

Aug. 25, 1931.

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1,820,751

STAMPING APPARATUS FOR REGISTRATION OF ANY DESIRED
VALUES OF BUSINESS OR WORK OPERATIONS

Filed June 18, 1928

4 Sheets-Sheet 1

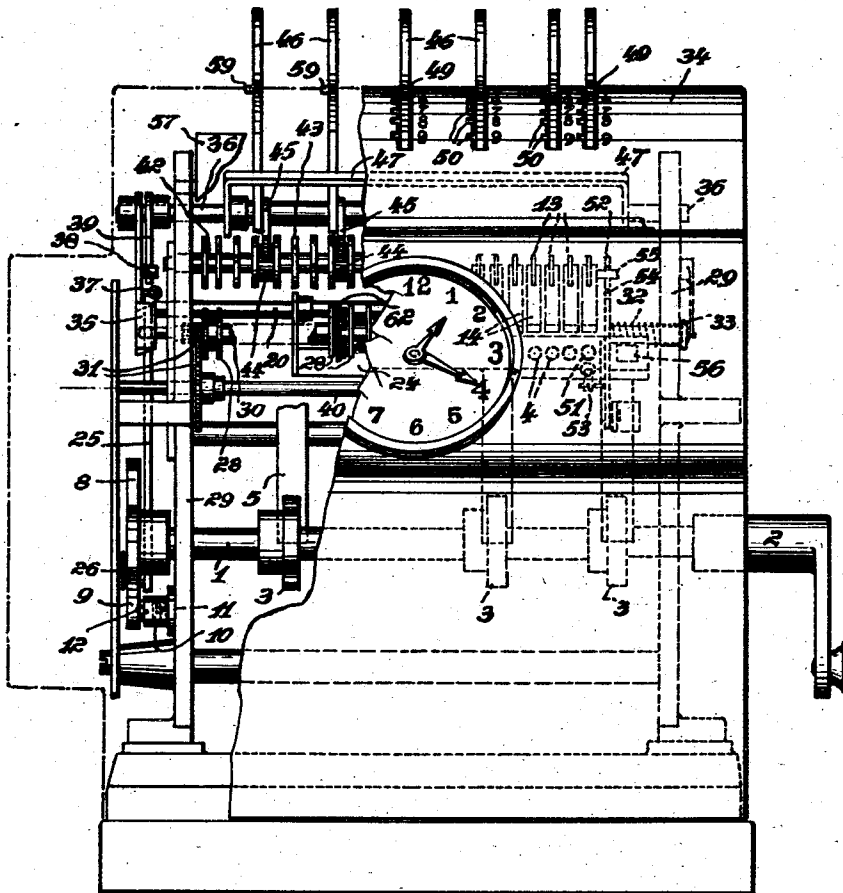


Fig. 1

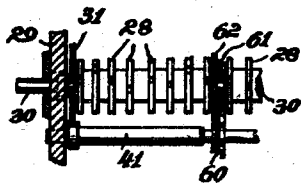


Fig. 5

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4 Sheets-Sheet 2

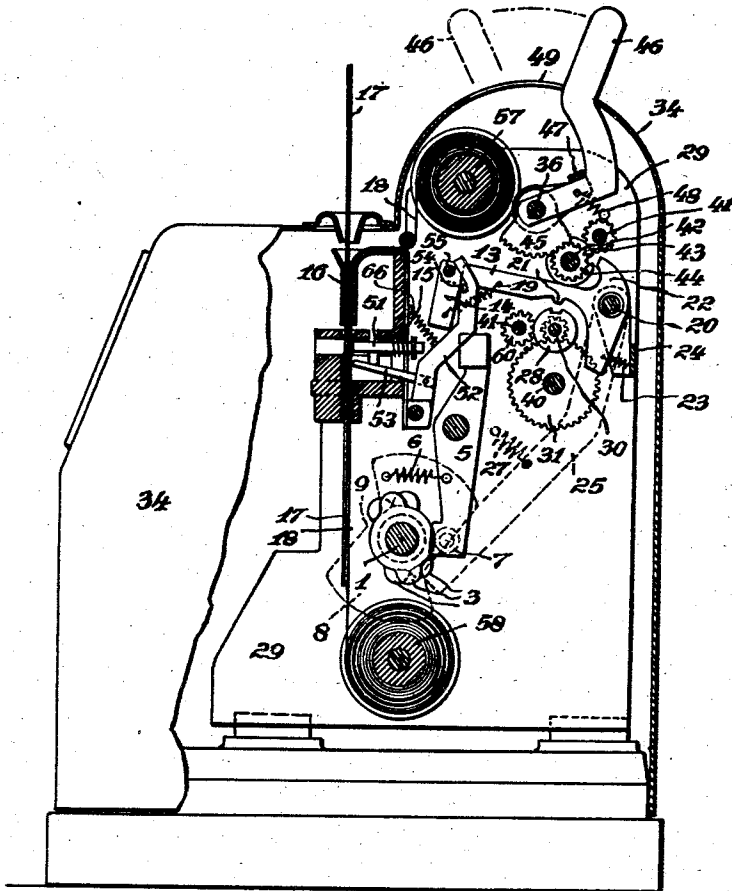


Fig. 2

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1,820,751

VALUES OF BUSINESS OR WORK OPERATIONS

4 Sheets-Sheet 3

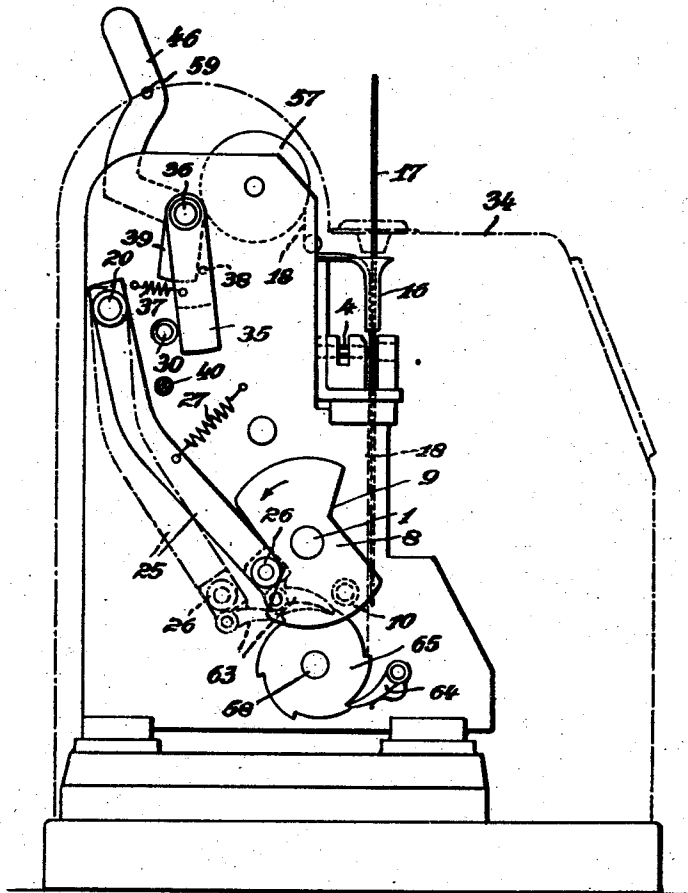


Fig. 3

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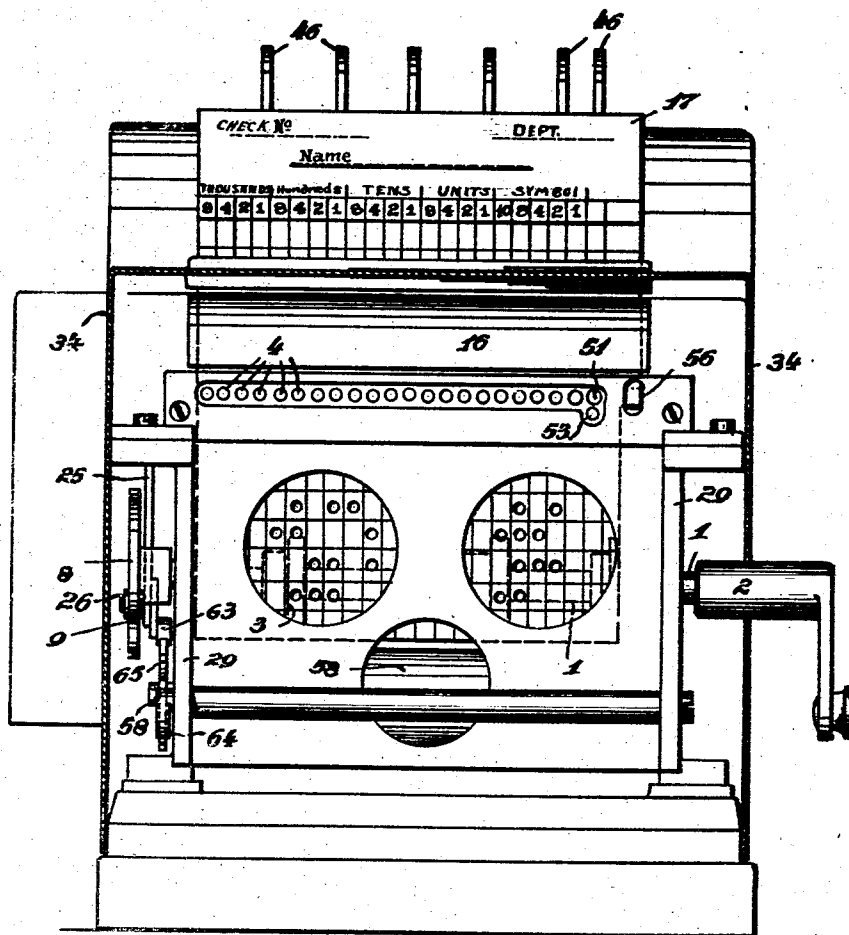


Fig. 4

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UNITED STATES PATENT OFFICE

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STAMPING APPARATUS FOR REGISTRATION OF ANY DESIRED VALUES OF BUSINESS OR WORK OPERATIONS

Application filed June 18, 1928, Serial No. 286,127, and in Germany June 22, 1927.

My invention relates to stamping apparatus for recording or registering any desired values of business or work operations on cards or paper strips particularly by means of perforations produced by punches and control levers associated with such punches.

In the known apparatus of this kind the punches are arranged in groups, each of these groups being associated with one of the decimal-numbers (digits). The control devices used with these apparatus for the stamping operation are always very complicated and are fit only for special purposes. Furthermore, the perforations made on cards by the known apparatus cannot be interpreted or calculated without considerable difficulty.

According to the present invention these disadvantages are obviated and an extremely simple and universally applicable apparatus is created by providing two setting discs or rolls for every control lever, one of which is controlled by means of a clockwork or other automatic counting device and the other by hand.

For the setting or characterizing of values of opposite signs such as plus and minus values, a special punch controlled by a control lever through an intermediate mechanism piece is utilized for the marking of one of the opposite values.

In the accompanying drawings an embodiment of the new stamping or punching apparatus is shown. In said drawings,

Fig. 1 is a front elevation of my improved punching or perforating apparatus, the front casing being partly broken away to show the internal structure,

Fig. 2, a sectional side elevation of the apparatus,

Fig. 3, an elevation of the other side of the apparatus,

Fig. 4, a sectional front elevation with a register card projecting partially from the guiding slot, and

Fig. 5, a detail of the apparatus consisting of a tens transmitting device between the sets of control discs upon the shaft 30.

Like parts are indicated by like numerals of reference throughout all the figures of the drawings.

Referring to the drawings, 1 is the main driving shaft at one end of which is mounted a handle 2 and intermediate the bearing standards 29 a number of cams or tappets 3. The cams 3 control the rotatable double-armed levers 5 serving as hammers for the perforating punches or dies 4 and pulled by a spring 6 with the bowl 7 against the circumference of the cams 3. The cams or tappets 3 are preferably angularly displaced upon the driving shaft 1, to render them operative in succession in order to facilitate the turning of the handle 2. For arresting the shaft 1 in the inoperative position there is mounted upon the other end of it a disc 8 simultaneously designed as a cam and provided on its face with recesses 9 into which fits a ball 12 pressed towards the disc by a spring 11 guided in the bore 10 of a stud fixed upon the frame. When the cams 3 are rotated the levers 5 are caused to perform striking motions which are transmitted to the punches 4 by the aid of intermediate members 14 pivoted to the control levers 13. The punches 4 are in known manner arranged in a horizontal row in such a manner, that they are forced perpendicularly against the card 17 introduced into the guiding slot 16 and against the strips of paper 18 and produce perforations in both of them, when the punches are depressed by the hammer levers 5 against the resistance of springs 15. The intermediate members 14 designed in the manner of intermediate hammers are pivoted on the levers 13 in such a manner, that they are pulled against corresponding stops of the levers 13 by springs 19.

The levers 13 are all rotatably mounted upon a shaft 20 and are each provided with a nose 21 for automatic control by a gear connected with the clockwork and a nose 22 to be controlled by a gear operated by hand. A downwardly directed arm of each lever 13 is connected by means of a spring 23 with a bow 24 rigidly connected with the shaft 20. There is also mounted upon the shaft 20 a lever 25, which is controlled by the cam 8 on the main driving shaft 1. A spring 27 pulls the lever 25 with a bowl 26 against the circumference of the cam 8.

The control gear driven by the clock or counting mechanism consists substantially of a series of control discs 28 (Figs. 1 and 2) adapted to revolve upon a common shaft 30 axially slidable in the supporting frame 29 and connected with one another by tens transfer means. Of the control disc sets composed of four or more control discs 28 the set of the lowest order is keyed to the shaft 30, which through a train of wheels 31 with shaft 40 is driven from a clockwork mechanism not illustrated, for instance from an electric auxiliary clockwork mechanism. A spring 32 forces the shaft 30 with a collar 33 against a side plate of the supporting frame 29. As long as the shaft 31 with its collar 33 abuts against the side plate of the frame 29, the control discs 28 are within the reach of, or register with, the control levers 13 appertaining to them.

By means of a lever 35 (Figs. 1 and 3) for part of its length designed as an inclined plane and adapted to rock upon a shaft 36 and pulled against a lever 39 rigidly connected with the shaft 36 by means of a spring 37, the lever 35 being provided with a stop pin 38, the shaft 30 is adapted to be moved, with its collar 33, away from the side plate of the frame 29 and thus to be displaced axially, so that the control discs 28 pass out of the reach of, or out of registry with, the respective levers 13.

Upon a shaft 42 there are rotatably mounted in sets of four, for instance, rigidly united control discs 43 with driving gear wheels 44. The driving wheels 44 are in engagement with toothed quadrants 45, which together with the hand levers 46 attached to them are rotatably mounted upon the shaft 36. Upon the shaft 36 there is furthermore rigidly mounted a bow-shaped stop lever 47 for the levers 46 in such a manner, that when any of the levers 46 is moved from its zero position an axial displacement of the shaft 30 is effected across the shaft 36 and the levers 35 and 39. For returning the stop lever 47 when the lever 46 is returned into the zero position there is provided a spring 48, which is fixed with its other end to the uprights 29 of the framework.

The hand levers 46 are guided in slots 49 in the casing 34. Adjacent to these slots 49 there are preferably provided on the casing 34 marks and indications for the positions of the levers 46 corresponding with the individual numerical values.

In the embodiment illustrated there are furthermore provided lateral notches 50 (Fig. 1) engaged by small projections or noses 59 on the levers 46, for the purpose of arresting the levers 46 in the various positions.

As shown in figures 2 and 5, the tens transfer mechanisms consist in known manner of a plurality of gear wheel trains mounted on the

shafts 41, which cooperate with single notched discs 61 and gear wheels 62 on the shaft 30 or the shaft 42 respectively. These toothed transfer means 60 to 62 are arranged at the places where the passage takes place from one set of control discs to the adjacent set of control discs.

For using my improved perforating or punching apparatus for recording opposite values, for instance plus and minus values, there is according to Figs. 1 and 2 provided a special perforation mechanism with a feeler lever device. This perforating mechanism is adapted to co-operate with the card column located immediately to the right of the five columns headed "Symbol" in Fig. 4, and consists substantially of a punch 51 arranged in one row with the other punches 4, for which in correspondence with the described mechanism of the apparatus there is provided a hammer-like lever 13 with intermediate member 14, noses 21 and 22, control discs 28 and 43, as well as a hand operating lever 46. The feeler lever device, which serves as a locking device for the intermediate member 14 of the punch 51 is formed by a lever 52 pivotally mounted upon the machine framing 29 with a feeler pin 53 fulcrumed upon it and a locking nose 54.

Upon the respective control lever 13 or on its intermediate member 14 is fixed a pin 55, which in a certain position of the lever 52 abuts against the nose 54 and prevents the motion of the intermediate member 14 into the position between the punch 51 and the hammer 5 belonging thereto. Into this position the lever 52 is moved during the punching process by a spring 66 secured to the frame 29 as soon as feeler pin 53 forced by the said spring against the card 17 or the strip 18 faces a perforation produced by the punch 51 during a previous perforating process, into which it drops. If there is no perforation in the card 17 or the strip 18 opposite the feeler pin, the lever 52 takes up the position during the punching process, in which the lever 13 with the pin 55 moves past the nose 54. In this case the marking punch 51 produces a perforation in the card 17 and in the strip 18.

If for instance the stamping or punching apparatus is to be used for registering workman's time, the time of arrival would be considered as a value to be subtracted, or in other words, as a minus value, while the time of leaving would be considered a plus value, on the assumption that the working time or rather the time interval between arrival and leaving is to be determined from these two time indications by algebraical addition. For instance, if the workman arrives at 7 o'clock, and leaves at 15 o'clock (3 p. m.), the number 7 will be perforated as a minus value, in the manner described below, by the stamping or punching apparatus at the time that

the workman enters the factory. The characterization as a minus value is obtained by producing a punch mark in the first column to the right of Fig. 4, in addition to making punch marks corresponding to the number 7 in one of the columns headed Units, Tens, Hundreds, Thousands.

This production of an additional punch mark in the first column to the right is effected by the perforating punch 51 in the following manner: When at the beginning of the working period the workman introduces the card 17 into the punching apparatus as shown in Fig. 4, the feeler lever 53 which is sensing the preceding line of the card (that is to say, the line immediately below) does not find any corresponding perforation in the first column to the right. Therefore, the lever 52 will remain in the position illustrated by Fig. 2, in which it does not prevent the corresponding lever 13 from swinging contraclockwise during the perforating operation. The intermediate member 14 will therefore come between the hammer 5 and the perforating punch 51 so that during the perforating operation proper the punch 51 will produce a perforation in the first column to the right.

When the workman leaves the factory, he will again introduce the same card into the same punching apparatus. Since owing to the function of the severing device described below, the card can now be shoved farther into the punching apparatus by the depth of one line, as compared with the punch marks made when the workman entered the factory, the feeler lever 53 will come into registry with the perforation made as described above in the first column from the right. The lever 52 will therefore be able to swing contraclockwise under the influence of the spring 66, so that the nose 54 of said lever will come into registry with the pin 55. The lever 13 to which this pin is secured will therefore no longer be free to move contraclockwise, as during the punching operation above referred to, and therefore the intermediate member will not be able to reach a position between the hammer 5 and the punch 51. The perforating operation proper will therefore produce in one of the left hand columns of the card 17 (Fig. 4) a punch mark corresponding to the time of leaving (15 o'clock, that is to say 3 p. m.), but no perforation will be made at this time in the first column to the right, and the punch mark corresponding to 15 o'clock will therefore be interpreted as a plus value.

In a suitable counting or computing machine, there is formed the algebraic sum of the plus value and the minus value 7, or in other words, the difference between 15 and 7, yielding the result 8, which is the number of hours between the time of arrival and time of leaving.

At the next punching operation made in connection with the arrival of the workman, there will be an additional perforation made in the first right hand column, since in view of the fact that at the previous operation no perforation was made in the said right hand column, the feeler lever 53 can not drop into a perforation, the operation therefore being similar to the one described in connection with the marking of the card at the time of the first arrival of the workman.

This additional perforation in the first column at the right can also be prevented during predetermined time intervals or with a proper adjustment of the hand levers 46, by means of the control discs 28 or 43, the operation of which is described below.

The intermittent forward motion of the card 17 introduced into the guide slot 16 of the perforating apparatus is in known manner caused by an edge severing device 56 serving as stop (Figs. 1 and 4), which during each punching operation cuts off an edge strip corresponding in length with the width of the line, so that the card 17 or the strip of paper 18 slides deeper into the apparatus by the height of a line after each recording or punching process. For checking purposes there is besides the card 17 introduced into the guide slot of the perforating apparatus a strip of paper 18 intermittently fed through the guide slot 16, which is automatically paid out from a reel 57 and wound up on another reel 58. This drive is effected according to Fig. 3 of the drawings by way of the driving lever 25 for the shaft 20 moved by the cam 8 and the levers 13 mounted upon it. The lever 25 carries at its lower end a pawl 63, which in cooperation with a stop pawl 64 mounted on the frame 29 acts on a ratchet wheel 65 rigidly connected with the winding up roller 58 and moves the roller 58 forward by one step, when the spring 27 moves the lever 35 towards the right. This mechanism has for the sake of clearness been omitted in Fig. 1 and is only illustrated in Fig. 4.

My improved perforating apparatus operates in the following manner:

Assuming that the apparatus is destined for recording values adjusted by a clockwork or a counting mechanism through the control discs 28 and the control levers 13, all the control discs 43 assume the position in which the noses 22 of the levers 13 face recesses or notches of the discs 43, so that the levers 13 remain unaffected by the discs 43. The shaft 30 is in this case driven by the clockwork and controls the punches 4 by means of the control discs 28 mounted upon it in sets and continuously connected in sets through the tens ratchet mechanisms 60, 61, 62 by the aid of the control levers 13 with the intermediate members 14. According to the values to be recorded individual punches 4 composed into combinations for each figure are then ren-

dered operative by interposing the intermediate members 14 between the punches 4 and the hammers 5.

The control discs 28 destined for the punches or dies 4 to be rendered operative are then brought by the clockwork and transmission gear into the position in which the noses 21 of the control levers 13 are opposite recesses upon the circumference of the control discs 28 so that the respective levers 13 with their intermediate members can freely be brought between punches and hammers during the perforating process by means of an elastic drive from the driving shaft 1. Since the values to be recorded as set by the clockwork represent as a rule opposite values, in case of working time control, for instance, the time when the workmen start and stop, one of the values is additionally marked by the special punching mechanism with feeler lever or selector device. Since the opposite values alternate as a rule in sequence, that is, the minuends and subtrahends follow each other in alternation, the feeler lever device releases the lever 13 with intermediate member 14 destined for the marking or indicating punch, if there is no perforation in the card 17 or the strip of paper 18 opposite to the feeler pin 53 into which it is able to drop. The marking or indicating punch 51 then produces an additional marking perforation for the respective perforation value in the card 17 or the paper strip 18. When the card 17 and the paper strip 18 move forward by one line the feeler or selector pin 53 drop during the next perforation process into the additional marking perforation, so that the lever 52 with its locking nose 54 prevents the downward motion of the control lever 13 and thus an additional perforating of the card 17.

If values adapted to be set by hand are to be recorded by perforations, the control disc shaft 30 driven by the clockwork is first axially displaced by a corresponding adjustment of the respective hand control levers 46 through the lever 47, the shaft 36, the levers 39, 35 to such an extent, that all the control discs 28 of this shaft 30 pass out of reach of the noses 21 of the respective control levers 13. Simultaneously the control discs 43 corresponding with the values to be recorded are by the hand control levers 46 brought into the position in which the noses 22 of the control levers 13 face recesses on the circumference of the control discs 43. During the punching process the levers 13 with their intermediate members 14, which are not restricted in their motion by the adjusted control discs 28 or 42 can thus be brought between the punches or perforating dies 4 and the hammer 5 belonging to them. The various movements of the punches 4 and the transmitting members during the punching process are caused by turning the handle 2.

The cam or tappet 8 mounted upon the shaft 1 imparts through the lever 25, the shaft 20 and the bow lever 24 a rocking or swinging motion to the control levers 13 resiliently connected with the bow 24 by the springs 23, so that these levers, as far as they are not prevented from doing this by the control discs 28 or 43, move together with their intermediate member 14 between the punches 4 and the hammer 5. Simultaneously the cams 3 mounted on the shaft 1 move the hammer levers 5 contacting with them through the antifriction bowls 7 in such a manner, that these levers act with their upper ends through the intermediate members 14 on the punches 4 and force them through the card 17 or the paper strip 18. After the punch 4 has penetrated through the card 17 or the strip of paper 18 the hammer levers 5 as well as the punches or dies 4 return into their inoperative position under the action of springs.

Both portions of the apparatus then receive separate mechanism 35, 37, 38, 39 for disconnecting the control discs 28 driven by the clockwork, when the hand operating levers 46 are operated.

My improved apparatus is particularly suitable for recording the working hours, in conjunction with the administration of stocks, order and dispatch offices, card indexes and so on.

Various modifications and changes may be made without departing from the spirit and the scope of the invention, and I desire, therefore, that only such limitations shall be placed thereon as are imposed by the prior art.

I claim as my invention:

1. Stamping apparatus for registering any desired values of business or work operations on cards or paper strips, comprising a casing, a plurality of perforating punches in said casing, control levers associated with the punches, two setting discs for each of said control levers, means for connecting one of said discs to a clockwork or other automatic counting device to be controlled thereby, and manually operable means connected to the other of said discs.

2. Stamping apparatus according to claim 1, including a separate punch and control lever therefor for indicating the plus or minus character of a registered value.

3. Stamping apparatus according to claim 1, including a separate punch and control lever therefor for indicating the plus or minus character of a registered value, and a card feeling device for controlling said separate punch.

4. Stamping apparatus according to claim 1, including a separate punch and control lever therefor for indicating the plus or minus character of a registered value, and a card feeling device for controlling said separate

rate punch, said device comprising a pivoted lever, a feeler pin mounted thereon, a spring for resiliently urging the pin against the card or strip to be perforated, said lever adapted, when the pin enters a characterizing perforation in such card or strip, to render the control lever for the separate punch inoperative so that said punch is not engaged by its operating hammer.

5. Stamping apparatus according to claim 1 wherein the discs driven by a clockwork or other automatic counting mechanism are mounted on a single shaft, said shaft being mounted in an axially displaceable manner in said casing, and a spring arranged to retain said shaft in the position in which the discs mounted thereon are in registry with the corresponding control levers.

6. Stamping apparatus according to claim 1 wherein the discs driven by a clockwork or other automatic counting mechanism are mounted on a single shaft, said shaft being mounted in an axially displaceable manner in said casing, a spring arranged to retain said shaft in the position in which the discs mounted thereon are in registry with the corresponding control levers, said manually operable means including a shaft and a plurality of levers mounted on said shaft and connected to the manually operated discs to rotate the same, and a lever system associated with the automatically operated shaft and operable upon movement of any of said manually operated levers out of its zero position to cause axial displacement of said last-mentioned shaft, whereby the control discs thereon are moved out of registry with their associated control levers.

7. Stamping apparatus according to claim 1 wherein the discs driven by a clockwork or other automatic counting mechanism are mounted on a single shaft, said shaft being mounted in an axially displaceable manner in said casing, a spring arranged to retain said shaft in the position in which the discs mounted thereon are in registry with the corresponding control levers, said manually operable means including a shaft and a plurality of levers mounted on said shaft and connected to the manually operated discs to rotate the same, and a lever system associated with the automatically operated shaft and operable upon movement of any of said manually operated levers out of its zero position to cause axial displacement of said last-mentioned shaft, whereby the control discs thereon are moved out of registry with their associated control levers, said lever system comprising a yoke lever mounted on said manual operating shaft, and a cam lever resiliently connected with said latter shaft.

In testimony whereof I affix my signature.
PAUL MANSEL.