June 15, 1937. A. E. LONG 2,084,097

TIME PRINTING CONSTRUCTION

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Fig. 1

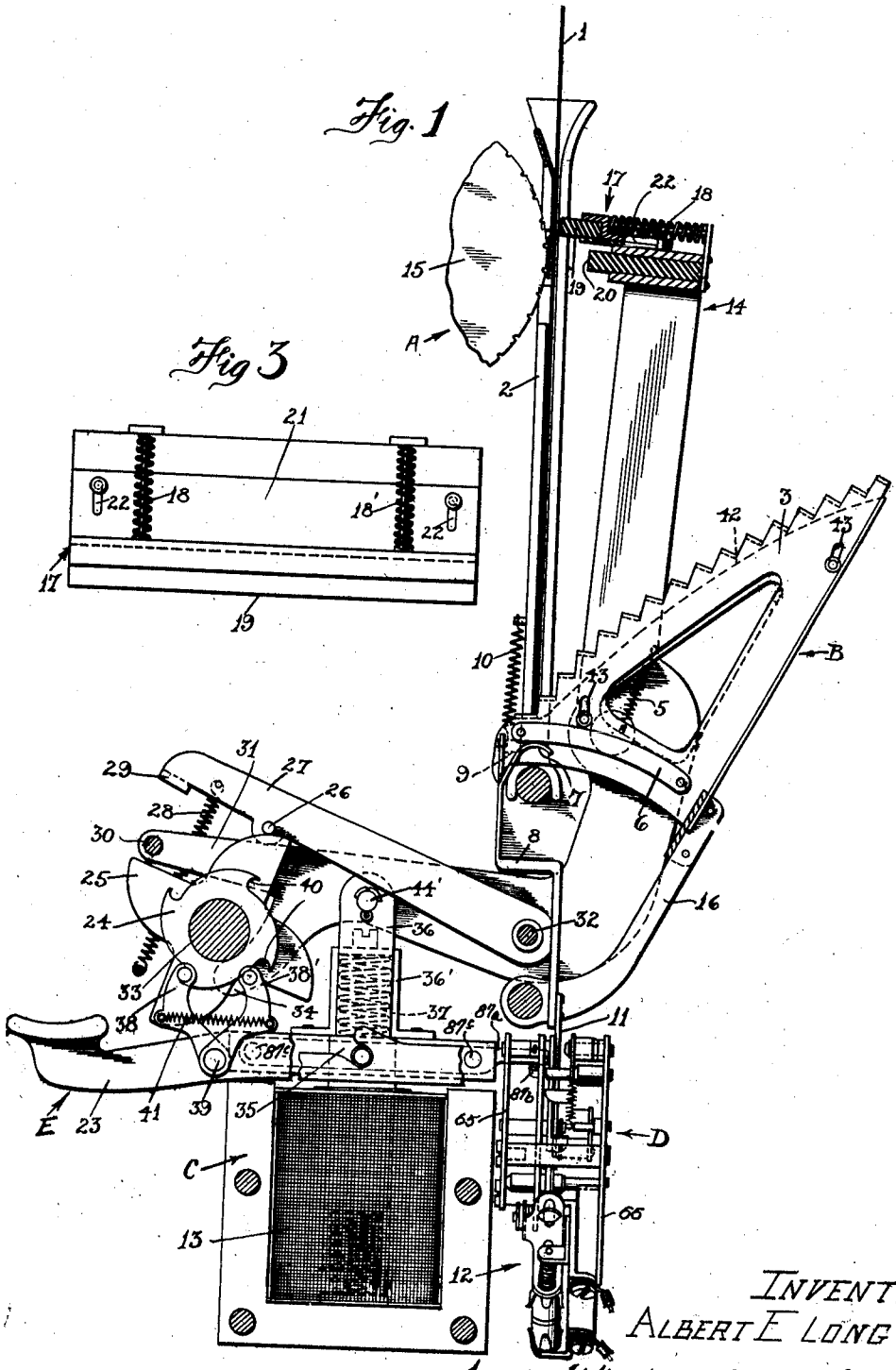


Fig 3

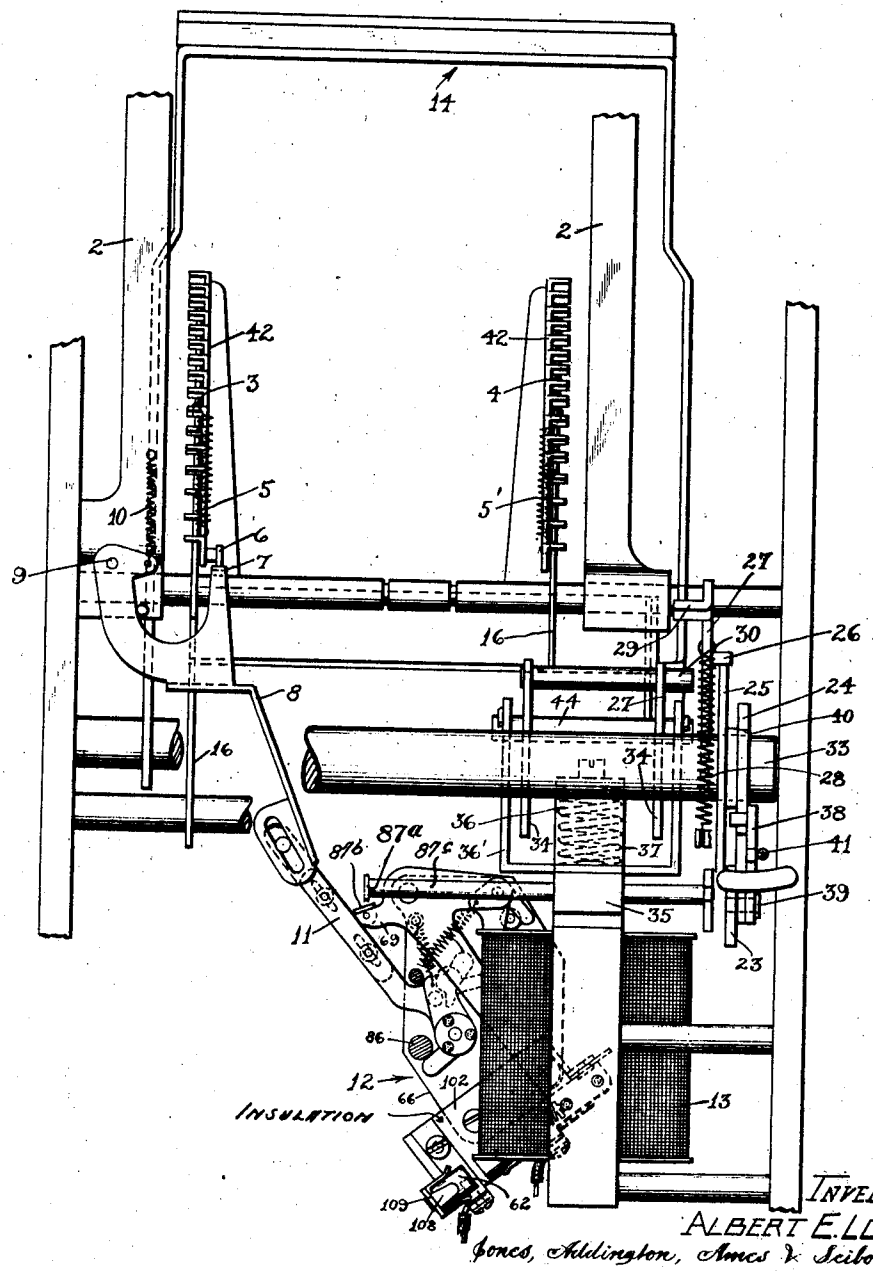
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TIME PRINTING CONSTRUCTION

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Fig 2



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Fig 4

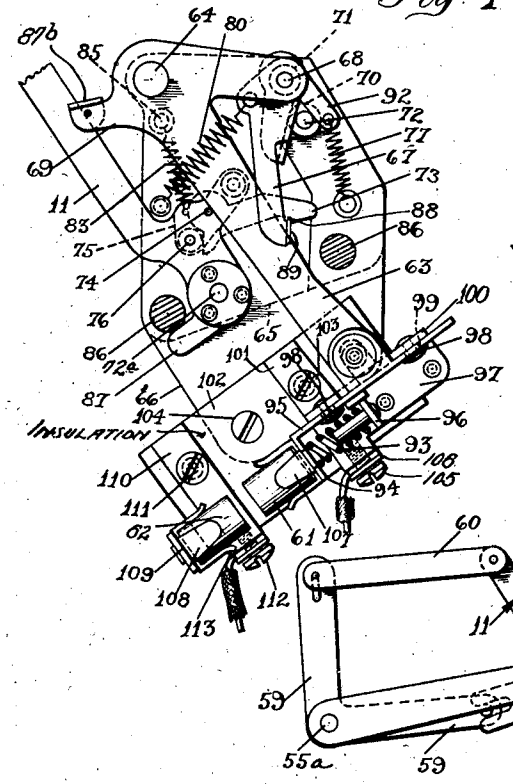


Fig 5

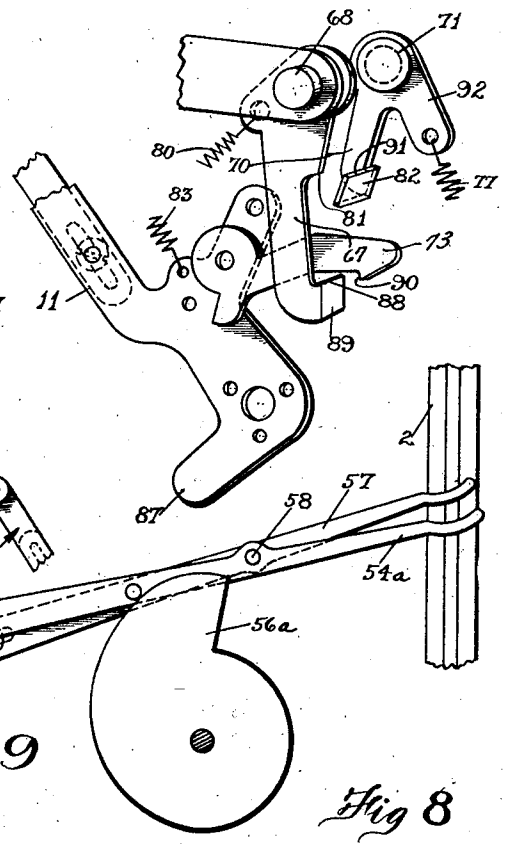


Fig 6

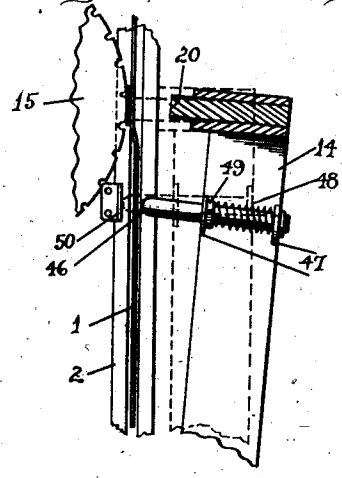


Fig 9

Fig 7

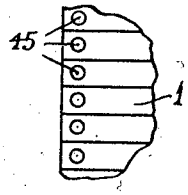
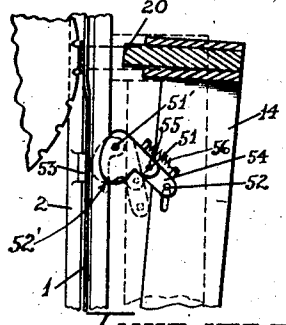


Fig 8



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Fig 9a

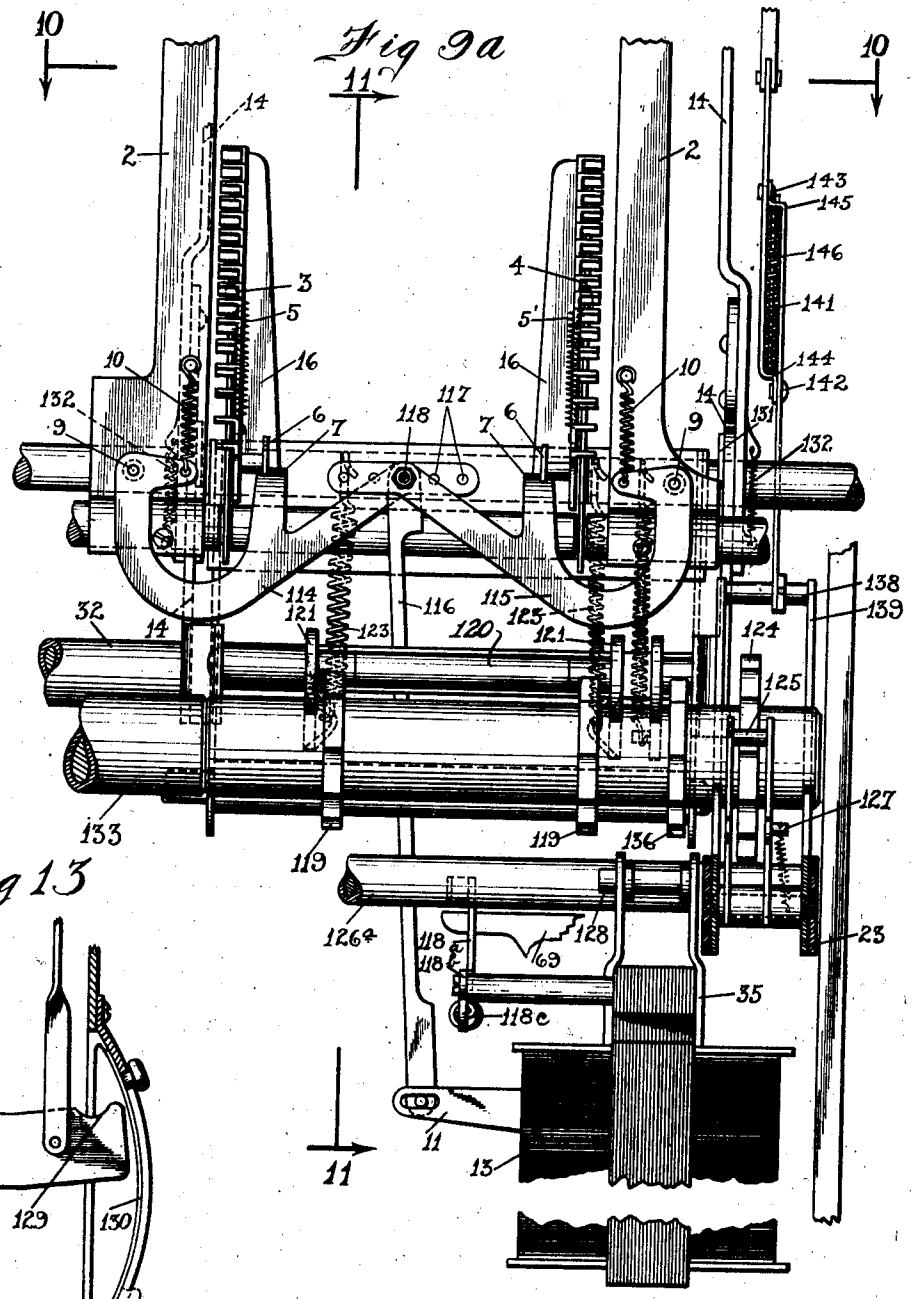


Fig 13

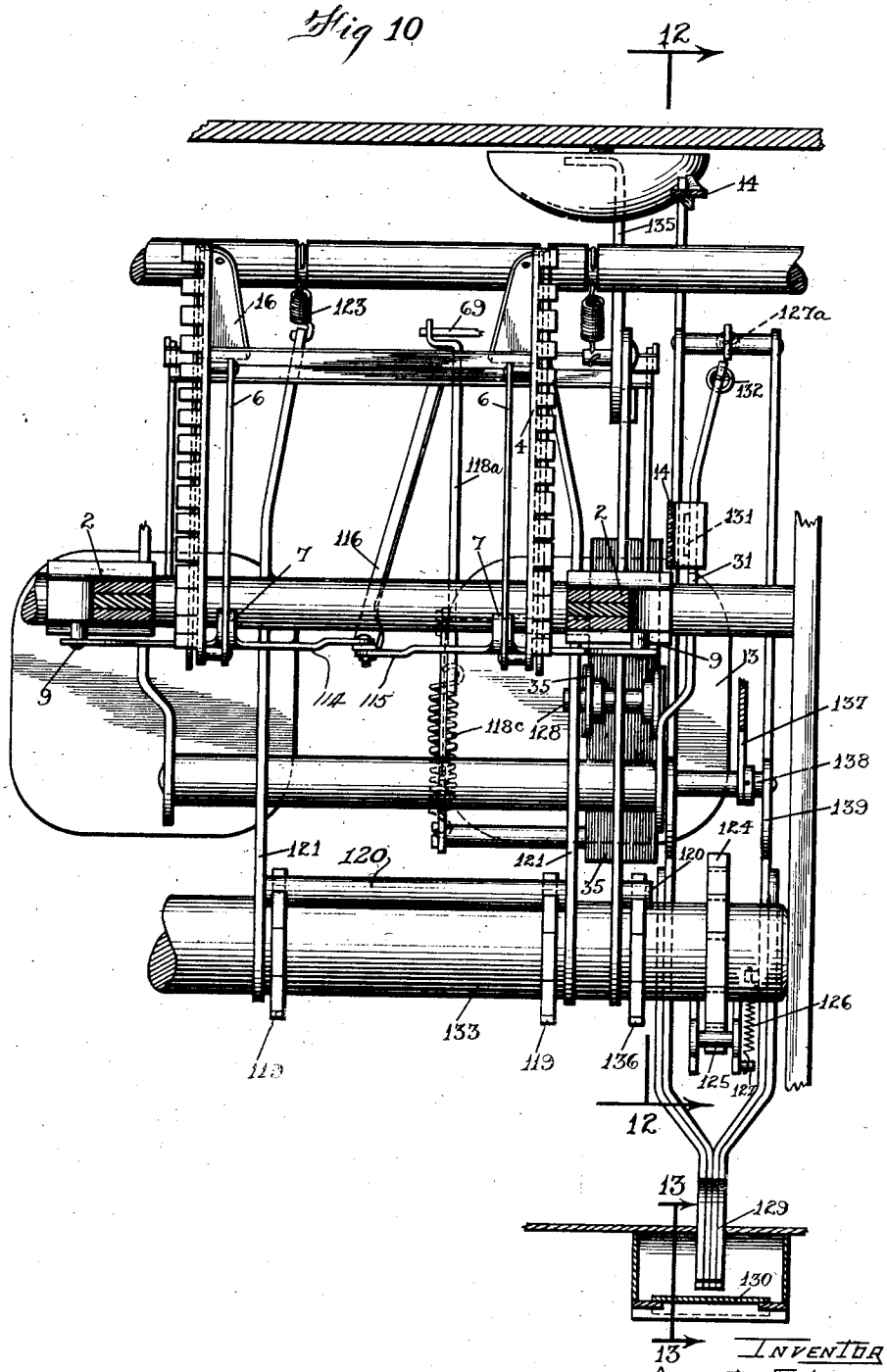
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Fig 10



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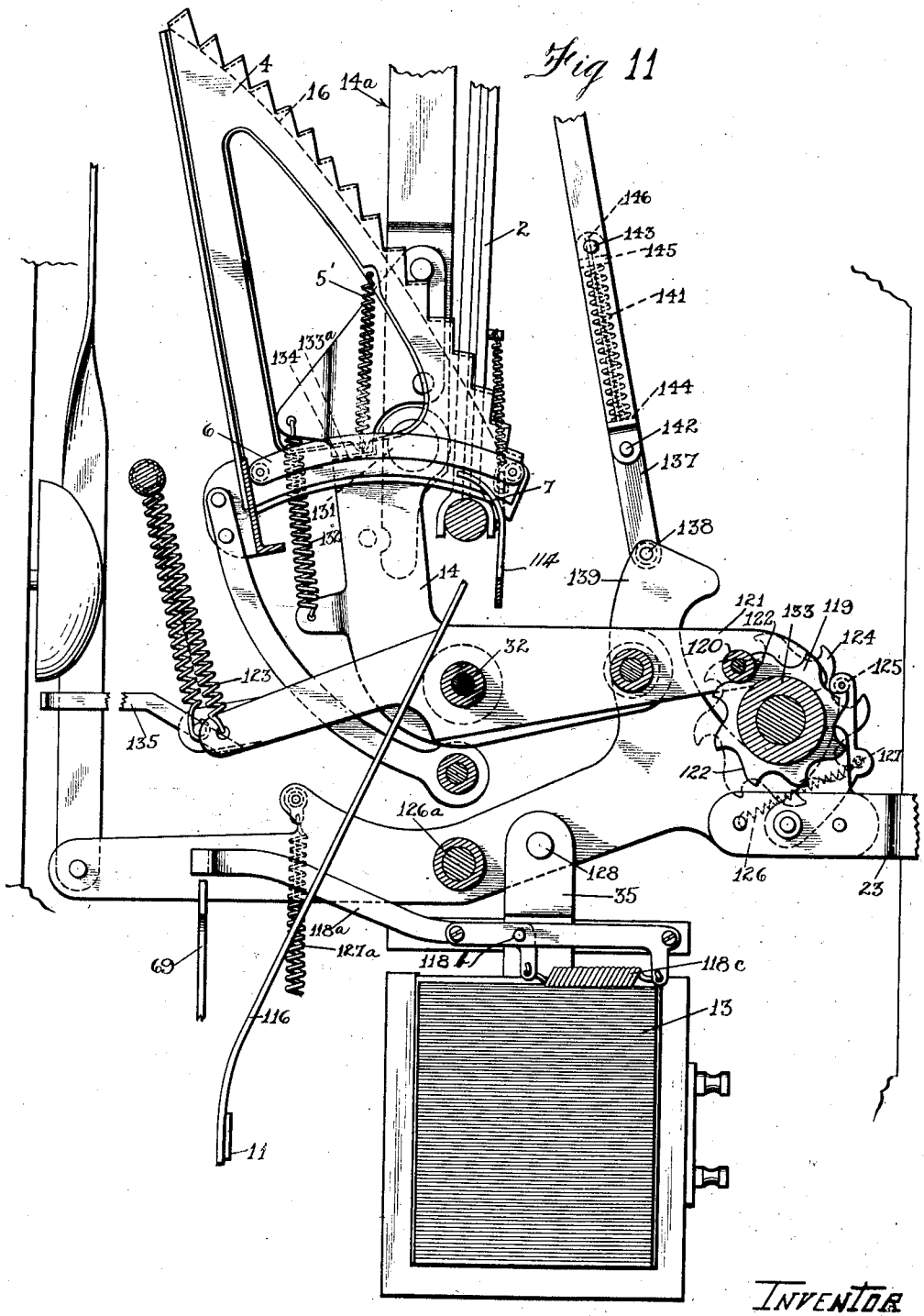
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Fig 11



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Fig 12

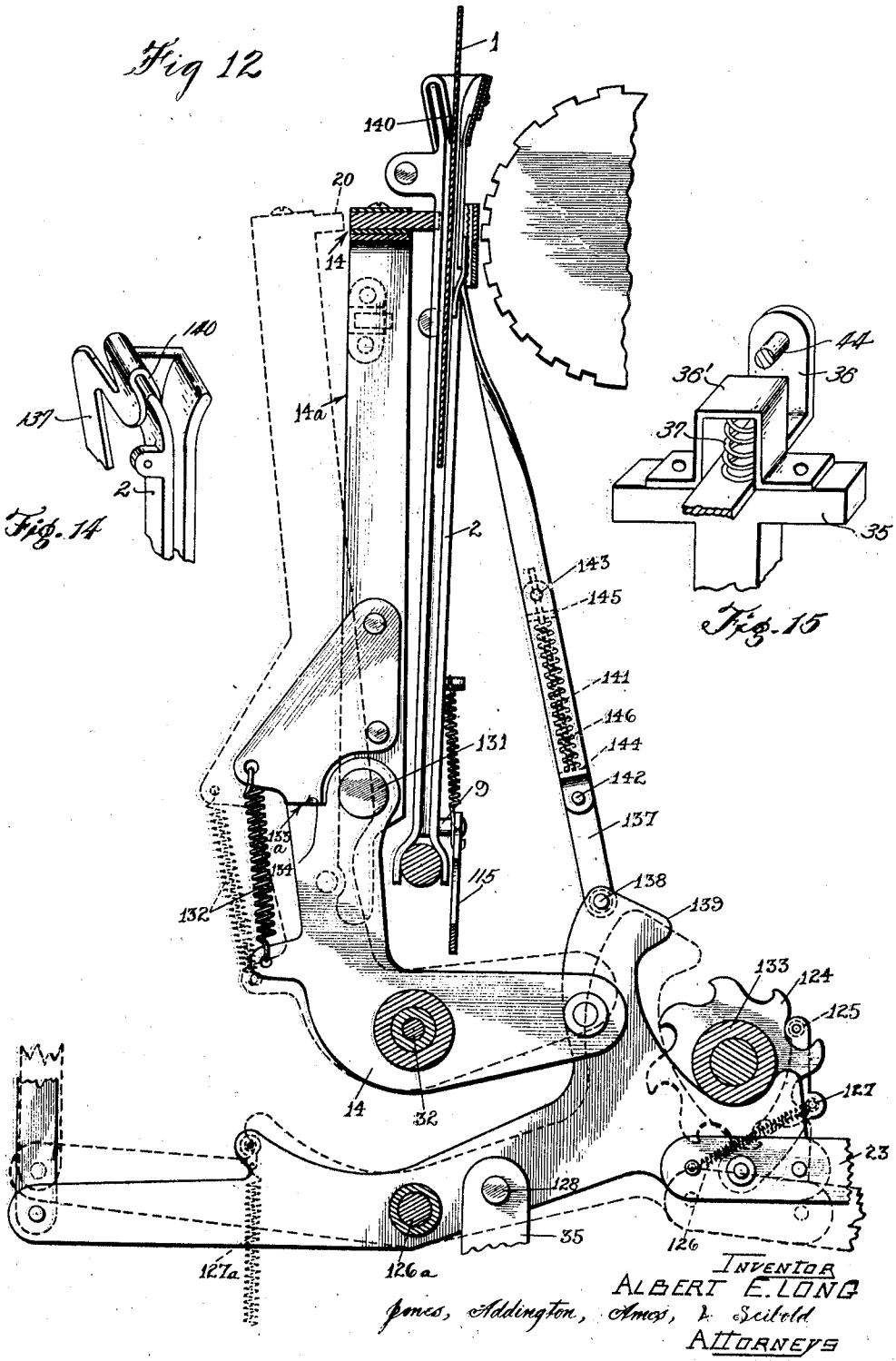


Fig. 14

Fig. 15

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Patented June 15, 1937

2,084,097

UNITED STATES PATENT OFFICE

2,084,097

TIME-PRINTING CONSTRUCTION

Albert E. Long, Chicago, Ill., assignor to Stromberg Electric Company, Chicago, Ill., a corporation of Delaware

Application November 23, 1931, Serial No. 576,636

12 Claims. (Cl. 234—43)

My invention relates to a time-printing construction, and more particularly to improvements in that type of time recorder, commonly known as in and out time recorders, wherein a workman inserts his time card and prints the time of his arrival or departure by the manual operation of a lever. Such a recorder, an example of which is described in Crook Patent No. 1,719,000, automatically sets a lateral shift and a vertical lift to effect a registration in a predetermined space on the time card in accordance with the working time schedule, and also sets a two-color ribbon to print red for late or all irregular registrations and blue for on-time registrations. Some of these recorders are equipped with means for manually setting the lift and shift mechanisms and have only a one-color ribbon. The number of registrations and positions for their location on the time card may vary from 1 to 176 or more.

In commercial time recorders of this type, the workman, upon arrival at work, removes his time card from the card rack and inserts it in the card receiver and, with the other hand, operates the printing lever to effect registration. If one hand is otherwise engaged, as in carrying a lunch pail or the like, it becomes very difficult and slow to complete the operation with one hand—that is, insert the card in the receiver, let go of the card, grasp the handle to press the printing lever, remove the hand from the printing lever and withdraw the card. Whether one or two hands are used to effect the registration, the two operations of placing the card in the receiver and pressing the printing lever are obviously slow and delay other workmen who are in line and in a hurry to make their registrations at the time of arrival in the morning and afternoon, and particularly is this emphasized at the time of departure at noon and at night. The collective effect of a slight delay on the part of each man is appreciable in its effect on the men toward the end of the line. It is also possible for a workman who is careless or in a hurry to register his time in the wrong space on the time card if he presses the printing lever before permitting his card to come to rest on the card abutment at the bottom of the receiver or starts to remove it before completing the hand operation, resulting in confusion of the records.

One of the objects of my invention is to provide an improved workman's time recorder having provisions whereby the mere act of inserting the card into the receiver will cause the printing operation.

Another object is to make the automatic printing available no matter at what point the lateral type wheel shift and vertical card lift come to rest.

Another object is to make the automatic printing available no matter how many registrations are required as determined by the size of the card and the number of registrations required thereon.

A further object is to make it necessary to enter the time card to its correct depth before a registration will be effected, thus reducing the workman's responsibility for correct registration to a minimum.

Another object is to provide a time recorder wherein the card is held in position while the registration is being made, making it impossible for the workman to effect a registration on the wrong line by pulling the card out quickly.

A further object of my invention is to provide a recorder which is adaptable for either hand or automatic printing without having to make adjustments of any kind.

A further object is to provide an automatic printing mechanism controlled by the card without interfering in any way with the regular automatic features of a card recorder or with the manual means for controlling the printing.

A further object is to provide a card recorder which can be easily changed from an automatic stamping recorder to a hand stamping recorder, or vice versa.

Another object is to make the operation of the printing mechanism very sensitive so that only a very slight pressure of the card or sheet is required to set it in motion.

Another object is to provide a printing mechanism which will operate no matter at what point on the card the pressure is applied, that is, in which no set method of inserting the card or sheet is required in order to operate the automatic printing mechanism.

A further object is to provide an improved time-printing construction having means for variably positioning the sheet to cause the printing to be variably placed on the sheet and having means controlled by the sheet for causing the printing operation.

A further object is to provide such a construction in which the sheet control of the printing operation is effected by the use of a movably mounted stepped member, the steps of which are successively moved into position to be engaged by the sheet.

Further objects will appear from the description and claims.

In the drawings, in which several forms of my invention are shown,

Figure 1 is a side elevation of apparatus embodying my invention;

Fig. 2 is a front view of the construction of Figure 1;

Fig. 3 is a plan view of the hammer-mounted card-holding construction of Figure 1;

Fig. 4 is a detailed view of the switch construction;

Fig. 5 is an enlarged perspective view of certain switch controlling parts;

Fig. 6 is a view showing a different form of a card-holding construction;

Fig. 7 is a view of the edge of the card with perforations for use in the construction of Fig. 6;

Fig. 8 is an elevational view of still another form of card-holding construction;

Fig. 9 is a side elevational view showing still another form of card-holding construction;

Fig. 9*a* is a front elevational view showing a different form of card control for the printing;

Fig. 10 is a sectional plan view on the line 10—10 of Fig. 9;

Fig. 11 is a section substantially on the line 11—11 of Fig. 9 showing the sheet-controlled switch-controlling mechanism and hammer actuating mechanism;

Fig. 12 is a section substantially on the line 12—12 of Fig. 10;

Fig. 13 is a detailed sectional view on the line 13—13 of Fig. 10;

Fig. 14 is a detail perspective view of a portion of the card grip construction; and

Fig. 15 is a detail perspective view of a portion of the spring hook connection between the armature and the hammer.

Two different constructions are shown and described in detail, both of which can be used effectively to accomplish the automatic printing by the insertion of the card in the funnel. In the first construction (Figs. 1 to 5 inclusive), the impression is made by a direct blow of the hammer against the type wheels, the hammer being directly connected to the armature of the electromagnet and cushioned by a coil spring attached thereto. In this method a separate operating means is provided to operate the impression member by hand if it is found desirable to do so. In the second construction (Figs. 10 and 11), the armature of the electro-magnet sets a ratchet in motion which communicates the movement to the hammer through a gradual rise and quick drop cam. This causes less racking on the type wheel mechanism and is more thoroughly cushioned through the stretching of the hammer springs before the actual blow takes place.

Referring to the drawings in detail, and first to Figs. 1 to 5 inclusive, the construction shown therein comprises a variable position, sheet-controlled time-printing construction comprising time-printing means A for printing on a sheet (including time-controlled printing wheels and a card-controlled hammer cooperating with the type wheels), means B for variably positioning the sheet to cause the printing to be variably placed on the sheet including a time-controlled rock frame movable step by step to different card-positioning positions, means D controlled by the sheet for causing the printing operation (including electromagnetic means C for controlling the hammer, a switch controlling the electromagnetic circuit caused to be moved to open position and latched as a result of energizing the electromagnet and unlatched as a result of placing the sheet in printing position to close the electromagnetic circuit) and manual means E for causing the actuation of the hammer independently of the electromagnetic control (including a manually-operable lever, a ratchet wheel given a step-by-step movement by said lever, a cam rotatable with said ratchet wheel, and a spring-pressed hammer controlled by said cam and acting on the printing wheel).

Before describing the construction in further detail, I will briefly outline the operation. The means for controlling the rock frame may be of any suitable type, such for instance as that disclosed in the patent to Crook, No. 1,719,000. With such a construction, the rock frame will be given a step-by-step movement, usually one step each day at a definite time of the day, to bring the steps of the slidably mounted stair step construction, one after the other into position to be engaged by the lower edge of the card when the workman inserts the card into the card-holding guides. In the automatic use of the recorder, the workman inserts his card 1 into the card-holding guides 2 and presses downwardly with sufficient force to move the two slidably mounted stair step members 3—4 downwardly against the resisting action of the coil tension springs 5—5'. The left-hand stair step member 3 of Fig. 2 is the only one concerned in effecting the printing operation, the right-hand stair step member 4 being provided principally to give a balanced resistance to the downward movement of the card 1. As the left-hand stair step member 3 is pressed downwardly, the arcuate presser bar 6, mounted on this stair step member 3, presses downwardly on the curved bearing finger 7 of the rock lever 8. This lever is thus rocked about its pivotal point 9 against the resistance of the coil tension spring 10. The rocking movement of this rock lever 8 actuates the latch-releasing lever 11 of the switch construction 12 which permits the switch to close, thus closing the circuit through the electromagnet 13 which actuates the printing hammer 14 to snap the card 1 over toward the printing wheel 15, thus causing the time to be printed on the card.

It will be seen that the insertion of the card 1 and the consequent slight downward movement of the left-hand stair step member 3 will cause the actuation of the printing hammer 14 no matter to what position the rock frame 16 may be moved, as the arcuate presser bar 6 will engage the presser finger 7 in all positions of the rock frame 16. The lower edge of the arcuate presser bar 6 is an arc about the axis of the rock frame 16.

In order to insure that the impression will be made at the proper space on the card 1, means are provided whereby the card 1 is gripped and held before the printing hammer 14 actually strikes the card. The construction shown in Figs. 1 and 3 for this purpose comprises a gripper bar 17 slidably mounted on the upper end of the hammer 14 and provided with a pair of coil compression springs 18—18' which will cause the gripper strip 19 to engage the card 1 before the impression face 20 of the hammer 14 strikes the card, but which springs 18—18' will yield to permit the continued movement of the hammer 14 after the gripper strip 19 engages the card. The slidable mounting of the gripper bar 17 is effected by the pin and slot construction indicated at 22.

There may be times when it will be desirable that the workman should be able to effect the printing operation manually without depending on the automatic electromagnet control. For

this purpose a manually-operable lever 23 is provided which, when depressed, will cause a stepped movement of the ratchet wheel 24, this in turn causing a stepped movement of the four-element cam wheel 25 which will release the pin 26 on the auxiliary hammer member 27, permitting this auxiliary hammer member 27 to snap downwardly under the action of the coil tension spring 28. This spring action of the auxiliary hammer brings the projection 29 on the auxiliary hammer 27 into engagement with the pin 30 on the arm 31 of the printing hammer 14, thus effecting the printing movement of the printing hammer.

I will now describe in greater detail certain features of the construction. The time-printing wheels 15 may be of any suitable type, such, for instance, as shown in the patent to Crook, No. 1,719,000. The printing hammer 14 may be pivotally mounted at 32 and limited in its oscillatory movement by means of the ratchet wheel shaft 33 which is engaged by the forked extensions 34 of the forwardly-extending part of the hammer lever 31. The hammer lever 31 may be connected with the T-shaped plunger or core 35 of the electromagnet 13 by means of a pair of U-shaped spring-holding members 36—36', one pivotally connected at 44 with the hammer lever 31 and the other rigidly secured to the crosshead of the T-shaped armature 35. The coil compression spring 37 held between these two U-shaped retainers 36 cushions the hammer blow and would also enable the armature 35 to complete its movement, even if for any reason the hammer 14 should be unable to complete its movement. This completion of the movement of the armature 35 would enable a resetting of the switch 12, as hereinafter explained in detail.

The transmission from the manually-operable lever 23 to the ratchet wheel 24 may be similar to that disclosed in the Crook Patent No. 1,719,000 comprising a pair of pawls 38—38' pivotally mounted at 39 on the lever 23 and cooperating with the teeth 40 of the ratchet wheel 24. On the downward movement of the lever 23 the left-hand pawl 38 pulls the ratchet wheel 24 around far enough to let the pin 26 on the auxiliary hammer 27 drop off from the crest of the cam wheel 25 to effect the printing operation of the hammer 14. When the lever 23 is released and raises under the action of a spring (not shown), the right-hand pawl 38' pushes the ratchet wheel 24 around far enough to allow the left-hand pawl 38 to cooperate with the succeeding tooth 40 of the ratchet wheel 24 on the next operation of the lever. A coil tension spring 41 connecting the two pawls 38—38' serves to maintain both of them in operative relation with respect to the ratchet wheel 24.

The slidable mounting 42 of the stair step members 3—4 on the rock frame 16 may be accomplished by the pin 43 and slot connection shown.

The automatically-reset card-released switch mechanism shown may be substantially the same as that disclosed in the co-pending application of Ernest S. Ostler, Serial No. 651,243, filed January 1, 1933 as a continuation in part of Serial No. 481,325, filed September 11, 1930, which contains generic claims on this feature.

The moving parts of the paper controlled switch comprise a slidably mounted contact member 61 for cooperation with the stationary contact member 62, the slide-actuating switch arm 63 oscillatably mounted on a shaft 64 extending between the side frame members 65 and 66, a latch member 67 pivotally mounted on a stud 68 secured to the actuating rock member 69, a spring pressed keeper member 70 rockably mounted on a stud 71 secured to the frame member 66, a stop pin 72 for limiting the spring pressed movement of the rockable keeper member and also of the latch member 67, the paper controlled trigger arm 11 rockably mounted on a shaft 72a extending between the side frame members 65 and 66 and the latch-releasing hook 73 pivotally mounted on a shaft 74 extending between the trigger arm 11 and a frame plate 75 secured to the trigger arm 11 by means of a pair of pins 76. A coil tension spring 77 is provided which tends to hold the arm 92 of the rockably mounted keeper 70 in engagement with the stop pin 72 on the side frame. Another coil tension spring 80 is provided secured to the pivotally mounted latch member 67 and tending to hold the edge 81 of this pivotally mounted latch member over against the laterally extending arm 82 of the keeper member 70. Another coil tension spring 83 is provided which serves as a returning spring for the rockably mounted trigger arm 11 when the edge of the paper is withdrawn, this spring having one end secured to the frame plate 75 on the trigger arm and its other end secured to a stud 85 on the side frame 66. The side frame members 65 and 66 are secured together and held in proper spaced relation by means of the shafts extending therebetween and a pair of spacing and securing rods 86 extending from one side frame to the other. One of these spacing members serves as a stop for the trigger member by reason of the engagement therewith of the rearwardly extending arm 87 on the trigger (Fig. 4).

The resetting of the switch is accomplished by means of a presser bar 87a mounted on a plurality of arms 87c extending laterally from the T-shaped plunger 35 and rigidly secured to said plunger. When this plunger is drawn downwardly the presser bar 87a engages a bearing plate 87b on the rock arm 69, thus opening the switch and causing it to be latched in open position by means of the latch member 67.

I will now explain the purpose of mounting the keeper member 70 in a manner permitting a slight oscillation thereof. This is to insure relatching of the paper controlled switch in open position upon the actuation of the switch returning arm 69, even if the paper should be left in a position to prevent the return of the trigger arm 11. In explanation of this, it will be seen that if the keeper member 70 were not permitted to yield under the pressure of the edge of the latch member 67 against the arm 82, and if at the same time the trigger arm 11 were not permitted to return under the action of the spring 83, the edge 88 of the lateral arm 89 of the latch 67 would move into engagement with the edge 90 of the hook 73 on the opening movement of the switch arm and the latching edge 81 of the latch member 67 would thus be prevented from engaging with the latching edge 91 of the keeper member 70. However, because of the yielding rockable mounting of the keeper member 70, the arm 92 of the keeper member will be rocked away from the limiting stop pin 72 because of the pressure of the edge of the latch member 67 against the surface of the laterally extending finger 82 of the keeper member (the tension of the spring 80 for the latch member being strong enough to over-

come the tension of the spring 77 for the keeper member).

This yielding of the keeper member 70 permits the hook-engaging edge 88 of the latch member 67 to swing free of the point 90 of the latch-releasing hook 73 (in the situation assumed in which the paper is preventing the return movement of the trigger arm and the hook 73 carried thereby). Thus, the switch member properly relatches when moved to open position by the switch opening arm 69 regardless of whether or not the paper controlled trigger arm 11 has been allowed to return.

The closing movement of the switch arm is effected by means of the coil compression spring 93 extending between a shoulder 94 on the contact carrying slide 95 and a lug 96 on the slide-carrying bracket 97. The contact-carrying slide 95 is slidably mounted on the bracket 97 by means of a pair of rivets 98 extending through slots 99 in the slide and secured to the flange 100 of the bracket 97. The slide carrying bracket 97 is, in turn, riveted to a mounting bracket 101 seated in a recess in an insulating block 102 to which it is secured by means of a screw 103. This insulating block is secured to the side frame by means of screws 104. The binding screw 105, previously referred to, is screwed into a laterally extending lug 106 formed integral with the mounting bracket 101. The circuit from this binding screw 105 to the movable contact 61 is through the mounting bracket 101, slide-carrying bracket 100 and either the slide 95 itself or slide-actuating spring 93 to the clip 107 which embraces the contact member 61. The stationary contact member 62 is mounted in a clip member 108 secured to a lug 109 extending from a mounting bracket 110 secured in a recess in the insulating block 102 by means of a screw 111. The other binding screw 112, previously referred to, is threaded into a lug 113 formed integral with the mounting bracket 110.

In the form of card-holding construction shown in Figs. 6 and 7, the card is provided with marginal perforations 45 for cooperation with yielding positioning and holding pins 46 mounted on the hammer 14. These pins 46 are slidably mounted in laterally-extending ears 47 secured to the hammer 14 and are spring pressed toward the card by means of coiled compression springs 48 extending between the collar 49 on the pins 46 and one of the ears 47 through which the pins are mounted. In operation, when the card 1 is inserted, causing the operation of the hammer 14, the positioning pins 46 will first enter the registering openings 45 in the card 1, thus holding the card accurately aligned in position while the hammer 14 continues its movement to effect the printing operation. The ends of the pins 46 engage suitable abutments 50 to prevent the pins 46 extending too far through the cards, thus facilitating the withdrawal of the pins 46 on the return of the hammer. The yielding mounting of the pins permits the hammer movement to continue after the pins have engaged the abutment.

In the construction of Fig. 8, a cam lever 51, pivotally mounted at 51' on the card holder 2 is provided for gripping the card 1, this cam lever having a pin and slot connection at 52 with the hammer 14 and having a gripping portion 52', the card being gripped between the portion 52' and the stationary lug 53 by the hammer movement. In the cam lever construction a link 54 pivoted at 55 forms a yielding connection between the cam 52' and the hammer 14. A spring 56 holds the lever 51 in yielding position so that when the hammer 14 is rocked forward the cam 52' grips the card and yet allows the hammer 14 to complete its movement due to the aforesaid yielding connection.

In the card control construction shown in Fig. 9 the depth to which the card may be inserted into the card holder 2 is determined by a rock lever 54a pivotally mounted at 55a and given a step-by-step movement by means of the spiral cam 56a which is oscillated step-by-step from day to day, to change the height of the card-engaging portion of the lever. This lever carries a trigger arm or lever 57 pivotally mounted on the card-positioning member at 58 and having a portion extending into position to be engaged by the lower edge of the card. This trigger lever 57 operates the trip lever 11 on the switch by suitable transmission, including a bell crank lever 59 pivotally mounted on the card-positioning member 54a and a link 60 pivotally connecting the bell crank lever 59 and trip arm 11.

It will be seen that in this construction also the card controls the tripping of the switch no matter in what position the card-positioning arm may be.

The construction of Figs. 9a to 13 is substantially the same as that disclosed in Figs. 1 and 2, except as to the transmission between two slidably mounted stair step members 3 and 4 and the latch releasing lever 11 of the switch construction and as to the means for controlling the printing hammer 14.

I will first describe the transmission from the slidably mounted stair step members to the latch controlling lever. This is so designed that pressure anywhere on the upper edge of the card will effect the operation of the latch releasing lever.

For this purpose, two rock levers 114 and 115 are provided, one for each slidable stair step member 3 and 4, a common transmission being provided from these rock levers 114 and 115 to the latch releasing lever 11 in the form of a link 116 pivotally connected to both rock levers 114 and 115 and also pivotally connected to the latch releasing lever 11. These rock levers 114 and 115, as in the form of Fig. 2, are pivotally mounted at 9, 9 on the card-holding guides 2 and are provided with curved bearing fingers 7, engaged by the arcuate presser bars 6 secured to the slidable stair step members 3 and 4.

In order to permit different spacings of the card guides 2 for different widths of cards, the rock levers 114 and 115 are provided with a series of holes 117 so that by removing the pivot screw 118 different holes in the two rock levers may be made to align with each other to permit of different spacings of the card guides, the screw being again inserted when the proper spacing has been obtained.

In order that the switch resetting arm may act in a yielding manner if necessary in resetting the switch, the laterally extending arm 118a which operates the resetting lever 69 is pivotally mounted at 118b on the plunger 35 and is yieldingly held in its lowermost position by means of a coil tension spring 118c.

Suitable springs 10 are provided for returning the levers 114 and 115 and suitable springs 5 are provided for returning the stair step members 3 and 4 when the card is withdrawn. The springs 10 serve to keep the weight of the levers 114 and 115 off the switch actuating lever 11

and the springs 5 serve to keep the weight of the stair step members off the curved bearing fingers 7 so that there is very little friction at this point when the stair step members are shifted from day to day.

It will be seen that the construction is such that a slight pressure on either one of the stair step members will cause an impression to be made and also that pressure on the card at any point of its upper edge will cause operation of the switch.

In present time recorders of the hand operated printing lever type, a considerable amount of pressure must be applied to cause the printing hammer to function. In some recorders the hammer blow is accomplished by a sliding trip-off arrangement after stretching a spring of considerable strength which requires a strong pressure to operate it. Another method (described in the patent to Crook No. 1,143,364) accomplishes the blow by a ratchet wheel connected to a cam and adapted to be rotated a definite distance to cause the cam to operate the hammer, a pawl for rotating the ratchet wheel part of the distance and a second pawl for rotating the cam into a position to operate again. In this method a spring of considerable strength must be provided to overcome the hammer springs on the return motion of the printing lever.

To operate such a construction electrically would place a heavy task on the electro-magnets and cause a heavy consumption of current. It is advisable to have the hammer function with as light a pull as possible. I have accomplished this result by causing the printing lever to operate the ratchet that turns the cam on the down move of the lever, using but one pawl, there being no additional pawl necessary to turn the ratchet to cause the cam to stretch the hammer spring on the return movement of the printing lever. I also reduce by half the amount of stroke necessary to cause the printing operation by using twice the number of teeth in the ratchet on the cam described in the Crook Patent No. 1,143,364. I will now describe in detail the construction for accomplishing these results.

The hammer 14 is pivotally mounted at 32 and is operated by means of a pair of rotatable cam wheels 119, which cam wheels may be driven either electrically or manually. The cam wheels 119 control the hammer 14 by means of a pin 120 extending between the forwardly extending arms 121 of the hammer lever which pin is engaged successively by the teeth 122 of the cam wheel 119. During the first part of the step movement of the cam wheel 119, the cam forces the pin 120 upwardly, withdrawing the hammer 14 from the printing position. At the latter part of the step movement, the pin 120 drops off the tooth 122 of the cam 119 and the hammer springs 123 cause the hammer 14 to strike a sharp uniform blow to effect a printing operation. The step movement of the cam wheel 119 is effected by means of a ratchet wheel 124 rotatable with the cam wheel 119 and actuated by means of a pawl 125 pivotally mounted on the main operating lever 23. In order to hold the pawl 125 in cooperative relation wtih respect to the ratchet wheel 124, a coil tension spring 126 is provided, secured to the pawl at 127 and having its other end secured to the main actuating lever. The main operating lever 23 is pivotally mounted at 126a and is normally held in raised position by means of the coil tension spring 127a. For electrical operation, it is pivotally connected at 128 with the plunger 35 of the electromagnet.

For manual operation, a forward extension is provided having a hand-engageable portion 129 (Figs. 10 and 13) which may be made accessible for operation by pushing the sliding closure 130 downwardly to the dotted-line position shown in Fig. 13.

It will be seen that the construction is such that the printing may either be accomplished automatically by pressing down on the card to operate the switch lever 11 or by pressing down on the hand lever to effect manual operation of the printing hammer in case current is not available for electrical operation or if, for any reason, manual operation is desirable. It will also be seen that the construction for manual operation involves hardly any additional mechanism but simply a slight extension on the hammer operating lever and a closure in the casing, which may be opened to permit access to this extension.

It will also be noted that the pin 120 serves to hold the rotatable cam wheels 119 against movement between strokes of the lever 23, thus dispensing with the necessity of a retaining pawl which is commonly used in ratchet mechanisms.

As is common in time recorders, the hammer 14 is so mounted that the printing action takes place as the result of the momentum of the upper portion of the hammer, this momentum effect being obtained by pivotally mounting the upper portion of the hammer at 131 and providing a coil tension spring 132 secured to the rearward extension of the upper portion of the lever. The lower portion of the lever is stopped in its spring-actuated movement by the engagement of the forward extension of the lever with the shaft 133 on which the cam wheels 119 and 136 and ratchet wheel 124 are mounted. The upper portion of the hammer 14a, however, flies forward under its own momentum about its pivotal point 131 against the retarding of the spring 132, which spring, however, withdraws the hammer portion 14a as soon as the printing action has taken place, to the position shown in Fig. 11, in which the shoulder 133a on the upper part of the hammer engages the shoulder 134 on the lower part of the hammer. The usual bell signal 135 may be provided for indicating that a printing operation has been effected, this signal apparatus being controlled by a cam wheel 136 similar to the cam wheel 119 controlling the printing hammer 14.

In order to insure that the card will be held in proper position during the printing operation, a card-gripping construction is provided comprising a yieldable extensible link 137 slidably connected at its upper end to move at an angle with respect to the card 1 and pivotally connected at its lower end 138 to the upward extension of the ratchet operating arm 139. When the ratchet operating arm 139 is in its uppermost position, the card-engaging portion of the gripping member 140 is out of the path of the card 1 so as not to interfere with the insertion of the card. However, upon the insertion of the card 1 and the consequent downward movement of the ratchet operating arm 139 the link 137 is drawn downwardly and the card-engaging portion of the card grip 140 is brought into engagement with the card 1 to prevent its withdrawal and hold it in proper printing position.

In order to secure uniform gripping action, a coil compression spring 141 is provided between the two parts of the extensible link. The two

parts of the link have a pin and slot engagement with each other, as indicated at 142 and 143, and the coil compression spring 141 is held in place between two opposed shoulder portions 144 and 145 of the link members. In order to prevent buckling of the spring, a guide pin 146 is provided, firmly secured to one of the shoulders and having its other end guided in a hole in the other shoulder. With this extensible yieldable connection, the ratchet operating arm can complete its movement after the card-engaging portion has been brought into gripping engagement with the card.

It will be seen that my improved time recorder effects an increase in speed over a construction requiring the insertion of the card or sheet with one hand and the operation of the lever with the other hand, thus increasing the capacity of the recorder and enabling one machine to take care of a larger number of workmen than has heretofore been possible. It will also be seen that this construction is much easier and simpler to operate than previous types in that it may be operated with the use of one hand only, which is a great convenience in case the workman happens to be carrying something in the other hand. It will also be seen that it insures the accurate placement of printing on the card or sheet, as the printing cannot take place until the card has been fully inserted and the card cannot be withdrawn until the printing operation has taken place. It also tends to prevent injury to the recorder by rough handling, which is common in recorders in which the workman has to operate the hammer actuating lever. It will also be seen that the elimination of the projecting handles gives more aisle space, which is an advantage where the passageways are narrow and every inch of available space is of importance.

While I have described my invention in connection with an in and out time recorder, many of its features are broadly applicable in other apparatus, such as job time recorders, time stamps, etc.

Further modifications will be apparent to those skilled in the art and I desire, therefore, to be limited only by the prior art and the scope of the appended claims.

In the claims, where the word "sheet" is used, it is intended to be broad enough in its meaning to include cards, papers, or articles of any sort on which time printing may be desirable.

The feature of gripping the card and locking it in proper position until after the printing operation has been completed is broadly claimed in my co-pending application Serial No. 724,675, filed May 9, 1934 as a continuation in part of the present application.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A variable position, sheet-controlled time-printing construction comprising means for printing on a sheet, means for variably positioning the sheet to cause the printing to be variably placed on the sheet including a rock frame movable step by step to different sheet-positioning positions and a stepped member mounted on said rock frame and movable with respect thereto, the steps of which are successively moved into position to be engaged by the sheet to effect a movement of the stepped member, and means controlled by the movement of the stepped member with respect to the rock frame for effecting the printing operation.

2. In a time printing device for printing on a sheet a movable impression member, an electro-magnet for operating said impression member, means for variably positioning the sheet to cause the printing to be variably placed on the sheet, a switch for controlling the circuit of said electro-magnet, spring means tending to close said switch, means controlled by movement of said impression member for setting and latching said switch in open position against the action of said spring means, and means comprising a movable member controlled by the inserting of the sheet to be stamped for releasing said latch to permit the spring to close the switch to cause the operation of the impression member to cause relatching of the switch in open position.

3. A sheet-controlled printing construction comprising printing means, means controlled by the insertion of a sheet into printing position for causing the printing operation comprising a pair of laterally spaced movable sheet-engaging members engageable by the end of the sheet and movable thereby, and means whereby pressure on either of said movable members will cause the printing operation.

4. A sheet-controlled printing construction comprising printing means for printing on the sheet, unitary means movable as a unit to various positions, sheet-positioning means movable with said unitary means, said sheet-positioning means comprising a pair of spaced members each engageable by the edge of a sheet and depressible thereby, and means responsive to depression of either of said members for causing a printing operation.

5. A time printing device comprising rotatable type wheels, an electromagnet for furnishing power for making the impression in the printing operation, means for causing the printing to be variably positioned on the sheet, a switch actuated by said last-named means when engaged by a sheet for controlling the circuit of the electromagnet, and means controlled solely by said electromagnet for opening the switch in definite time relation to the printing operation.

6. A time printing device comprising rotatable type wheels, an electromagnet for furnishing power for making the impression in the printing operation, means for causing the printing to be variably positioned on the sheet, a switch for controlling the circuit of the electromagnet closed by the engagement of a sheet with said positioning means, and means controlled solely by said electromagnet for opening the switch in definite time relation to the printing operation and locking it in open position.

7. A sheet controlled printing construction comprising printing means, a rockably mounted frame, a stepped member mounted on said frame for movement therewith as said frame is rocked, said member engageable with a sheet in any of its positions to variably position the sheet with respect to said printing means and movable with respect to said frame when engaged by a sheet, a switch for controlling the printing operation, and mechanical means for transmitting to said switch the movement of said stepped member resulting from the engagement of the edge of the sheet with any of its steps.

8. A sheet controlled printing construction comprising printing means, a movable sheet positioning member for variably positioning a sheet with respect to said printing means, a switch for controlling operation of the printing means, means connecting said member and said switch whereby pressure on said member in any of its positions by the insertion of a sheet closes said

switch to effect a printing operation, and means responsive solely to operation of said printing means for opening said switch, whereby opening of said switch is independent of the condition of said member.

9. A sheet controlled printing construction comprising printing means, a movable sheet positioning member for variably positioning a sheet with respect to said printing means, a switch for controlling operation of the printing means, mechanical transmission means between said member and said switch whereby pressure on said member in any of its positions caused by the insertion of a sheet closes said switch, and means responsive solely to the operation of said printing means for opening said switch and for latching it in open position, whereby opening and latching of said switch is independent of the position of the sheet and of the condition of said member.

10. In a card time recorder, printing means, variable card positioning means including a movable abutment engaged by a card when inserted in printing position and movable thereby, a magnet and an armature therefor, means controlled by said movable abutment for energizing said magnet to attract said armature, and means controlled by said armature for operating said printing means to effect a printing operation and for deenergizing said magnet in definite time relation with respect to the printing operation irrespective of the position of said abutment.

11. In a card time recorder, printing means including a spring pressed hammer, a card receiver, means for variably positioning a card in said receiver, an electromagnet provided with an armature having a back and forth movement, mechanical transmission between said armature and said hammer whereby said spring pressed hammer is withdrawn and released to effect the printing operation during attraction of said armature when said electromagnet is energized, a switch for controlling said electromagnet closed by the insertion of a card in said receiver into engagement with said positioning means in any of its positions, and means controlled by said armature for opening said switch.

12. A sheet controlled printing construction comprising printing means for printing on a sheet and means controlled by the sheet for causing the printing operation comprising a pair of spaced movable members engageable by the edge of the sheet and movable thereby and means whereby pressure on either of said movable members will cause the printing operation.

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