recorded at a remote location, comprising: recording means adapted to have information recorded thereat; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set; and operating means responsive to said recording means and controlled by the information recorded thereat for setting said marking means and advancing said marking means towards an article to mark upon the latter indicia representing said information, said marking means being set in response to the advancing movement thereof.

9. Means as claimed in claim 8, wherein said operating means includes motor means for advancing said marking means and simultaneously indexing same from one of said predetermined positions to another, and wherein said operating means further includes means responsive to said recording means for stopping the indexing movement of said marking means to set same.

10. Remotely set means for directly marking articles with indicia representing certain information recorded at a remote location, comprising: recording means adapted to have information recorded thereat; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set; a Geneva wheel mechanism for indexing said marking means from one of said predetermined positions to another; and operating means including clutch means operable in response to said recording means and controlled by the information recorded thereby to stop the indexing of said marking means to set same, and means for operating said marking means to cause it to mark upon said article indicia representing the determined characteristics thereof.

11. A marking apparatus for directly marking upon articles indicia representing recorded information, comprising: means defining a marking station; a reciprocating carriage adapted for advancing movement to and retracting movement from said marking station; motor means for reciprocating said carriage; marking means on said carriage adapted to be set to any one of a plurality of predetermined positions relative thereto and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set, said marking means being adapted to mark an article at said marking station when said carriage is advanced thereto; indexing means for causing said marking means to be moved consecutively through said predetermined positions relative to said carriage while said carriage is advancing; and setting means for arresting the movement and setting said marking means when it has indexed to a position for marking the specific indicia representing the recorded information, whereby when said carriage is advanced to said marking station it will cause said marking means to mark said specific indicia directly upon an article at said marking station.

12. A marking apparatus for directly marking upon articles indicia representing information recorded on a multiple position electrical switch, comprising: means defining a marking station; a reciprocating carriage adapted for advancing movement to and retracting movement from said marking station; motor means for reciprocating said carriage; marking means on said carriage adapted to be set to any one of a plurality of predetermined positions relative thereto and operable to mark an

23

article with any one of a plurality of indicia depending on how said marking means is set, said marking means being adapted to mark an article at said marking station when said carriage is advanced thereto; indexing means for causing said marking means to be moved consecutively through said predetermined positions relative to said carriage while said carriage is advancing; and setting means for arresting movement of and setting said marking means when it has indexed to a position for marking the specific indicia representing the information recorded on said multiple position electrical switch, whereby when said carriage is advanced it will cause said marking means to mark said specific indicia directly upon an article at said marking station.

13. A marking apparatus for directly marking upon articles indicia representing information recorded on a multiple position electrical switch, comprising: means defining a marking station; a reciprocating carriage adapted for advancing movement to and retracting movement from said marking station; motor means for reciprocating said carriage; marking means on said carriage adapted to be set to any one of a plurality of predetermined positions relative thereto and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set, said marking means being adapted to mark an article at said marking station when said carriage is advanced thereto; indexing means for causing said marking means to be moved consecutively through said predetermined positions relative to said carriage in direct response to the advancing movement of said carriage; and setting means for arresting the movement of and setting said marking means when it has indexed to a position for marking the specific indicia representing the information recorded on said multiple position electrical switch, whereby continued advancing movement of said carriage will cause said marking means to mark said specific indicia directly upon an article at said marking station.

14. A marking apparatus for directly marking upon articles indicia representing recorded information, comprising: means defining a marking station; a reciprocating carriage adapted for advancing movement to and retracting movement from said marking station; motor means for reciprocating said carriage; marking means on said carriage adapted to be set to any one of a plurality of predetermined positions relative thereto and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set, said marking means being adapted to mark an article at said marking station when said carriage is advanced thereto; indexing means including a fixed stop member disposed in the path of said carriage, means projecting from said marking means and adapted to engage said stop member when said carriage is fully retracted, and resilient means associated with said marking means for urging said projecting means against said stop member, whereby when said carriage is advanced the abutment of said projecting means against said fixed stop member will cause said marking means to move consecutively through said predetermined positions relative to said carriage in direct response to the advancing movement of said carriage; and setting means for arresting the movement of and setting said marking means when it has indexed to a position for marking the specific indicia representing the recorded information, whereby the continued advancing movement of said carriage will cause said marking means to mark said specific indicia directly upon an article at said marking station.

15. A marking apparatus for directly marking upon articles indicia representing information recorded on a multiple position electrical switch, comprising: means defining a marking station; a reciprocating carriage adapted for advancing movement to and retracting movement from said marking station; motor means for reciprocating said carriage; marking means on said carriage adapted

24

to be set to any one of a plurality of predetermined positions relative thereto and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set, said marking means being adapted to mark an article at said marking station when said carriage is advanced thereto; indexing means including a fixed stop member disposed in the path of said carriage, means projecting from said marking means and adapted to engage said stop member when said carriage is fully retracted, and resilient means associated with said marking means for urging said projecting means against said stop member, whereby when said carriage is advanced the abutment of said projecting means against said fixed stop member will cause said marking means to move consecutively through said predetermined positions relative to said carriage in direct response to the advancing movement of said carriage; and setting means for arresting the movement of and setting said marking means when it has indexed to a position for marking the specific indicia representing the information recorded on said multiple position electrical switch, whereby the continued advancing movement of said carriage will cause said marking means to mark said specific indicia directly upon an article at said marking station.

16. A marking apparatus for directly marking upon articles specific indicia representing information recorded on a multiple position electrical switch, comprising: means defining a marking station; a reciprocating carriage adapted for advancing movement to and retracting movement from said marking station; motor means for reciprocating said carriage; marking means on said carriage adapted to be set to any one of a plurality of predetermined positions relative thereto and operable to mark an article with any one of a plurality of specific indicia depending on how said marking means is set, said marking means being adapted to mark an article at said marking station when said carriage is advanced thereto; indexing means for causing said marking means to be moved consecutively through said predetermined positions relative to said carriage in direct response to the advancing movement of said carriage, the amount of such relative movement of said marking means being proportional to the distance said carriage advances; and setting means for arresting the movement of and setting said marking means when it has reached a position for marking the specific indicia representing the information recorded on said multiple position electrical switch, whereby the continued advancing movement of said carriage will cause said marking means to mark said specific indicia directly upon an article at said marking station, said setting means including a plurality of fixed spaced electrical contacts disposed along the path of said carriage, each contact corresponding to a single position of said marking means, an electrical brush on said carriage adapted to scan consecutively said contacts when said carriage is advanced, a solenoid on said carriage adapted to arrest the movement of said marking means relative to said carriage when energized, and electrical circuit means including said multiple position switch, spaced contacts, brush, and solenoid for causing said solenoid to be energized when said brush contacts the contact corresponding to the position of said marking means at which it is adapted to mark said specific indicia.

17. A marking apparatus for directly marking upon articles specific indicia representing information recorded on a multiple position electrical switch, comprising: means defining a marking station; a reciprocating carriage adapted for advancing movement to and retracting movement to and retracting movement from said marking station; motor means for reciprocating said carriage; marking means on said carriage adapted to be set to any one of a plurality of predetermined positions relative thereto and operable to mark an article with any one of a plurality of specific indicia depending on how said marking means is set, said marking means being adapted to mark

25

an article at said marking station when said carriage is advanced thereto; indexing means for causing said marking means to be moved consecutively through said predetermined positions relative to said carriage in direct response to the advancing movement of said carriage, the amount of such relative movement of said marking means being proportional to the distance said carriage advances; and setting means for arresting the movement of and setting said marking means when it has reached a position for marking the specific indicia representing the information recorded on said multiple position electrical switch, whereby the continued advancing movement of said carriage will cause said marking means to mark said specific indicia directly upon an article at said marking station, said setting means including a plurality of fixed spaced electrical contacts disposed on said carriage, each contact corresponding to a single position of said marking means, an electrical brush on said marking means adapted to scan consecutively said contacts when said carriage is advanced, a solenoid on said carriage adapted to arrest the movement of said marking means relative to said carriage when energized, and electrical circuit means including said multiple position switch, spaced contacts, brush, and solenoid for causing said solenoid to be energized when said brush contacts the contact corresponding to the position of said marking means at which it is adapted to mark said specific indicia.

18. A printing apparatus for directly printing upon articles indicia representing information recorded on a multiple position electrical switch, comprising: means defining a printing station; a reciprocating carriage adapted for advancing movement to and retracting movement from said printing station; motor means for reciprocating said carriage; printing means on said carriage adapted to be set to any one of a plurality of predetermined positions relative thereto and operable to print an article with any one of a plurality of indicia depending on how said printing means is set, said printing means being adapted to print an article at said marking station when said carriage is advanced thereto; indexing means for causing said printing means to be moved consecutively through said predetermined positions relative to said carriage in direct response to the advancing movement of said carriage; setting means for arresting the movement of and setting said printing means when it has indexed to a position for printing the specific indicia representing the information recorded on said multiple position electrical switch; and inking means for inking said printing means when said carriage is advanced after said printing means is set, whereby continued advancing movement of said carriage after said printing means is set will cause the latter to be inked and then to print said specific indicia directly upon an article at said marking station.

19. Apparatus as claimed in claim 18, wherein said carriage is mounted for reciprocation on a base, and wherein said inking means comprises an ink pad, a pair of pivoting linkages on said base for supporting said ink pad, first cam means for pivoting said linkages when said carriage is advanced to move said ink pad from an inking position out of the path of said carriage after said ink pad has contacted said printing means to ink the latter,

26

and second cam means for moving said linkages in the reverse direction when said carriage is retracted to move said ink pad back into an inking position, said second cam means being operative to return said ink pad to an inking position without causing the latter to re-ink said printing means.

20. Apparatus as claimed in claim 19, wherein said first cam means is on said linkages and wherein said second cam means is on said carriage.

21. A system for determining characteristics of an article and directly marking on such article indicia representing the determined characteristics thereof, comprising: a fixed sensing station having means thereat for sensing and recording information representing characteristics of an article positioned at said station; means for transporting an article to said station; marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark an article with any one of a plurality of indicia depending on how said marking means is set; and operating means responsive to said recording means and controlled by the information recorded thereby for setting said marking means and operating said marking means to cause it to mark upon said article indicia representing the determined characteristics thereof and for resetting said sensing and recording means after said marking means is set before marking takes place.

22. Means for directly marking articles with indicia representing certain information recorded at a remote location, comprising: a fixed sensing station having means thereat for sensing information representing characteristics of an article positioned at said station; recording means at said fixed sensing station including multiple position electrical switch means responsive to and operable by said sensing means to be so positioned as to represent information sensed by said sensing means; means for transporting an article to said fixed sensing station; a marking station spaced from said sensing station and having means thereat for marking an article thereat, said marking means adapted to be set to any one of a plurality of predetermined positions and operable to mark said article with any one of a plurality of indicia depending on how said marking means is set; means for transporting an article from said sensing station to said marking station; and operating means responsive to said recording means and controlled by the information recorded thereby for setting said marking means and operating said marking means to cause it to mark upon an article thereat indicia representing the determined characteristics thereof and for resetting said sensing and recording means after said marking means is set, said operating means including an electrical circuit having said switch means therein.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,080,813

March 12, 1963

Donald F. Staub et al.

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 2, line 71, for "efficent" read -- efficient --;
column 6, line 41, for "beans" read -- means --; column 17,
line 11, for "prinicple" read -- principle --; column 20, line
44, for "stattion" read -- station --; column 23, line 8, after
"arresting" insert -- the --; column 24, line 69, strike out
"to and retracting movement".

Signed and sealed this 1st day of October 1963.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents

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