(No Model.) 8 Sheets—Sheet 1.

# J. J. BUSENBENZ.

## TIME STAMP.

No. 526,854. Patented Oct. 2, 1894.

Fig. 1.

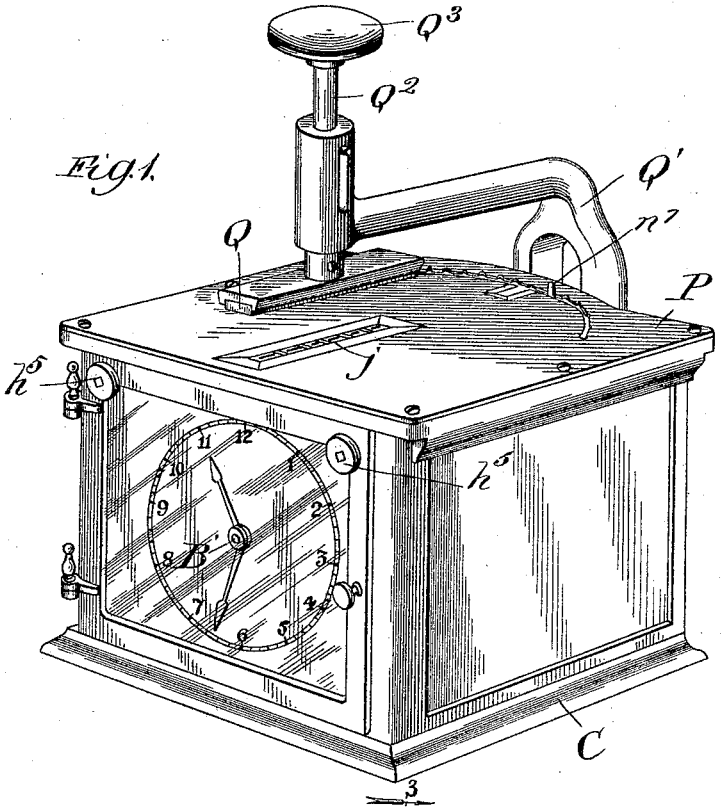
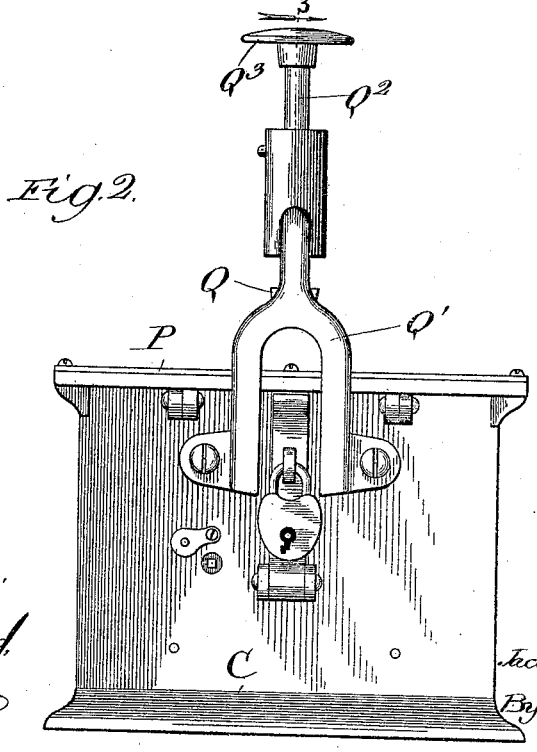



Fig. 2.

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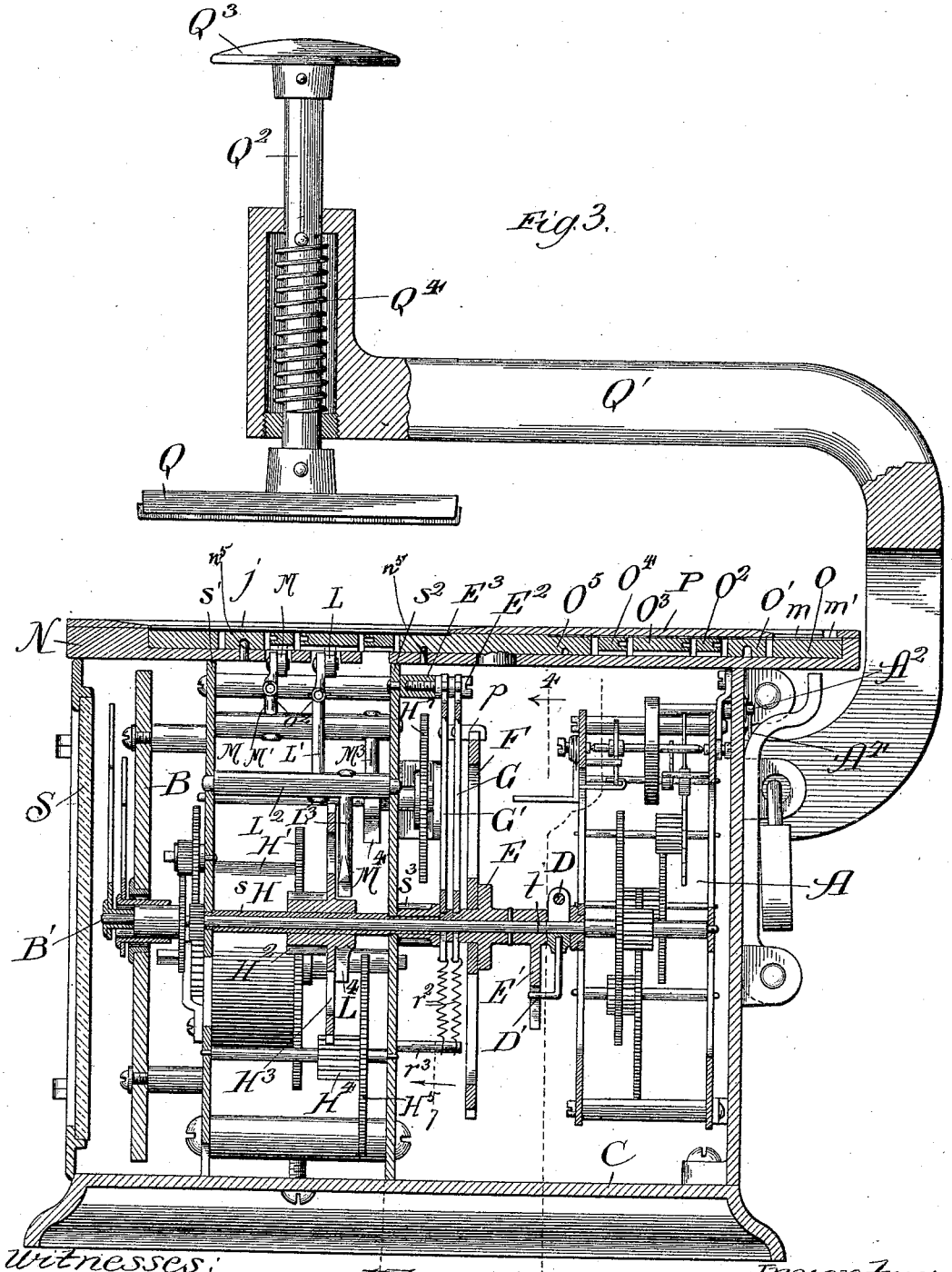
(No Model.) 8 Sheets—Sheet 2.

# J. J. BUSENBENZ.

## TIME STAMP.

No. 526,854. Patented Oct. 2, 1894.

Fig. 3.



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# J. J. BUSENBENZ.

## TIME STAMP.

No. 526,854. Patented Oct. 2, 1894.

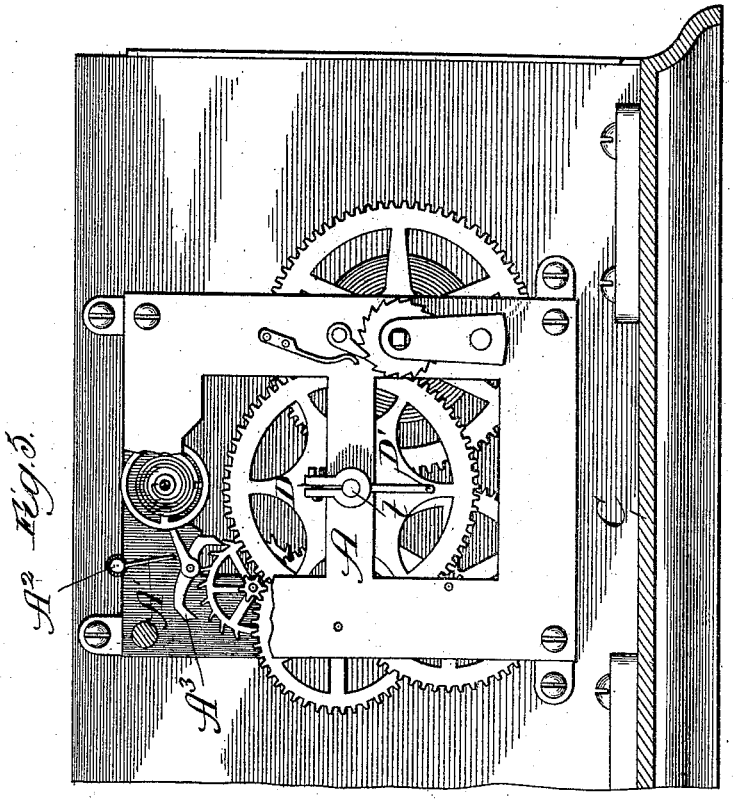


Fig. 5.

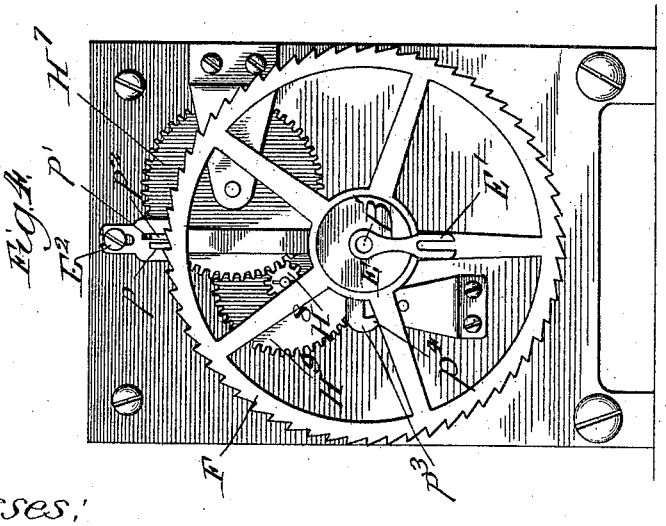


Fig. 4.

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(No Model.) 8 Sheets—Sheet 4.

# J. J. BUSENBENZ.

## TIME STAMP.

No. 526,854. Patented Oct. 2, 1894.

Fig. 6.

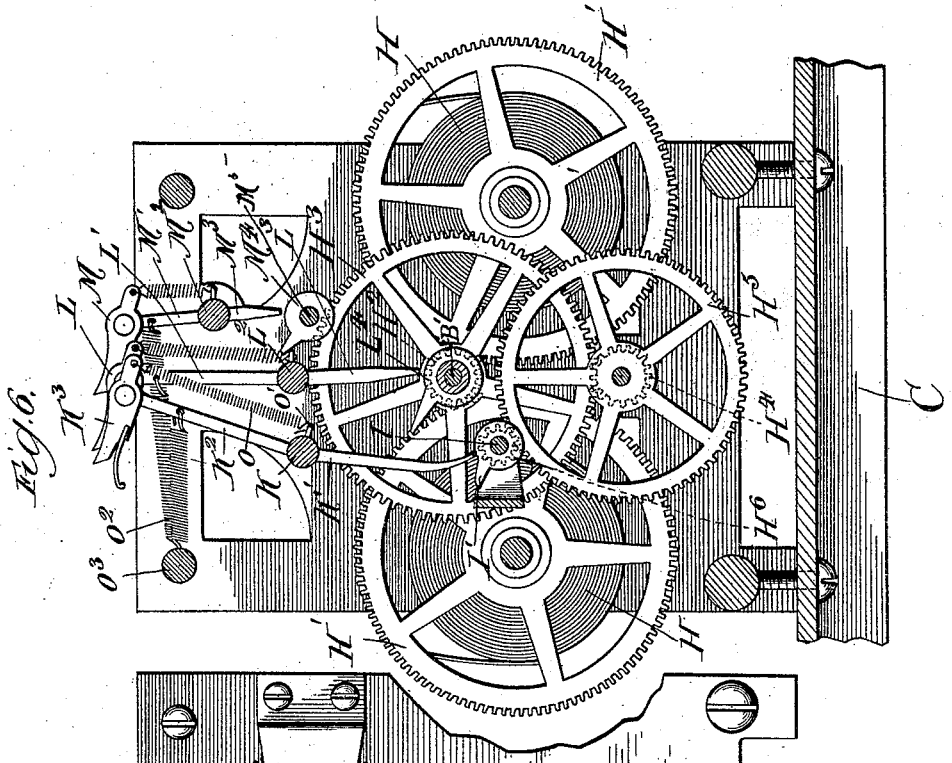


Fig. 7.

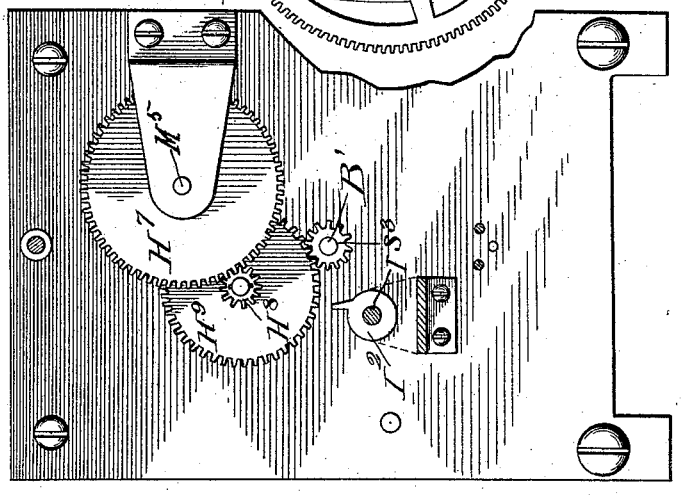
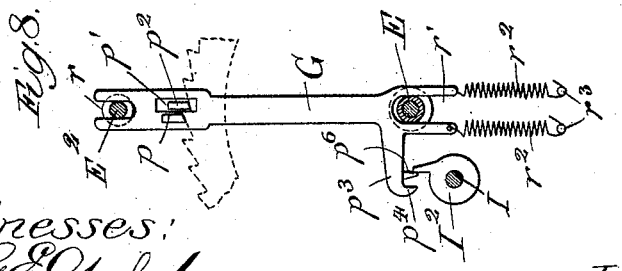


Fig. 8.



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(No Model.) 8 Sheets—Sheet 5.

# J. J. BUSENBENZ.

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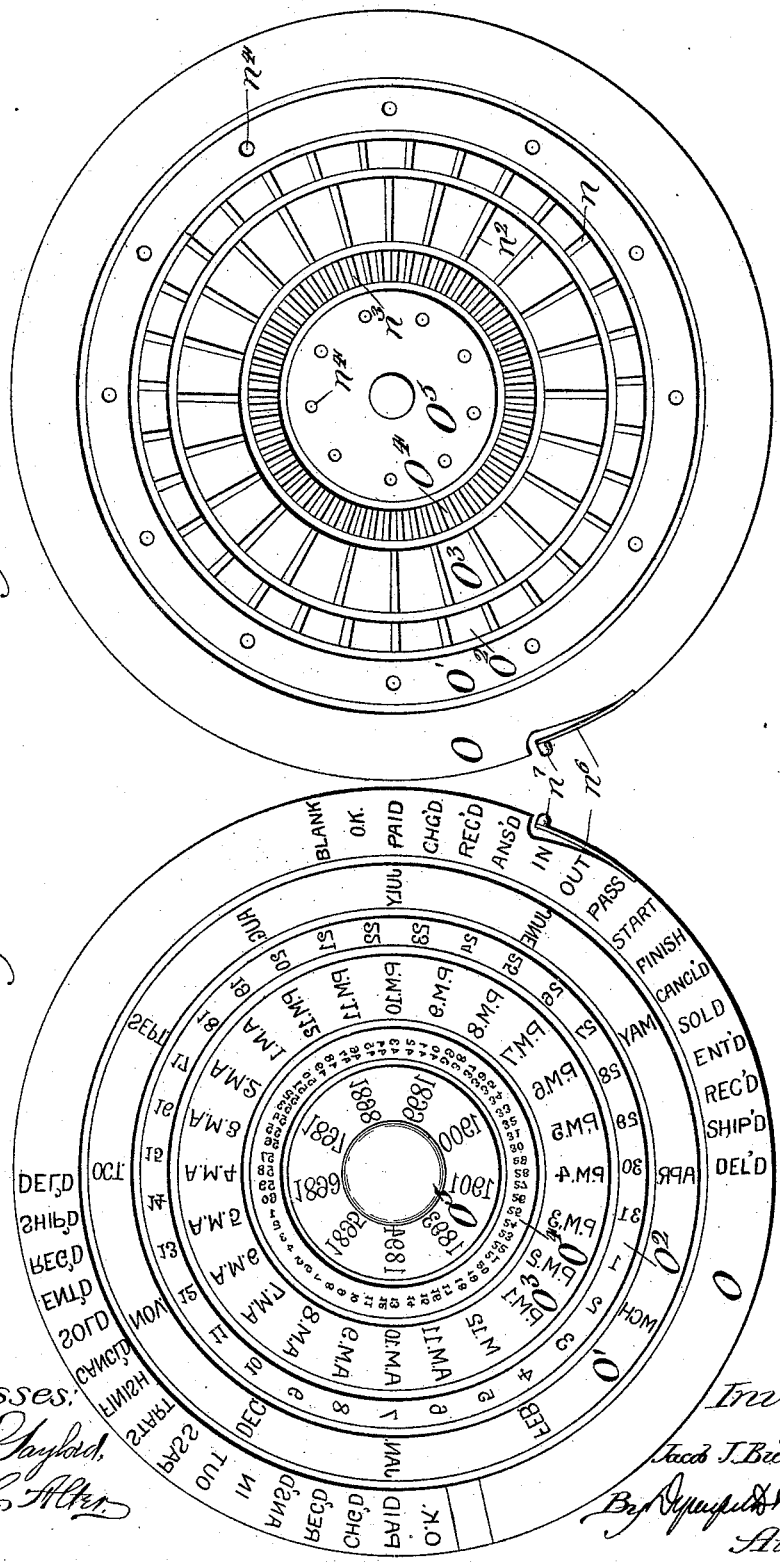


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# J. J. BUSENBENZ.

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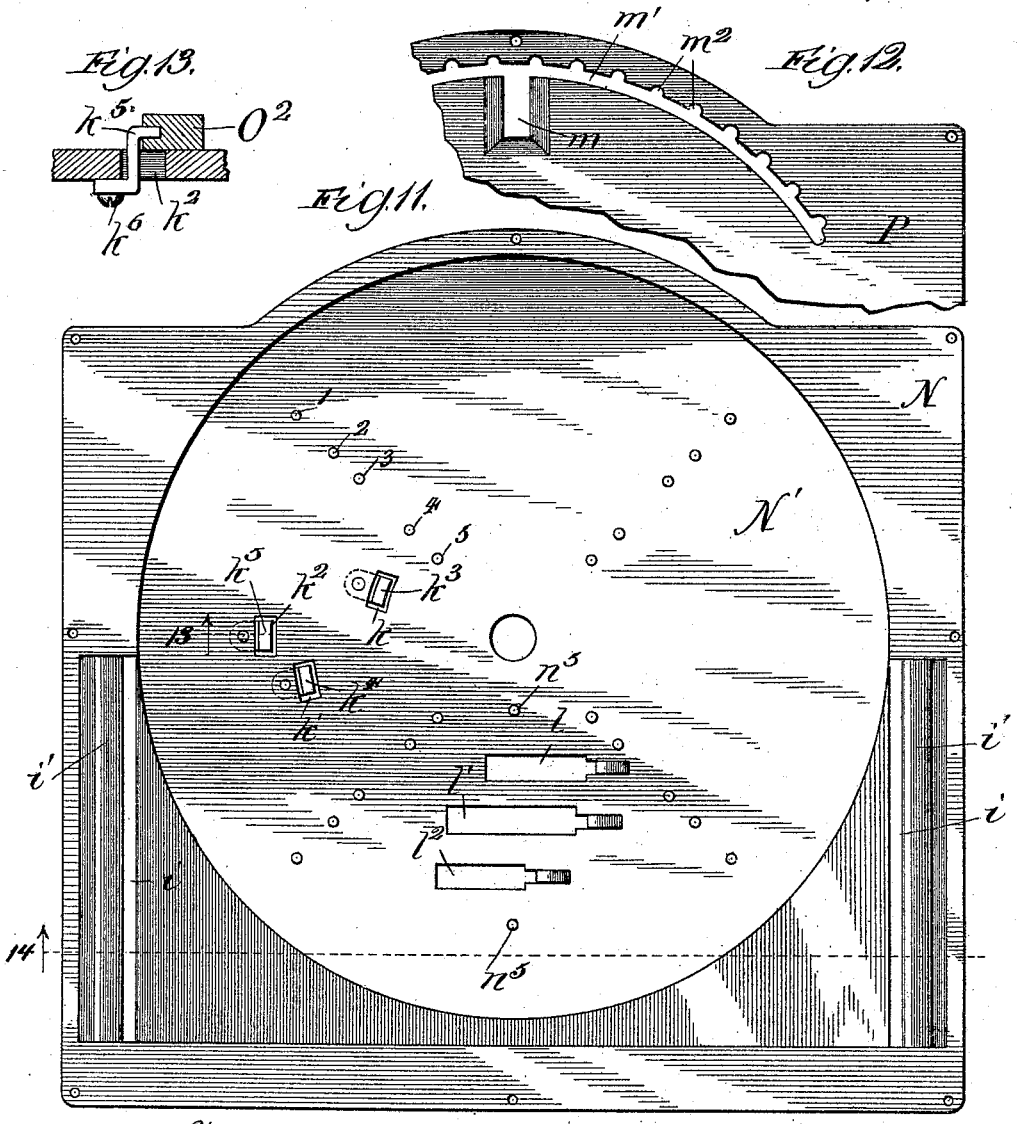


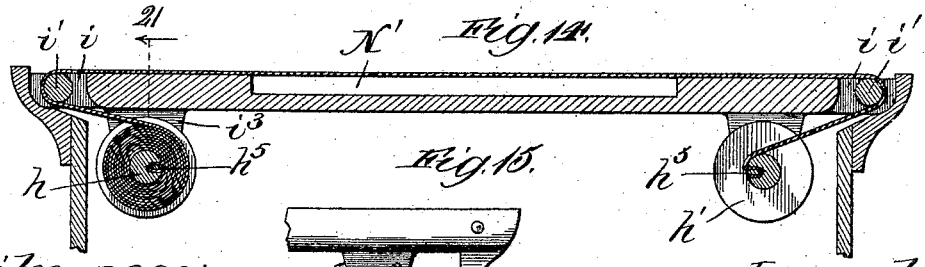


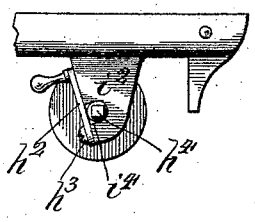


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(No Model.) 8 Sheets—Sheet 7.

# J. J. BUSENBENZ.

## TIME STAMP.

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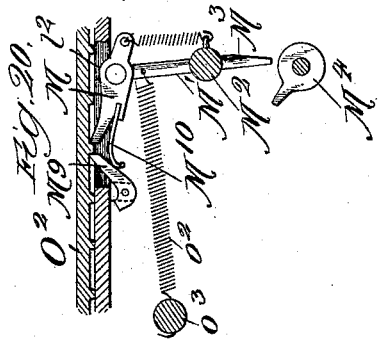

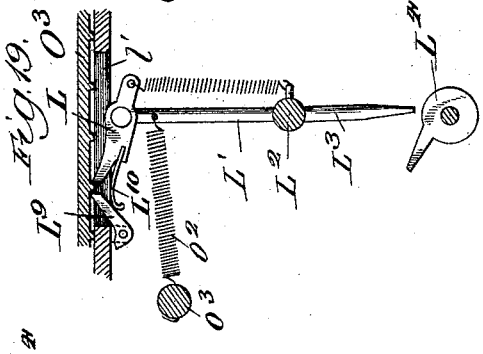

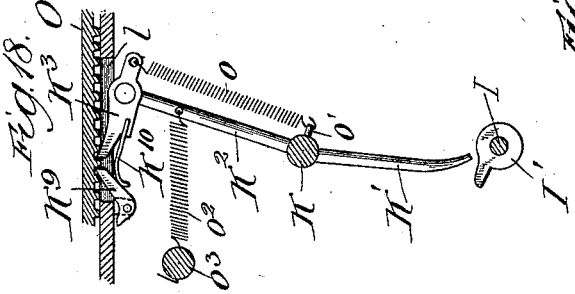

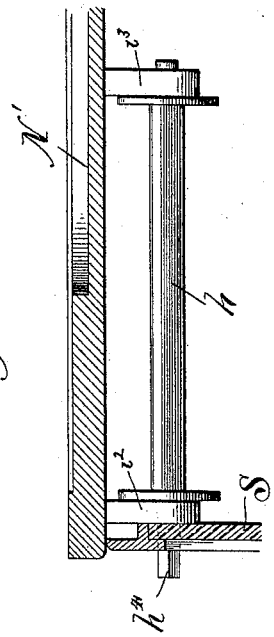

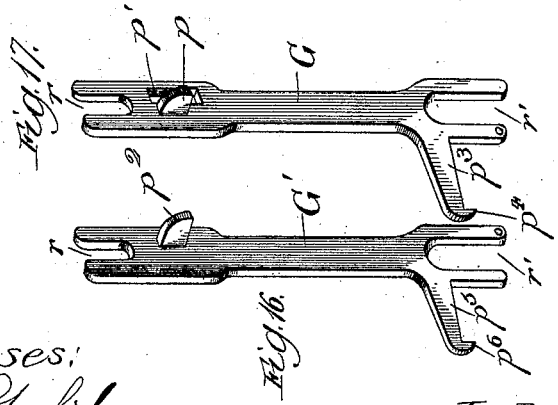

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Luke J. Atty.

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(No Model.) 8 Sheets—Sheet 8.

# J. J. BUSENBENZ.

## TIME STAMP.

No. 526,854. Patented Oct. 2, 1894.

Fig. 27.

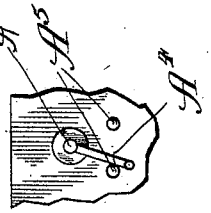



Fig. 23.

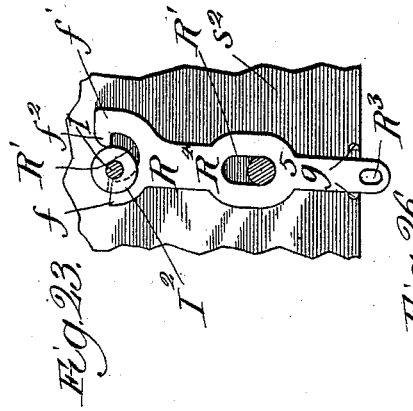
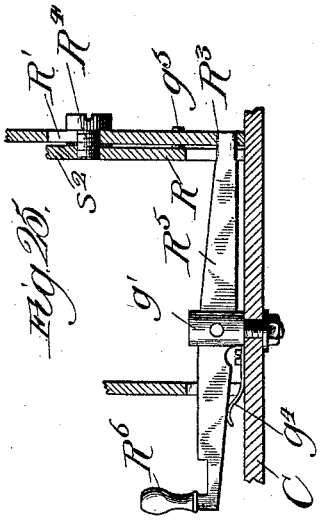



Fig. 26.

Fig. 25.



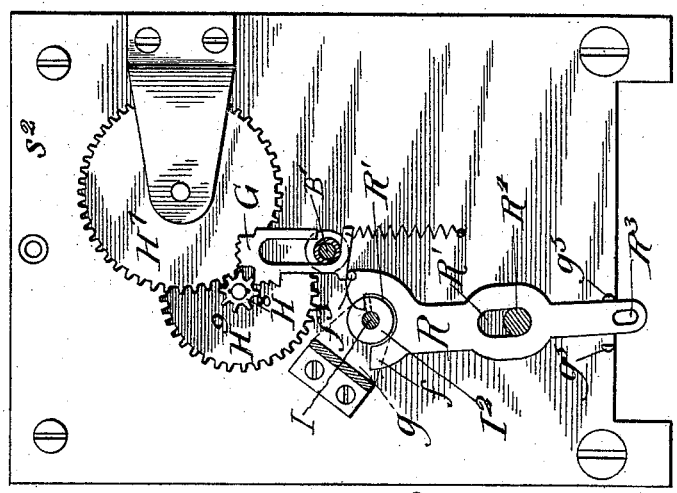
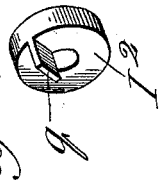




Fig. 22.

Fig. 24.




Witnesses:
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Luke's & Alter.

Inventor:
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# UNITED STATES PATENT OFFICE.

JACOB J. BUSENBENZ, OF CHICAGO, ILLINOIS.

## TIME-STAMP.

SPECIFICATION forming part of Letters Patent No. 526,854, dated October 2, 1894.

Application filed March 13, 1894. Serial No. 503,472. (No model.)

*To all whom it may concern:*

Be it known that I, JACOB J. BUSENBENZ, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Time-Stamps, of which the following is a specification.

My invention relates to an improvement in mechanism of the nature known as time stamps, the purpose of which is to permit a printed mark to be made which shall present the exact time indicated upon a clock; and the object of my invention is to produce a time stamp presenting desirable and useful features, and which shall be more economical in construction and more durable, and the operation of which shall in no manner interfere with the time keeping properties of the clock train.

My invention consists in the general and specific details of construction and combination of parts, all as hereinafter more fully set forth.

In the drawings, Figure 1 is a view in perspective of a time stamp embodying my improvements. Fig. 2 is a rear elevation thereof. Fig. 3 is a central, vertical section taken on the line 3 of Fig. 2 and viewed in the direction of the arrow. Fig. 4 is a transverse sectional elevation taken on the line 4 of Fig. 3 and viewed in the direction of the arrow. Fig. 5 is a transverse, vertical section taken on the irregular line 5 of Fig. 3 and viewed in the direction of the arrow. Fig. 6 is a transverse, vertical section taken on the line 6 of Fig. 3 and viewed in the direction of the arrow. Fig. 7 is a transverse, vertical section taken on the line 7 of Fig. 3 and viewed in the direction of the arrow. Fig. 8 is a view in elevation of a pair of bars and connected parts which constitute the release mechanism operated by the time keeping train for releasing the printing train motor at intervals. Fig. 9 is a plan view of the printing wheels. Fig. 10 is an inverted plan view of the printing wheels. Fig. 11 is a plan view of the top plate showing the guide pins for the printing rings or wheels, the openings through which the pawls project, and the guide lugs which hold the rings or wheels against vertical displacement. Fig. 12 is a broken plan view of the cover plate at the rear end thereof. Fig. 13 is a vertical sectional detail view of the guide lug for a printing wheel taken on the line 13 of Fig. 11 and viewed in the direction of the arrow. Fig. 14 is a vertical, transverse section taken through the top plate and illustrating the mode of employing and operating the inking ribbon. Fig. 15 is a broken side elevation showing the mode of locking the ink ribbon rolls in position. Figs. 16 and 17 are perspective views of the dog carrying bars involved in the release mechanism. Fig. 18 is a sectional diagrammatic view of the minute printing wheel pawl mechanism; Fig. 19, a similar view of the hour printing wheel pawl mechanism; Fig. 20, a similar view of the date printing wheel pawl mechanism. Fig. 21, a transverse section on the line 21 of Fig. 14 showing one of the ink ribbon rollers. Fig. 22 is a view in rear elevation of the stamp mechanism showing a preferred construction of the release dog mechanism and illustrating the preferred mechanism for setting the printing train. Fig. 23 is a view in elevation illustrating a detail of the printing train setting mechanism in a different position from that illustrated in Fig. 22. Fig. 24 is a perspective view of the stud carrying disk which it is preferred to employ in the release dog mechanism. Fig. 25 is a view in sectional side elevation of the lever and connected parts for setting the printing wheel mechanism; Fig. 26, a plan view of the same; and Fig. 27, a view in rear elevation of a section of the back plate showing the lever which operates the arm to engage the pallet to stop the time keeping train.

The clock mechanism illustrated herein is the common Seth Thomas movement and will not require extended description. It is indicated generally by the letter A. In connection with the clock movement, the mechanism for stopping the movement of the train is shown to consist in an arm A′ swinging on a horizontal pivot $A^2$ in the path of the pallet $A^3$, the horizontal pivot $A^2$ being in the form of a pin which passes through the case and carries at its outer end an arm $A^4$, the vibration of which in either direction is limited by studs $A^5$, Fig. 27. When in the position shown in Fig. 5 of the drawings the arm A′ is out of engagement with the pallet $A^3$ so

that the latter is free to vibrate. When the arm is swung on its pivot, however, to engage the pallet $A^3$, it is obvious that it stops its movement.

The clock dial B is at the end of the case C opposite to that in which is mounted the clock movement, and the shaft B′, which carries the minute hand, extends forward from the time keeping train, being divided into two parts, as indicated at *t*, Fig. 3. A sleeve *s* extends from the partition plate *s′* to the partition plate $s^2$ and through the latter, and carries on its rear end a toothed barrel $s^3$. The sleeve *s* is free to rotate in the bearings afforded in the partitions *s′* and $s^2$, but in its rotation it is independent of the minute shaft B′; which passes through the sleeve *s*. On the section of the minute shaft B′, which is adjacent to the time keeping train A, there is mounted thereon, through the medium of the adjustable collar D, a downward and forward extending hooked arm D′. Upon the rear end of the other section of the minute shaft B′ is a sleeve or arbor E, the rear end of which carries the radially extending forked arm E′, in the fork of which enters the projecting end of the hook D′. The sleeve or arbor E is keyed to rotate with the minute shaft B′, and carries the release wheel F, having the ratchet on its periphery. The arbor E is provided with annular grooves at a point between the release wheel F and the partition $s^2$ to afford guides for the lower forked ends of the release dog bars G and G′. The forward end of the sleeve or arbor E abuts against the toothed barrel $s^3$, and hence the movement produced in the ratchet wheel F, called the release wheel, is not given to the toothed barrel $s^3$.

In Figs. 8, 16 and 17 a construction of the dog carrying bars for the release mechanism is shown which differs from that illustrated in Fig. 22 so far as it relates to the lower end thereof, the form illustrated in Fig. 22 being preferred, especially if it be desired to incorporate in the time stamp the means for setting the printing train shown in Fig. 22. If the setting mechanism is not desired, however, the other construction may be employed. Hence both will be described. The bars G and G′ comprise narrow vertical bars forked at both the upper and lower extremities, as indicated at *r* and *r′*. From the lower extremities extend springs $r^2$ to studs $r^3$ extending inward from the plate $s^2$, the function of which springs is to hold the bars G G′ in their lowermost position. The lower forked end of each bar G G′ embraces the arbor or sleeve E, as previously described, and the upper fork embraces a set screw $E^2$ entering a stud $E^3$ at the upper end of the partition $s^2$. The set screw $E^2$ permits perfectly free movement in vertical line to the bars G G′. On the rearward bar G is the rearward extending dog *p* and the slot *p′* through which extends the dog $p^2$ extending rearward from the face of the bar G′. At the lower end there extends laterally from the bar G an arm $p^3$ terminating in a tooth $p^4$, and from the bar G′ extends a similar arm $p^5$ terminating in a tooth $p^6$, the arm $p^5$ being shorter than the arm $p^3$. The dogs *p* and $p^2$ extend across the periphery of the ratchet wheel F to engage the ratchets thereof; and are in planes one in advance of the other with relation to the direction of rotation of the ratchet-wheel, and it will thus be clear that as the ratchet wheel F rotates by each tooth thereof first one and then the other of the dogs *p* and $p^2$ will be engaged, lifted and dropped, carrying with it the bar G or G′ and causing alternately the teeth $p^4$ and $p^6$ to occupy a position in the path of a rotating spur, presently described. Thus as one bar drops by a ratchet-wheel tooth clearing its dog *p* or $p^2$, its tooth $p^4$ or $p^6$ is presented to the path of the spur to stop the latter in its rotation upon being released from the other dog $p^4$ or $p^6$ by the raising of the respective bar G or G′ by the action of a ratchet-tooth on a dog *p* or $p^2$.

The printing train is constructed substantially like the clock train, power being transmitted from springs H, which are wound independent of the clock train, to a train of gears H′ $H^2$ $H^3$ $H^4$ $H^5$ $H^6$ $H^7$ $H^8$ and $H^9$. I illustrate two motor springs H and gears H′, although it will be obvious that the number may be increased or diminished. Upon the shaft I is carried the pinion $H^6$ and adjacent to this pinion is mounted a disk I′ carrying a single spur. Upon the same shaft I, but on the opposite or rear side of the partition $s^2$, is mounted an exactly similar disk $I^2$ carrying a spur. Instead of being exactly similar to the disk I′, as illustrated in Fig. 8, the disk $I^2$ may have the stud *q* projecting laterally from its face, (Fig. 24) the stud *q* having the functions of the spur in the form of disk illustrated in Fig. 8; that is to say, the function of the spur in one form and of the stud *q* in the other form is to engage the teeth $p^4$ and $p^6$ of the arms $p^3$ and $p^5$ extending outward from the bars G G′. It will be obvious that owing to the absence of any escapement in the printing train there would be nothing to prevent a rapid and continuous unwinding of the springs; but by placing upon the minute printing shaft I the disk $I^2$, the rotation of which is prevented by the teeth $p^6$ and $p^4$, until the latter are lifted out of the way by the engagement with the dogs *p* and $p^2$ of the ratchet on the release wheel F, an escapement mechanism is presented, which causes the action of the spur I′ to take place intermittingly on every minute. The intermitting restraint of the rotation of the shaft I is communicated throughout the train of gear to the hour and day printing mechanism, as will presently appear. A shaft K, extending from the partition *s′* to the partition $s^2$, has a downward projecting arm K′ which extends into the path of movement of the spur disk I′. Extending upward from this shaft is an arm $K^2$ carrying at its upper extremity a pawl $K^3$

held pivotally to the arm $K^2$ and retained in normal position by a spring $o$ extending to a pin $o'$ on the shaft K. A spring $o^2$ connects the arm K with a rod $o^3$, the effect of which spring is to hold the rod K, and hence the pawl $K^3$ carried thereby, normally in its advanced position. The movement of the pawl is effected as will readily appear by the engagement of the lower extremity of the downward depending arm K′ with the spur on the disk I′ against the tension of the spring $o^2$, which latter causes the pawl to advance when the engagement with the spur disk I′ ceases. The pawl $K^3$ engages and moves the minute printing wheel as will presently be explained. A similar pawl L on an arm L′ extending upward from a shaft $L^2$ engages and moves the hour printing wheel in a manner presently described. From the shaft $L^2$ there extends downward an arm $L^3$ in the path of the spur disk $L^4$ on the shaft of the pinion $H^2$. A similar pawl M upon a rod M′ extending upward from a shaft $M^2$ moves the date printing wheel. From the shaft $M^2$ there extends downward an arm $M^3$ in the path of a spur disk $M^4$ on the shaft $M^5$ of the gear wheel $H^7$, which meshes with the pinion $H^8$ and through gear $H^9$ with pinion $H^2$.

It is preferred to make the sides of the case C removable, but as to this the choice of the mechanic will prevail. The top comprises a plate N having the central circular recess or cavity N′. In the cavity N′ are radially arranged pins 1, 2, 3, 4, 5, which may be in a series of four, as illustrated in Fig. 11, or greater or less number. The purpose of these pins is to afford guides for the printing rings O O′ $O^2$ $O^3$ $O^4$ $O^5$. Of these rings O carries type for printing legends, such as O. K., paid, charged, &c. This ring is adjustable in a special manner as presently described. The ring O′ is the month printing ring and is adjustable by hand; the ring $O^2$ is the date printing wheel and has on its under face teeth $n$ to be engaged by the pawl M; the wheel $O^3$ is the hour printing wheel having on its under face teeth $n^2$ to be engaged by the pawl L; the ring $O^4$ is the minute printing wheel and carries on its under face teeth $n^3$ to be engaged by the pawl $K^3$; and the innermost ring $O^5$ has on its upper face type indicating the year. It will be understood that all these rings have upon their upper faces printing type cast therewith, but the outermost ring O has, in addition to the printing type cast thereon, printed marks corresponding with and diametrically opposite to the printing type, which marks are presented to the eye through the opening $m$ formed in the cover plate P, presently described.

The rings O′ $O^5$ are not provided with teeth, to enable them to be moved intermittingly by pawls such as pawls $K^3$ L and M, but are provided with shallow recesses $n^4$, adapted to engage pins $n^5$ extending upward from the plate N. The recess is so shallow that a little effort will permit the rings to be turned to break the engagement of the pins and recesses, although the rings will be held in sufficiently firm position during the ordinary operation of printing. The outermost ring is cut away in part of its periphery to receive a spring $n^6$, the end of which carries the upward extending finger $n^7$ through the medium of which the ring may be turned, said finger $n^7$ projecting through a curved slot $m'$ formed in the cover plate P. The edge of the slot $m'$ is provided with recesses $m^2$, in which the finger $n^7$ enters laterally under the tension of the spring $n^6$. The means of adjustment herein described is considered desirable in connection with the outermost ring as the printing type in this is subject to change frequently. In the case of the month printing rings and the year printing rings the change occurs so seldom as to make special facility for effecting the change unnecessary.

The plate N within the depressed portion N′ is provided with three elongated openings $l$ $l'$ and $l^2$ for the projection through the plate of the pawls $K^3$ L and M, respectively. In the circular line of movement of the rings $O^2$ $O^3$ and $O^4$ the plate N is also provided with openings $k$ $k'$ and $k^2$, through which extend angular studs $k^3$ $k^4$ and $k^5$, secured to the under side of the plate N by the set screw $k^6$. Each ring $O^2$ $O^3$ and $O^4$ is provided on its outer face with an annular groove, which groove receives the end of a stud $k^3$ $k^4$ or $k^5$. The function of the stud is to steady the ring during the shifting action to prevent its being lifted out of its position. The printing is performed through an opening $j$ in the top plate P. It is effected as usual by the impact of a stamp plate Q carried by an arm Q′ through the medium of a plunger rod $Q^2$ having a head $Q^3$ and surrounded by a retracting spring $Q^4$ within a socket formed at the end of the arm Q′. Between the plate P and the type rings the inking ribbon is introduced in the following manner:

At each end of the plate N a slot $i$ is provided, extending longitudinally across which is a roller $i'$. Extending downward from the under side of the plate N are hangers $i^2$ $i^3$, each of which hangers is provided with a recess $i^4$ constituting a bearing for the ribbon rollers $h$ $h'$. The recess $i^4$ in the hangers is adapted to be closed by a swinging arm $h^2$ pivoted on a screw $h^3$, the screw being so tight that while permitting the arm $h^2$ to be moved if sufficient strength be employed it will yet hold it normally in position to close the recess $i^4$ to prevent the roller from being withdrawn. Each roller $h$ $h'$ is provided at its end with a nib $h^4$ to permit it to be wound by a key, or it may carry the thumb-knob $h^5$ for this purpose. The inking ribbon is applied to roller $h$, passed around the guide roller $i'$ across the printing opening $j$ and hence across all the printing rings and around the opposite guide roller $i'$ to the roller $h'$ where as to the roller $h$ it is secured by a slot and entering plate $h^5$.

For the purpose of setting the type printing rings without disturbing the time keeping train, it is obvious that the connection between the time train and the arbor E may be broken by releasing the collar D from the shaft B′; but to permit the setting to be accomplished without requiring access to the interior mechanism I have provided the device illustrated in Figs. 22 to 26, which comprises the following elements: The disk $I^2$ having the lug $q$, previously described, is mounted on a shaft having one bearing passing through the partition wall $s^2$ and the opposite bearing in an outward extending angle plate $g$. A setting bar R, terminating at its upper end in the peculiar fork R′, having the central elongated slot $R^2$, and at its lower end a slot $R^3$ is secured by a loose set screw $R^4$ to the partition $s^2$. The plate R is free to rise and fall under the movement produced by the rocking lever $R^5$ having its pivot in the ears $g'$, the inner end of which lever $R^5$ enters the slot $R^3$ in the plate R, while the other end, which is provided with a handle $R^6$, projects outward from the time stamp to be accessible to the hand when the door S is opened. The fork R′ comprises one arm $f$ presenting a squared edge and another arm $f'$ presenting the inward extending hook $f^2$. The edge of the end $f$ and the inner face of the hook $f^2$ constitute the opposite engaging teeth of an escapement for the disk $I^2$ by permitting the lug $q$ to be engaged and released alternately by the faces $f$ and $f^2$. The arm $f'$ of this fork is provided also with the outward projecting pin $f^3$ which is adapted to engage the lower forked end of the bars G G′, which lower forked end is for the purpose of this engagement as illustrated in Fig. 22, slightly altered from the form illustrated in Fig. 8; that is to say, one of the members of the lower forked end is bent to extend into the line of the other, the function of affording means for connecting the spring $r^2$ being retained while in this case it also affords a medium for the engagement of the pin $f^3$ with the bars G G′ for the operation of the setting mechanism, which is as follows: Downward pressure being applied at the extremity of the rocking lever $R^6$ against the resistance of the spring $g^4$, the setting plate R is lifted, causing the pin $f^3$ to engage the lower end of the bars G G′, to lift the latter thereby to break engagement between the dogs $p^6$ and $p^4$ and the spur disk $I^2$ as well as to break engagement between the dogs $p$ and $p^2$ and the release wheel F. As the dogs $p^4$ and $p^6$ become lifted from their engaging position however the faces $f$ and $f^2$ in the forked arms of the plate R come into engaging position with the lug $q$. While thus elevated by the depression of the outer end of the lever $R^6$ the lower end of the plate R is oscillated laterally to the limit permitted by the pins $g^5$, this oscillation producing a corresponding oscillation in the forked arms $f f'$ and causing the release for a half rotation in each half oscillation of the disk $I^2$, the tension of which, it will be understood, is obtained from the printing train springs H. When sufficient change has been effected in the printing rings by this action, the lever $R^5$ is released, whereupon the setting plate R falls to break engagement between its forks and the lug $q$ and the engagement of the dogs $p^4$ $p^6$ is restored.

In order that the printing wheels may hold a firm position against tending to advance by the normal spring-tension of their advancing pawls, I provide the pawls $K^9$ $L^9$ and $M^9$, held with relation to the advancing pawls $K^3$ L and M, by springs $K^{10}$ $L^{10}$ and $M^{10}$, as illustrated in Figs. 18, 19 and 20. The pawls $K^9$ $L^9$ and $M^9$ engage the opposite face of the teeth engaged by the pawls $K^3$ L and M and are released by the same motion which vibrates these pawls under the vibration of their arms, being sufficiently heavy toward their engaging ends to drop, by their own gravity, out of engagement with the teeth when the advancing pawls of the printing-wheels are retracted, and thus separate their springs $K^{10}$, $L^{10}$ and $M^{10}$ from engagement with the pawls $K^9$, $L^9$ and $M^9$.

It will be observed that the power required for moving the pawls $K^3$ L and M forward, thereby to advance the printing rings, is obtained entirely in the retraction of the springs $o^2$, the reaction of which springs is instantaneous, while the accumulation of power therein is more gradual. This is especially noticeable with the pawls M and L for the date printing rings and hour printing rings, respectively. The distension of the spring is accomplished by the engagement with the arms of the spur disks which proceeds intermittingly until release takes place by the passing of the spur beyond the arm. The distension of these springs is the only power required from the printing gear motor springs H.

While the release mechanism for the printing train comprised in the ratchet wheel F and bars G G′ and attendant parts is preferred, it will be understood that my invention is not limited to this specific mechanism. It is conceived to be desirable that the release wheel F shall be upon the minute shaft of the clock train; but it may be upon another shaft driven from any one of the clock gear, its only requisite being that at a definite and positive interval it shall produce the release of the printing train.

I have shown minute, hour and date rings moved by the printing train; but it is entirely within my invention to increase the number of rings or to decrease the number; in the former case to provide for moving the month ring as well as the date ring or to provide for the interposition of a ring moving once in ten minutes and having six figures to represent minute-tens, the minute-wheel in such case being smaller and having numbers only from blank to naught, and in the latter case to provide for the omission of mechanism for mov-

ing the date ring, which in this case may be adjusted by hand in any suitable manner.

It may here be stated that although the adjustment of the year, month and legend printing ring is accomplished by hand in the form illustrated, it will be entirely practicable if desired to provide means for moving these rings through mechanical means operated by hand.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a time stamp, in combination, a time-keeping train and its motor, a printing-train having its independent motor and releasingly controlled by the time-keeping train, and horizontal rotary printing-rings, one within the other and each carrying, at suitable intervals about its printing surface, type indicating divisions of time and connected with the printing-train to be rotated by it intermittingly in accordance with the divisions of time on the rings upon release of the printing-train, substantially as described.

2. In a time-stamp, the combination with the time keeping train and its motor and the printing train and its motor and a release mechanism operating upon the printing train and operated by the time keeping train, of horizontal rotary printing wheels one within the other and each carrying, at suitable intervals about its printing-surfaces, type indicating divisions of time, spring-actuated engaging devices engaging the printing wheels to move the same, and a connection between said spring-actuated engaging devices and the printing train for moving said engaging devices against their spring resistance, thereby to cause them on release to move the wheels, substantially as described.

3. In a time-stamp, in combination with the printing train and its motor and the time keeping train and its motor, and with the release mechanism operating to release the printing train at intervals and operated by the time keeping train, horizontal rotary printing rings one within the other and each carrying at suitable intervals about its printing surfaces, type indicating divisions of time, arms and connections engaging said printing rings to move the same under independent spring tension and trips adapted to engage said arms and moved intermittingly by the printing train when the printing train is released, substantially as described.

4. In a time-stamp, in combination with a time train and its motor, the printing train and its motor and a release mechanism operated by the time train and engaging and releasing the printing train step by step, a minute printing ring, an hour printing ring and a date printing ring, each having on one face printing type and on the other face teeth constituting a ratchet and all being rotary and horizontally disposed one within the other, pawls engaging said ratchets, respectively, springs normally retaining said pawls in the advance position, spur disks intermittingly rotated by the printing train as the latter is released and arms connected with said pawls and adapted to be engaged by the spur disks, whereby the spur disks engage said arms to cause the pawls to be retracted against the resistance of their springs, the minute ring operating pawl once every minute, the hour printing ring operating pawl once every hour and the date printing ring pawl once a day, substantially as described.

5. In a time-stamp, the combination with the time train and its motor and printing train and its motor, and a release mechanism operated by the time train to engage and release the printing train step by step, of a setting mechanism actuated by hand and permanently independent of the time mechanism and operating to disconnect the release mechanism between the time train and printing train and to restrain and release the printing train by manipulator movement, substantially as described.

6. In a time-stamp, in combination with the printing train, the plate N, annular guide ways on said plate, slots in said plate coincident with certain annular guide ways, printing rings having printing type upon the upper face and ratchets on the lower face and supported in said annular guide ways, pawls passing through said slots to engage said ratchets and means actuated by the printing train for operating said pawls, substantially as described.

7. In a time-stamp, in combination with the printing train, the top plate presenting guide ways and slots as described, printing rings in said guide ways having printing type on their upper faces and ratchets on their lower faces, pawls engaging the ratchet teeth to advance the same and pawls engaging said ratchet teeth to restrain the same, substantially as described.

8. In a time-stamp, in combination with a time keeping train and its motor and the printing train and its motor, the release mechanism operated by the time keeping train and operating to restrain and release the printing train, comprising a stud-carrying disk on a shaft of the printing train, a ratchet wheel on a shaft of the time keeping train, lift bars engaged and lifted by the ratchet against spring tension, dogs on said lift bars presenting teeth, said teeth being located with relation to the stud on said disk, whereby the teeth will be engaged alternately by said stud during the operation of lifting and releasing said bars, substantially as described.

9. In a time-stamp, the combination with the time-keeping train and its motor, the printing-train and its motor, and a release mechanism actuated by the time-train and operating to release the printing-train step by step, printing rings having printing-type on their upper faces and ratchets on their lower faces and all being rotary and horizontally disposed one within the other, pawls engaging said ratchets, springs holding said

pawls normally in advanced position, shafts having arms carrying said pawls, arms extending from said shafts for oscillating the same in their bearings, and spur-carrying disks on shafts in the printing-train and receiving motion from the printing-train, each spur adapted to engage an arm to oscillate a pawl-carrying shaft against the tension of the pawl-retaining spring, whereby the minute ring pawl shall be retracted and released once every minute, and the other pawls on the other rings shall be released hourly or daily, as set forth.

10. The combination with the time-train and its motor and the printing-train and its motor, of a release mechanism for the printing-train actuated by the time-train, comprising a ratchet wheel F on a shaft in the time-keeping train, a spur disk on a shaft of the printing-train, parallel arms G G′ each having a stud $p$ $p^3$ engaged and lifted by the ratchet on the wheel F, each said bar G G′ being spring retained and having the dog $p^3$ $p^5$, presenting the spur engaging tooth $p^4$ $p^6$, the parts being arranged to operate substantially as described.

11. In a time-stamp, the combination with the time-train and its motor, the printing-train and its motor and a release mechanism comprising a ratchet wheel on a shaft of the time-keeping train, bars having studs engaged by said ratchet and having dogs adapted to engage a spur disk on a shaft of the printing-train, and with said spur disk, of a hand setting mechanism for the printing-train comprising a spring retained bar having a fork presenting detaining faces adapted to engage the spur on said spur disk, said bar adapted to engage the dog-carrying lift bars when elevated, thereby disconnecting said dogs from said spur disk, whereby the elevation and oscillation of said hand setting bar produces alternate release and detention of said spur disk for the release step by step of the printing-train, substantially as described.

12. In a time-stamp, the combination with a printing-ring having teeth on its lower face, of a spring controlled ring advancing pawl $K^3$ and means for operating the same and a detaining pawl $K^9$, having a connection with said advancing pawl and operating to detain the ring when the advancing pawl has advanced said ring sufficiently far in its forward movement and to be released from engagement with the ring during the requisite advancing movement of said advancing pawl, substantially as described.

13. In a time-stamp, a printing-ring O having on part of its upper surface printing-type and on the opposite part of the same surface, diametrically opposite said printing-type, designating marks, and a spring-finger $n'$, in combination with a cover-plate P having on one side an aperture through which printing is performed, and, diametrically opposite said aperture, a slot exposing said designating marks, and a curved slot $m'$ through which said spring-finger projects and provided with recesses $m^2$, substantially as and for the purpose set forth.

JACOB J. BUSENBENZ.

In presence of—
M. J. FROST,
W. N. WILLIAMS.