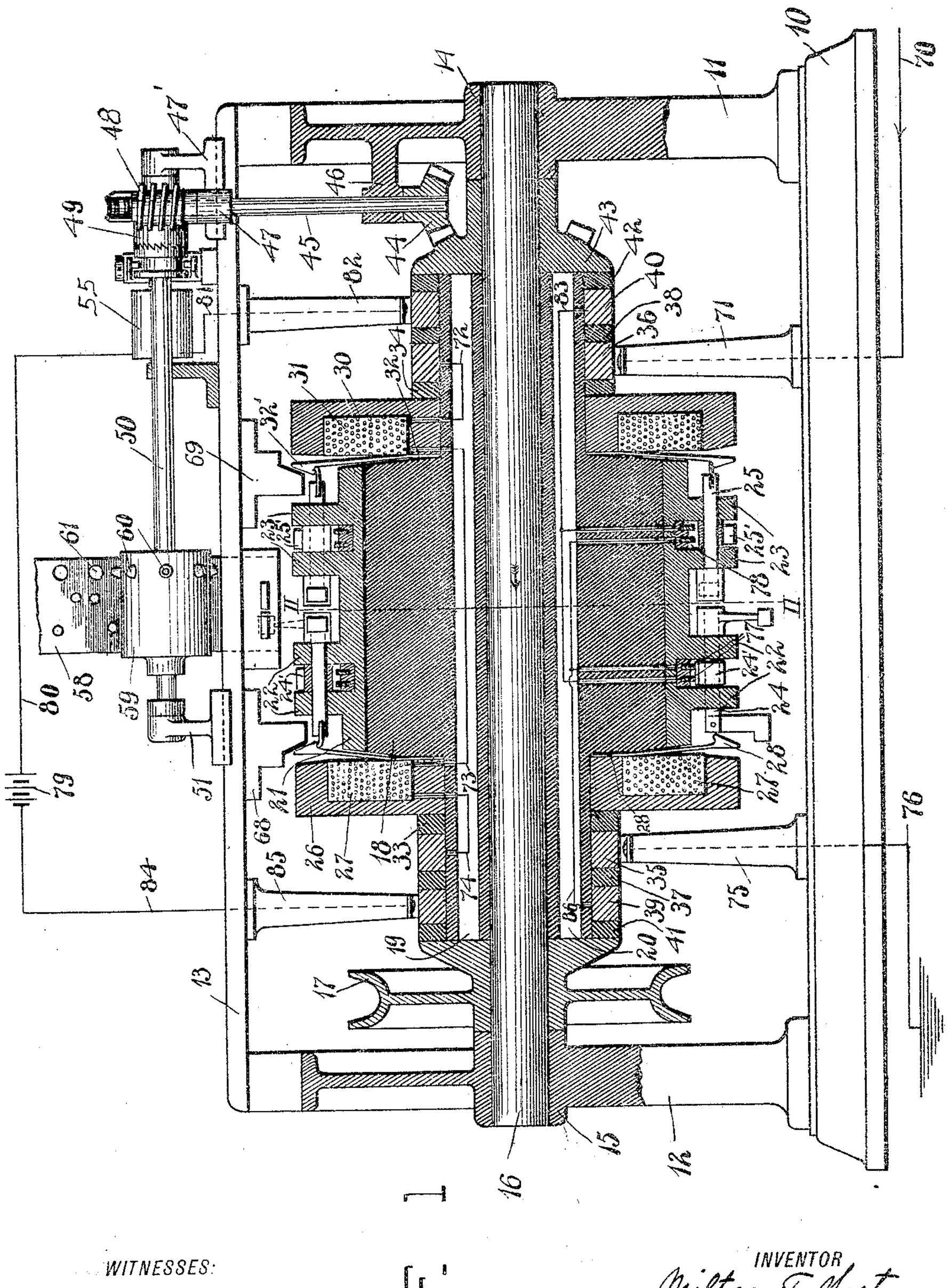
No. 896,784. PATENTED AUG. 25, 1908.

M. T. WESTON.

NON-SYNCHRONOUS RECEIVING PERFORATOR.

APPLICATION FILED NOV. 26, 1904. RENEWED JAN. 18, 1908. 3 SHEETS—SHEET 1.



WITNESSES:

S. J. Hoopter

C. von Gruber.

INVENTOR

Milton T. Weston,

BY Knight Bros

ATTORNEYS

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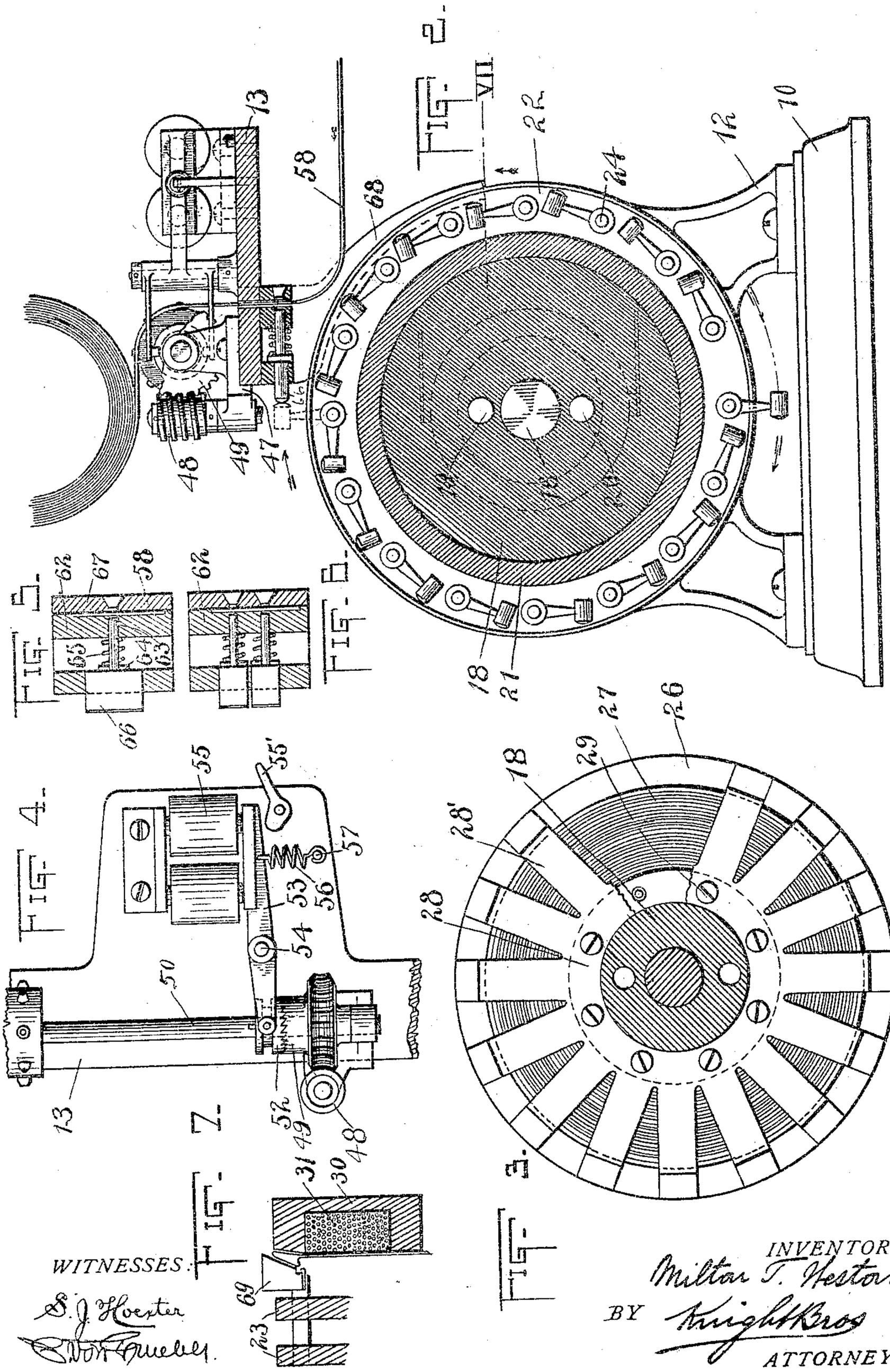

FIG. 1.

FIG. 5.

FIG. 6.

FIG. 4.

FIG. 7.

FIG. 3.

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E. Von Gruber.

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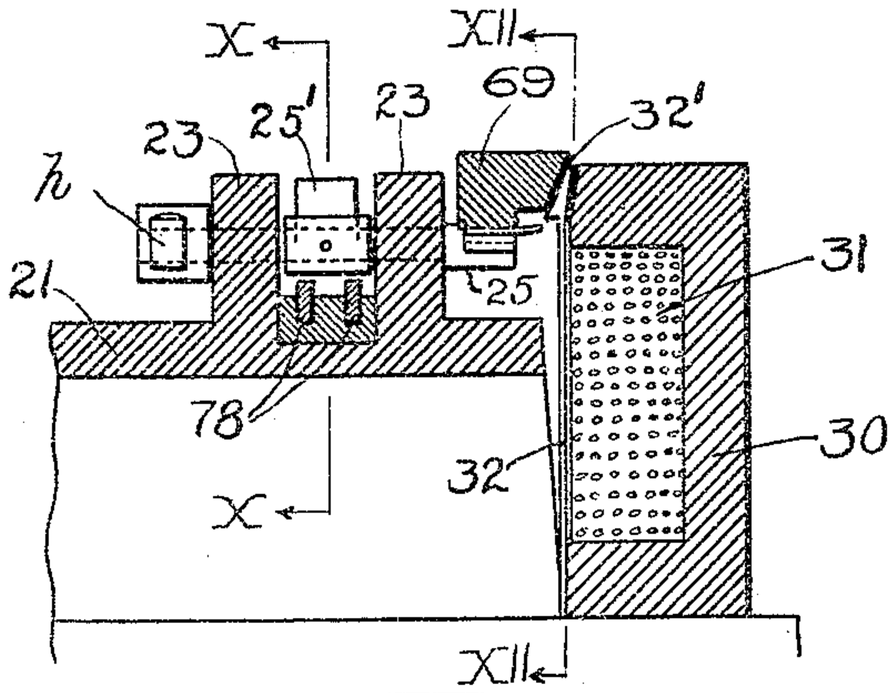

FIG. 8.

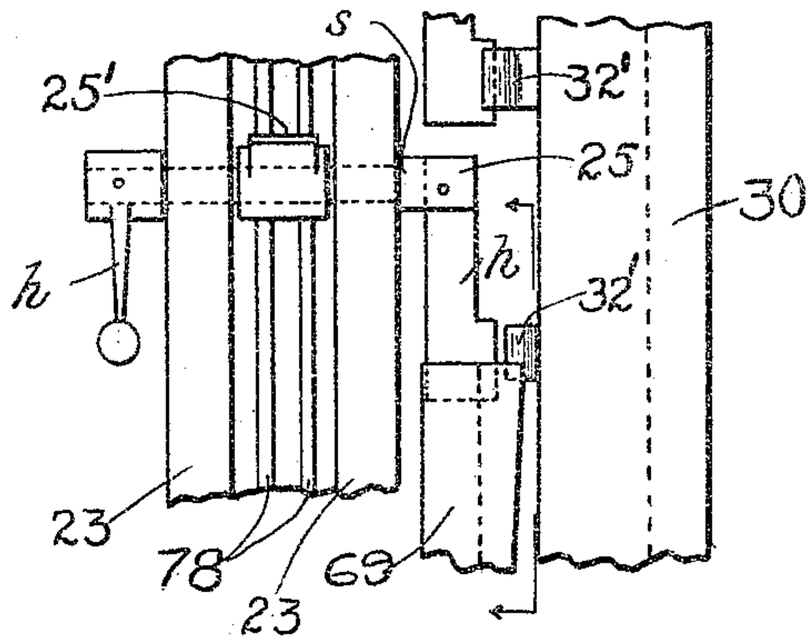

FIG. 9.

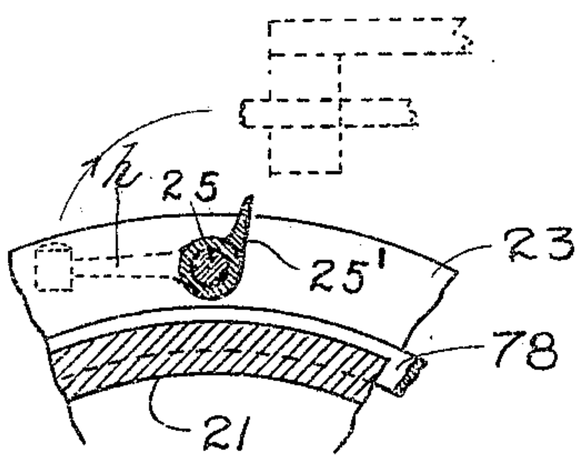

FIG. 10.

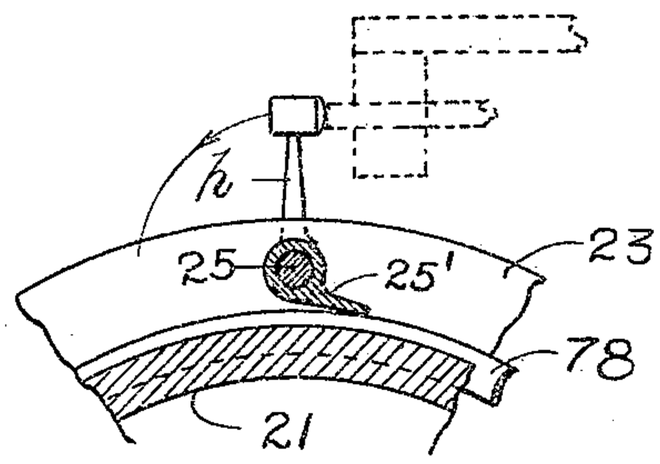

FIG. 11

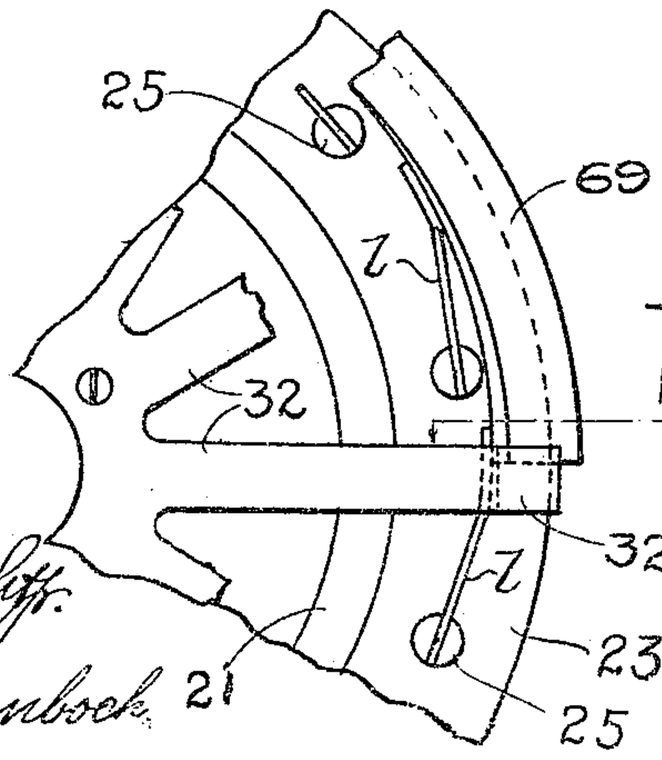

FIG. 12.

WITNESSES:

O. Knight.

William L. Spanbock.

INVENTOR

Milton T. Weston

BY

Knight Bros

ATTORNEYS

UNITED STATES PATENT OFFICE.

MILTON T. WESTON, OF NEW YORK, N. Y.

NON-SYNCHRONOUS RECEIVING-PERFORATOR.

No. 896,784. Specification of Letters Patent. Patented Aug. 25, 1908.

Application filed November 26, 1904, Serial No. 234,432. Renewed January 18, 1908. Serial No. 411,497.

To all whom it may concern:

Be it known that I, MILTON T. WESTON, a citizen of the United States, residing in the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Non-Synchronous Receiving-Perforators, of which the following is a specification.

My invention relates to a perforator for electric telegraph systems.

It is especially concerned with a receiving perforator in which the actual work of perforating a strip of paper is done by mechanical means instead of by electrical means as was heretofore the custom.

The object of my invention is to produce a nonsynchronous receiving perforator of high speed and small current.

It is obvious that where the punch is operated electrically, the current must be of sufficient strength and duration to energize the punching magnet sufficiently to overcome the inertia of its armature and do the actual work of perforating. The speed of the machines now in use is thus very much restricted. In my device this restriction is done away with entirely, and there is practically no limitation to the speed. Moreover, the strength of current required in the operation of my perforator is very small in comparison with that required by previously used machines. It takes advantage of the law that the attraction of a magnet for its armature is inversely proportional to the square of the distance between them. This is accomplished by moving the armature over to its magnet by mechanical means where it may be easily held by a comparatively small current.

Many features of novelty will present themselves in the description of the apparatus in detail and these will be particularly pointed out in the claims.

In order that my invention may be clearly understood I have hereunto appended two sheets of drawings showing various views of the machine, in which

Figure 1 is a central longitudinal elevation of the machine, showing the wiring, Fig. 2 is a cross sectional elevation of the machine on line II II of Fig. 1. Fig. 3 is a detail view of the armature latches and the magnet core, Fig. 4 is a detail view of the automatic clutch, Fig. 5 is a detail view of the single punch, Fig. 6 is a detail view of a double punch, and Fig. 7 is a detail sectional view showing the last position of the operation of the mechanical means for moving the armature over to its magnet core, on line VII of Fig. 2. Fig. 8 is a view similar to Fig. 7 (taken on the line VIII of Fig. 12) showing the entire hammer and the circuit closers located between the journal rings 23. Fig. 9 is a plan view of the portion of the apparatus shown in Fig. 8. Fig. 10 is a sectional detail view, (taken on the line X—X of Fig. 8), showing the hammer closed. Fig. 11 is a similar view showing the hammer open, and in the act of striking the perforating punch. Fig. 12 is a detail view, (taken on the line XII—XII of Fig. 8), showing the cam for freeing the latch arms of the hammers from the armature latches.

Referring now in detail to said drawings, 10 designates the base plate of the machine, at the two ends of which are erected the standards 11, 12. A plate 13 extends across the upper ends of these standards. Journaled in journal bearings 14, 15 in said standards is a rotating shaft 16 which is rotated by a driving pulley 17 fixedly secured thereto. Pulley 17 may be driven by any suitable driving mechanism (not shown). The rotating shaft 16 also carries a cylinder or drum 18 which has a large central body portion, and end portions of smaller diameter, as clearly shown in Fig. 1 of the drawings. This cylinder 18 is provided with two longitudinal passages 19 and 20 for certain wires, which will be described hereinafter. This cylinder serves as the basal member upon which several of the other members of the apparatus are mounted. A hammer carrying ring 21 fits over the large central body portion of said cylinder, and is provided on its periphery with two pairs of journal rings 22 and 23. Each pair of said journal rings 22 and 23, serves as the mounting for a row of hammers 24 or 25. Each of said hammers comprises a shaft *s*, a latch arm *l*, and a weighted hammer *h* (see Fig. 9). Mounted on said shaft portion, between the journal rings, is a circuit closer 24′ or 25′ which serves to close a local circuit which will be described hereinafter. Said circuit closer also serves as a stop for preventing the hammer from swinging too far. Mounted on the end portion of said drum 18 is a magnet core 26 which is in the form of a disk having a circular recess concentric with the center of the disk and forming a depression in which the magnet coil 27 lies. (See Figs. 1 and 3.)

An armature plate 28 in the form of a spider is screwed on the face of this core by screws 29, and its arms 28′ which I designate "armature latches" are flexible so that they may be mechanically moved over to the core, and will spring back when freed, as will be described hereinafter.

A magnet core 30 having a coil 31 and an armature 32 with arms 32′, all of which are in every way similar to those already described is correspondingly mounted upon the other end portion of said cylinder 18. Besides the above mentioned magnets, these end portions have mounted upon them insulating rings 33 and 34, conducting rings 35 and 36, insulating rings 37 and 38; conducting rings 39 and 40; and insulating rings 41 and 42; these members being positioned on said cylinder in the order stated from innermost to outermost, the insulating ring 41 lying immediately adjacent the pulley 17, described above. A bevel gear wheel 43 mounted on the shaft 16 opposes the insulating ring 42 and prevents its displacement. Said bevel gear wheel 43 is in mesh with a bevel gear wheel 44 on one end of a shaft 45, which is held in position by a bracket 46 on the standard 11 and a bracket 47 on the plate 13, so that the shaft 45 rotates with the shaft 16. A worm wheel 48 is mounted on the other end of the shaft 45, which in turn meshes with the gear wheel of a clutch member 49 loosely mounted on a rotatable shaft 50; said shaft 50 is journaled in a bracket 51 and an arm 47′ of the bracket 47, both of which brackets are secured to the plate 13. For rotating the shaft 50, there is splined thereon a clutch member 52 which may be slid into engagement with the clutch member 49 by means of a lever 53 (see Fig. 4) which is pivoted at 54 and operated by an automatically energized magnet 55. A spring 56 secured at one end to a lug 57 and at the other end to the armature end of said lever 53 serves the purpose of opening the clutch when the rotation of the shaft 50 is to be stopped. The circuit which energizes the magnet 55 will be described hereinafter. When it is desired to maintain the shaft 50 in constant rotation with the shaft 16, the lever 53 may be manually operated by the cam 55′.

The purpose of the shaft 50 is to feed the paper web or ribbon 58 past the punch or punches, in order that the perforation thereof may be accomplished. For this purpose, I mount upon the shaft 50 a drum 59 which is provided with traction lugs 60, operating in corresponding holes 61 in the web. Thus when the clutch members are in engagement with each other, the paper web or ribbon is caused to travel past the punch or punches, which will now be described.

The punches are shown in detail in Figs. 5 and 6. Fig. 5 shows the single punch while Fig. 6 shows the double punch. The machine is made to operate either the single or double punch, according to which alphabet is to be employed. Where the single punch is used, the perforations will, of course, be made in a single line, and where the double punch is employed, the perforations will be in two lines, and thus the combination will be different. The punch shown in Fig. 5 will serve to illustrate both, it being understood that the two punches would be constructed in the same way as the one. In said punch, 62 designates the casing or block suitably supported by the plate 13, 63 the punch, 64 a nut thereon against which a spring 65 abuts, the other end of said spring being opposed to a portion of the casing 62. An anvil 66 integral with said punch 63 operates the same against the tension of spring 65, and the paper web 58 is backed by a die 67.

In the operation of my improved perforator, the drum 18 is rapidly revolved by the shaft 16 and the hammers 24 and 25 are normally held in locked position by means of their latch arms, and the armature latches 28′ and 32′. But these hammers are selectively released at certain intervals determined by the operator or transmitter, in the manner hereinafter described, and as a hammer is released it swings outwardly by centrifugal force. As it reaches a position at the upper portion of the cycle of the cylinder its weighted hammer portion strikes against the anvil 66 and thus causes a perforation to be made in the web 58. Upon rebounding it is at once locked in normal position by its latch arm engaging with the armature latch.

The means for effecting the release of the hammers will now be described.

Supported in proper position under the plate 13 are stationary cams 68 and 69. These are shown in Figs. 1, 2 and 7. Where but one row of hammers is used only one cam will be required. A description of one of said cams serves the purpose of illustrating both. The cam 68, as seen in Fig. 2 is an elongated plate which has its underneath surface cut to an arc corresponding to the circle in which the hammers and armature latches revolve, but it is slightly eccentric thereto. The lower end of said cam is nearer to the latch arms of said hammers and the side face of the cam is so formed that by the time they have reached the lower end of the cam, the armature latches have been moved over to the core; and the hammers are prevented from swinging out by reason of the cam which has now taken the place of the armature latches in holding them in normal position. Should there be no current flowing through the coils 27 or 31 at the time the hammers and armature latches leave the cam, the armature latches immediately spring away from their core and assume their former position of locking the hammers in. But when a momentary impulse passes

through the coil, the armature latch just leaving the cam at that moment will be retarded by the magnetism just long enough for the hammer to swing out before said armature latch returns to lock it in, and consequently a perforation will be made in the paper web 58 for each impulse which is sent through the coil. It is immaterial whether or not more hammers than one are freed by a single impulse, because the effect of freeing two or three at once would be merely to lengthen the hole which corresponded to the impulse; and as the web is moving uniformly forward, any omission of impulse will result in an unpunched space in the web. Thus the operator composes his letters by a combination of perforations and spaces.

The electric circuits which enable the transmitter to thus select the letters will now be described. Said circuits are shown only in Fig. 1. Current enters the machine by line wire 70 from which it passes by a brush 71 into the conducting ring 36. From ring 36 the current passes by wire 72 to magnet coil 31 and thence by wire 73 to magnet coil 27. From magnet coil 27, the current leaves by wire 74, passes into conducting ring 35 and thence by brush 75 to grounded wire 76. Thus for each impulse which comes over the line wire each of the magnet cores 26 and 30 will be energized to hold the armature latch just at that moment leaving the cam and thus permit the corresponding hammer to swing free of its retaining means.

If current impulses of one polarity are to be used, the hammers and armature latches must be arranged on the drum in staggered relation so that if possible but one will be leaving the cam at any particular moment. But where it is desired to operate the machine by different polarity currents the double punch is used and the armatures must each be polarized to its particular polarity so that it will be attracted and held only by a current of one polarity. In that way the transmitter or operator can select the polarity of the impulse and thus provide for releasing a hammer in a predetermined row, and so compose his letters.

I have shown in Fig. 1 a means for automatically operating the clutch to effect the feeding of the ribbon during the receipt of a message. This is accomplished by means of a local circuit which is left open at the terminal rings 77 and 78. One side of this circuit comprises the battery 79, wire 80 which connects the battery with the magnet 55, wire 81 connecting the magnet with a brush 82 which delivers the current to the conducting ring 40 and a wire 83 which conducts the current to one side of the above-mentioned terminal rings. The other side of said circuit comprises a wire 84 leading from the battery 79, a brush 85 to which said wire conducts the current, said brush contacting with the conducting ring 39, and a wire 86 which conducts the current from said conducting ring to the other side of said terminal rings. The manner of automatically closing this circuit is very simple. As a hammer swings out a circuit closes 24′ or 25′ bridges over the gap and completes the circuit, thus energizing the magnet 55. As stated above, the cam 55′ might be employed to maintain the clutch in constantly closed position, in which case the local circuit might be permanently opened.

While I have shown and described my invention in specific form, it is not intended to limit the scope to the exact construction herein disclosed. Numerous modifications in the details might be made without departing from the spirit of my invention. For instance, the machine might be employed to operate any means of making an impression upon a web. I do not limit my invention to the use of a perforator.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In an electromechanical perforator, the combination with a hammer and its retaining means; of mechanical means freeing said hammer from its retaining means, and electrical means holding said hammer and retaining means in freed relation.

2. In an electromechanical perforator, the combination with a hammer, and means engaging said hammer; of mechanical means moving said engaging means away from said hammer, and electrical means holding said engaging means away from said hammer.

3. In an electromechanical perforator, the combination with a hammer; of a retaining means for said hammer, mechanical means for moving said retaining means away from said hammer, and an electromagnet for holding said retaining means away from said hammer.

4. In an electromechanical perforator, the combination with a hammer; of a retaining means therefor, a cam for moving said retaining means away from said hammer, and an electromagnet for holding said retaining means away from said hammer.

5. In an electromechanical perforator, the combination with a rotating member, a hammer pivotally mounted thereon, a latch for said hammer rotating therewith, and an electromagnet rotating therewith capable of holding said latch; of a stationary cam for moving said latch from said hammer and into engagement with said electromagnet.

6. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web; of a rotating member, hammers carried thereby and tending to swing outward by centrifugal force into position to operate said punch, means preventing said hammers

from swinging outwardly, means for moving said preventing means away from said hammers, and means for holding the preventing means away from said hammers.

7. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web; of a rotating member, hammers carried thereby and tending by centrifugal force to swing outwardly into position to operate said punch, means preventing said hammers from swinging outwardly, mechanical means for moving said preventing means away from said hammers, and a separate means for holding the said preventing means away from said hammers.

8. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web; of a rotating member, hammers carried thereby and tending by centrifugal force to swing outwardly into position to operate said punch, means normally preventing said hammers from swinging outwardly, mechanical means for freeing said hammers from said preventing means, and electrical means for holding the said preventing means free from said hammers.

9. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web; of a rotating carrier, hammers carried thereby and tending by centrifugal force to swing outwardly into position to operate said punch, means for preventing said hammers from swinging outwardly, a cam for moving said preventing means away from said hammers, and an electromagnetic means for holding said preventing means away from said hammers.

10. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web, a rotating carrier, hammers carried thereby and tending by centrifugal force to swing outwardly into position to operate said punch, and means tending to hold said hammer against swinging outwardly; of a mechanical means and an electrical means coöperating to selectively free said hammers from said holding means.

11. In an electromechanical perforator, the combination with a rotating carrier, and hammers carried thereby tending to swing outwardly by centrifugal force; of means for holding said hammers against such swinging outwardly, and a mechanical means and an electrical means coöperating to selectively free said hammers from said holding means.

12. In an electromechanical perforator, the combination with a rotating carrier, and a plurality of hammers carried thereby and tending by centrifugal force to swing outwardly; of a plurality of means normally holding said hammers from swinging outwardly, a cam for moving said holding means away from said hammers, and one electromagnet for holding all of said holding means away from said hammers.

13. In an electromechanical perforator, the combination with a rotating shaft, a carrier rotating therewith, a plurality of pivotally mounted hammers mounted thereon normally locked but tending by centrifugal force to swing outward, means for selectively freeing said hammers, and a punch adapted to be operated by the impact of said hammers; of a web; a feed roller causing said web to travel past said punch, and means for causing said shaft and said feed roller to rotate together.

14. In an electromechanical perforator, the combination with a rotating shaft, a carrier rotating therewith, a plurality of pivotally mounted hammers mounted thereon normally locked but tending by centrifugal force to swing outward, automatically operated means for selectively freeing said hammers, and a punch adapted to be operated by the impact of said hammers; of a web, a feed roller causing said web to travel past said punch, and automatically operated means for causing said shaft and said feed roller to rotate together.

15. In an electromechanical perforator, the combination with a rotating shaft, a carrier rotating therewith, a plurality of hammers on said carrier, and a punch adapted to be operated by the impact of said hammers; of a web, a feed roller for moving said web past the punching position of said punch, and automatically operated means for imparting rotation to said feed roller from said rotating shaft.

16. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web; of a rotating carrier, hammers carried thereby and tending by centrifugal force to swing outwardly into position to operate said punch, means for preventing said hammers from swinging outwardly, a cam for moving said preventing means away from said hammers and for holding the hammers from swinging out, and a separate means for retarding the return of said preventing means when the cam has left them.

17. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web; of a rotating carrier, hammers carried thereby and tending by centrifugal force to swing outwardly into position to operate said punch, means for preventing said hammers from swinging outwardly, a cam for moving said preventing means away from said hammers and for holding the hammers from swinging out, and an electrical means for retarding the return of said preventing means when the cam has left them.

18. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web; of a rotating carrier, hammers carried thereby and tending by centrifugal force to swing outwardly into position to operate said punch, means for preventing said hammers from swinging outwardly, a cam for moving said preventing means away from said hammers and for holding the hammers from swinging out, and an electromagnet for retarding the return of said preventing means when the cam has left them.

19. In an electromechanical perforator, the combination with a moving web, and a punch mounted in position to perforate said web; of a rotating carrier, hammers carried thereby and tending by centrifugal force to swing outwardly into position to operate said punch, an armature comprising a plurality of armature latches for locking said hammers, means for moving said armature latches away from said hammers and holding the hammers, and one electromagnet for holding said armature latches away from said hammers after the means which moved the armature latches away has left them.

20. In an electromechanical perforator, the combination with a rotating shaft, a carrier rotating therewith, a plurality of pivotally mounted hammers mounted thereon normally locked but tending to swing outward, circuit closers on said hammers, means for selectively freeing said hammers, and an impression means adapted to be operated by the impact of said hammers; of a web, a feed roller for moving said web past said impression means, means normally inoperative to cause said shaft and roller to rotate together, an electromagnet, a clutch operated thereby when same is energized to render operative the said means to cause the shaft and roller to rotate together, and a circuit for energizing said magnet and provided with open terminals in position to be closed by said circuit closers on the hammers.

MILTON T. WESTON.

Witnesses:
CURT VON GRUEBER,
O. KNIGHT, Jr.