

No. 619,667.

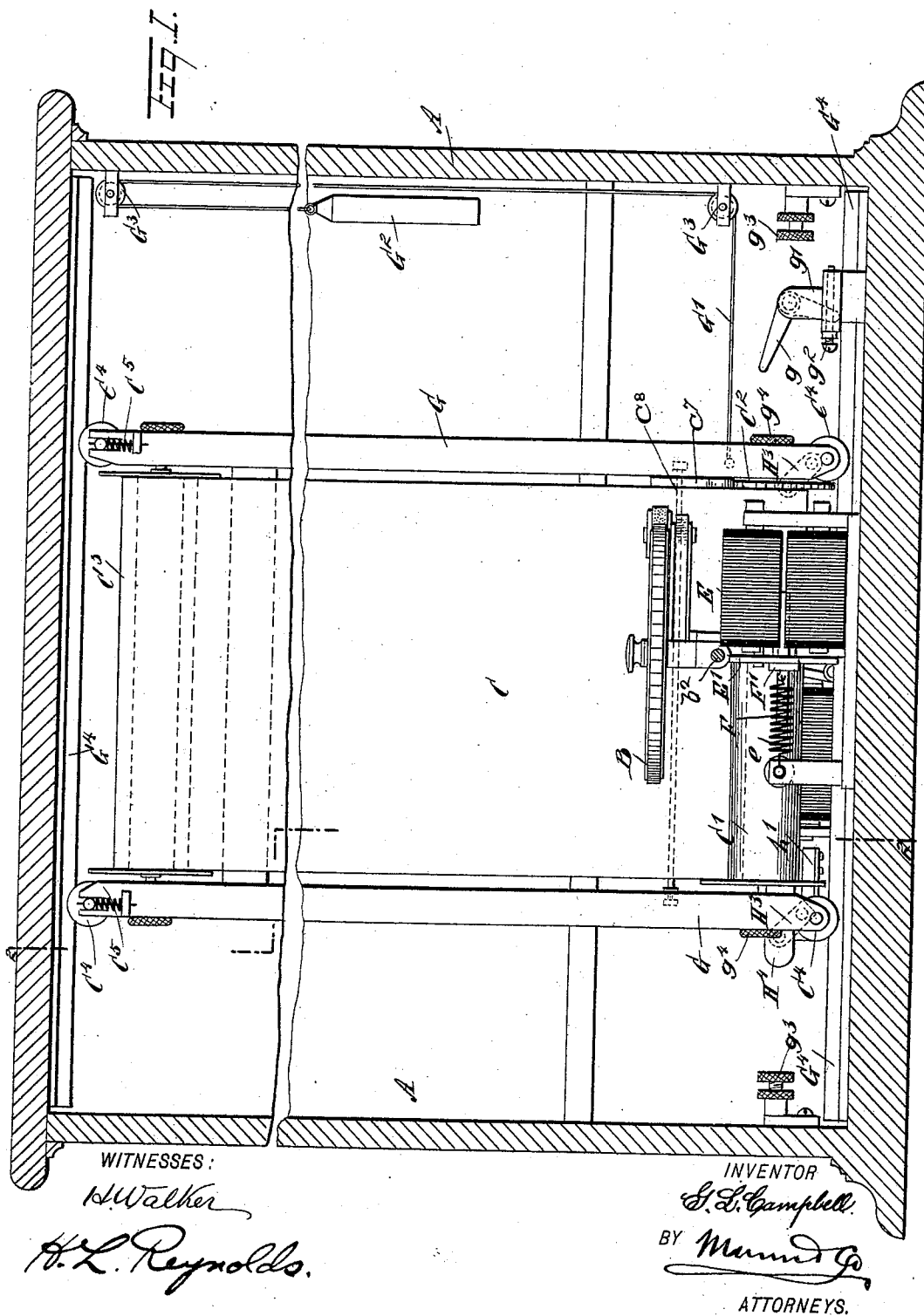
Patented Feb. 14, 1899.

G. L. CAMPBELL.
ELECTRIC PRINTING MACHINE.

(Application filed Oct. 30, 1897.)

(No Model.)

5 Sheets—Sheet 1.



No. 619,667.

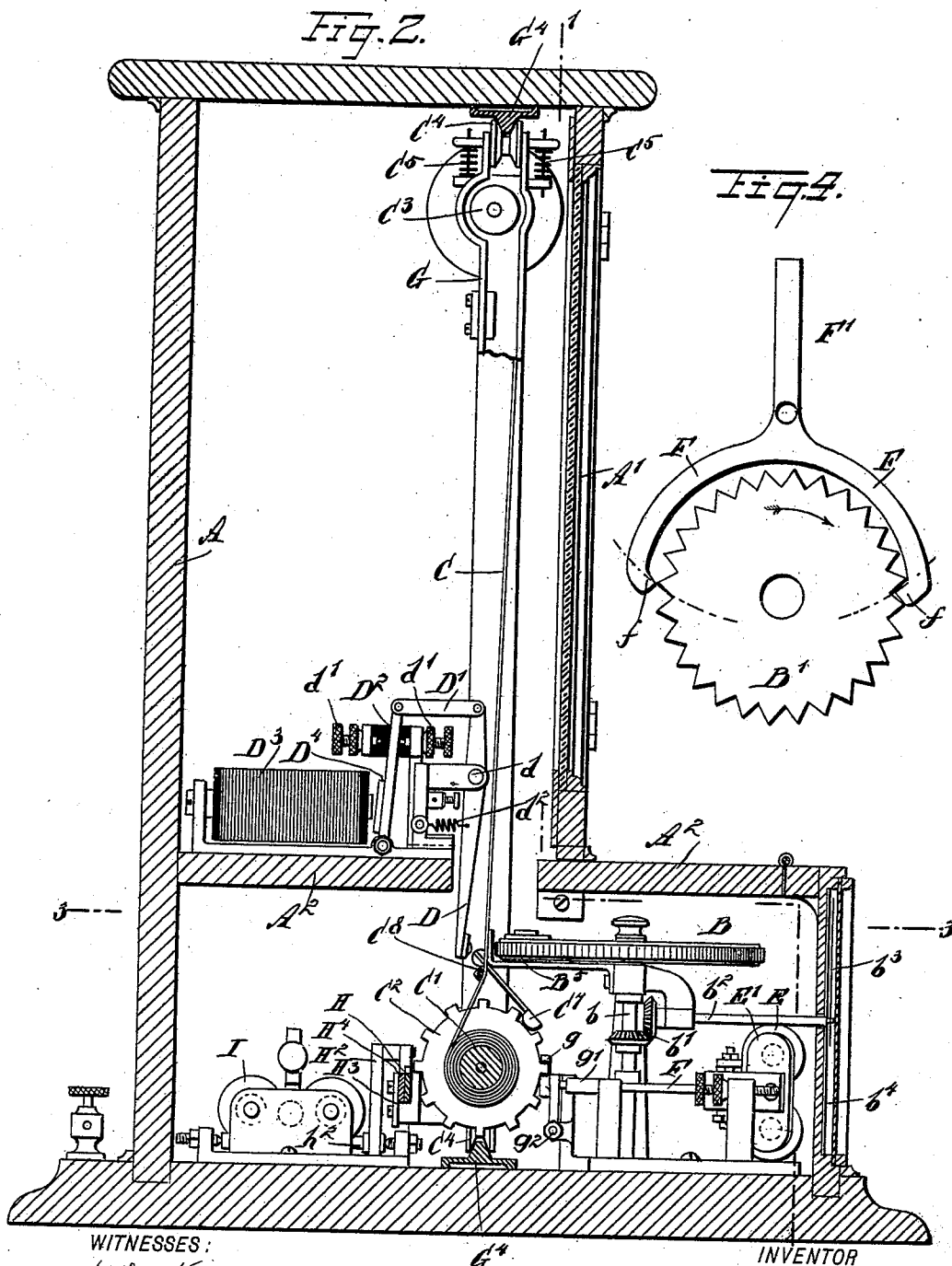
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5 Sheets—Sheet 2.



WITNESSES:

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No. 619,667.

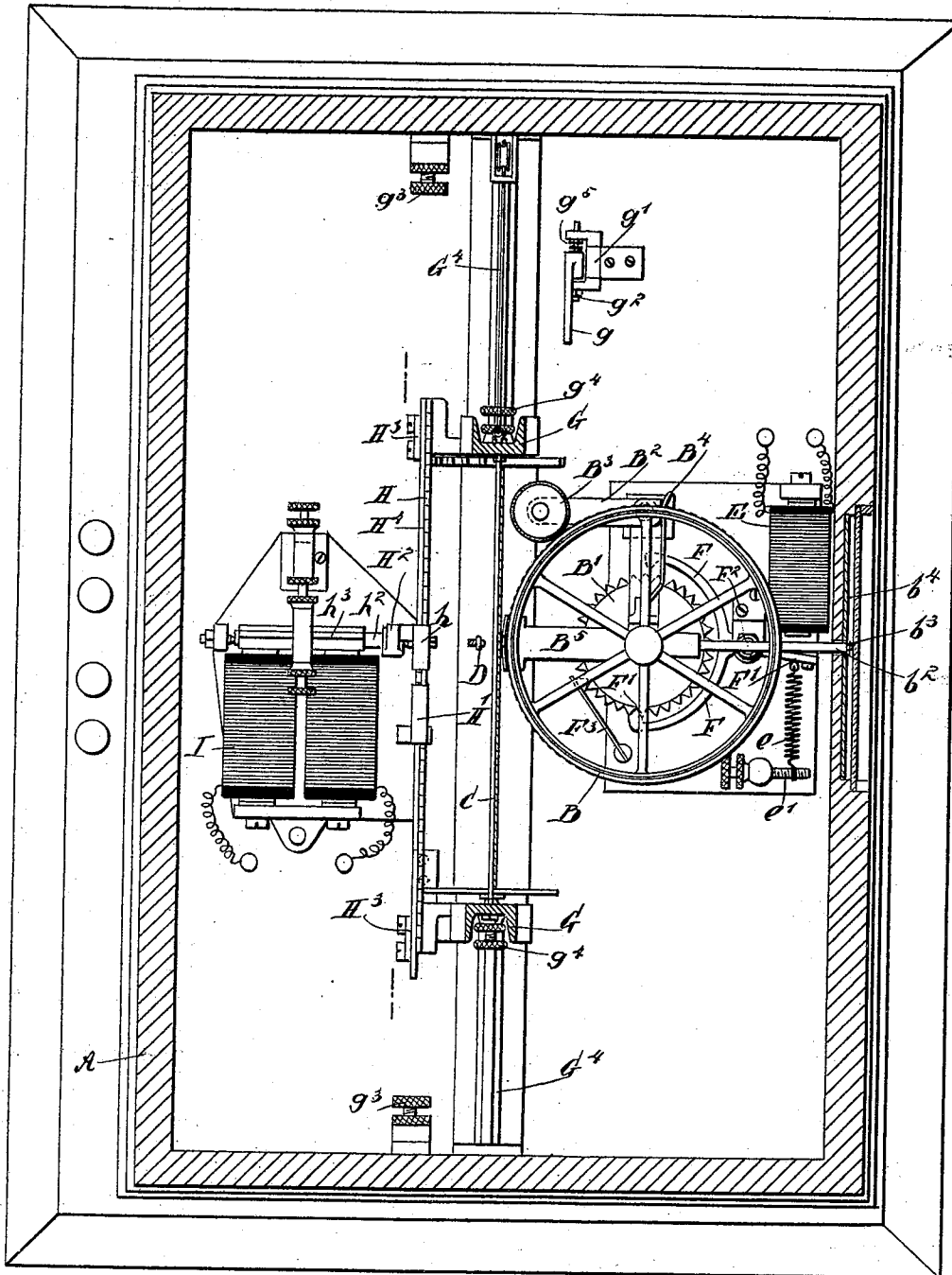
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5 Sheets—Sheet 3.



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Fig. 3.

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Fig. 5.

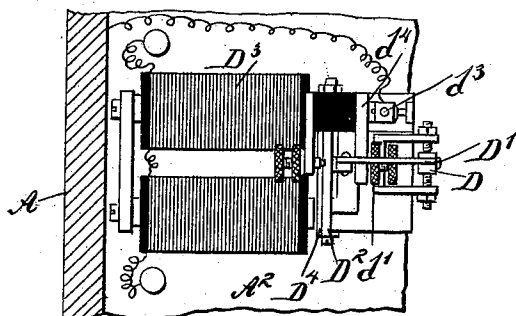


Fig. 6.

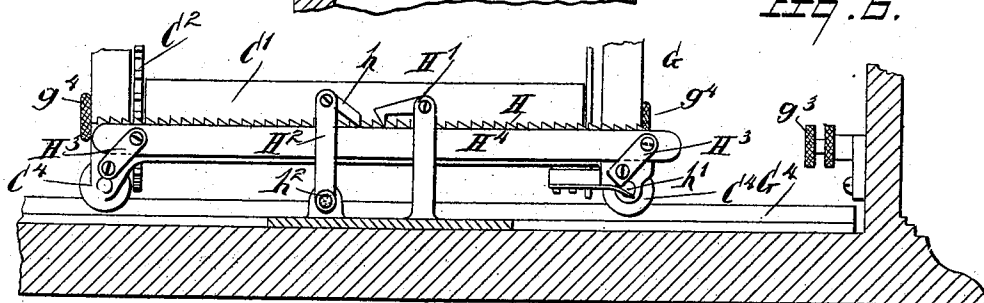


Fig. 7.

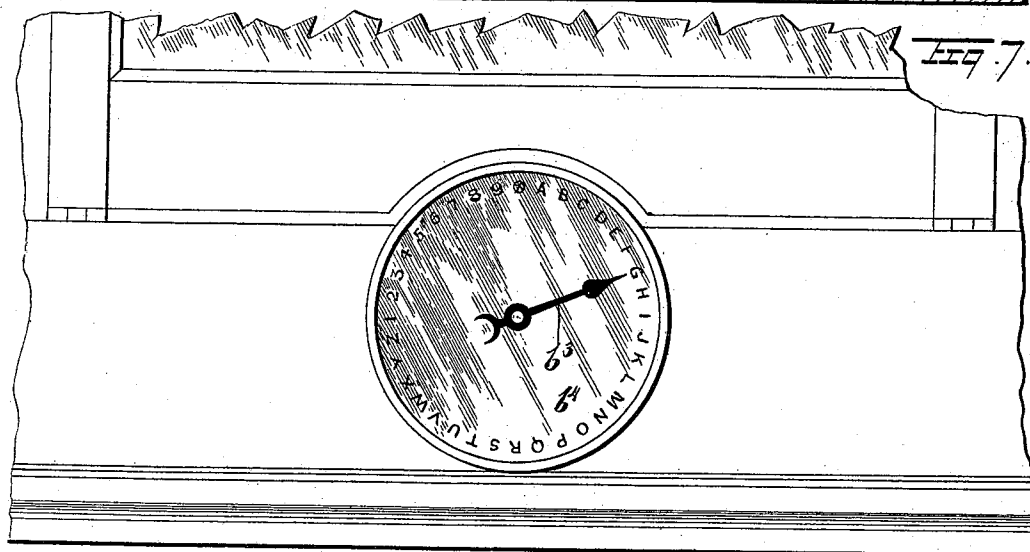
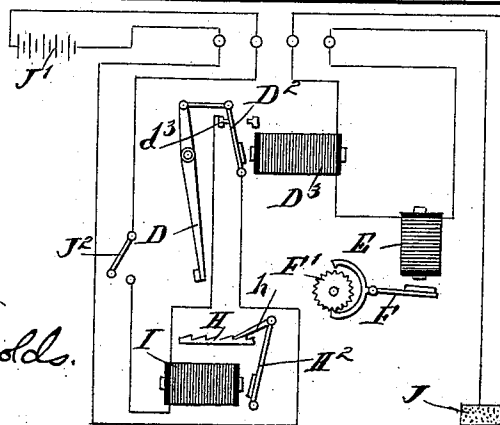


Fig. 8.



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5 Sheets—Sheet 5.

Fig. 9.

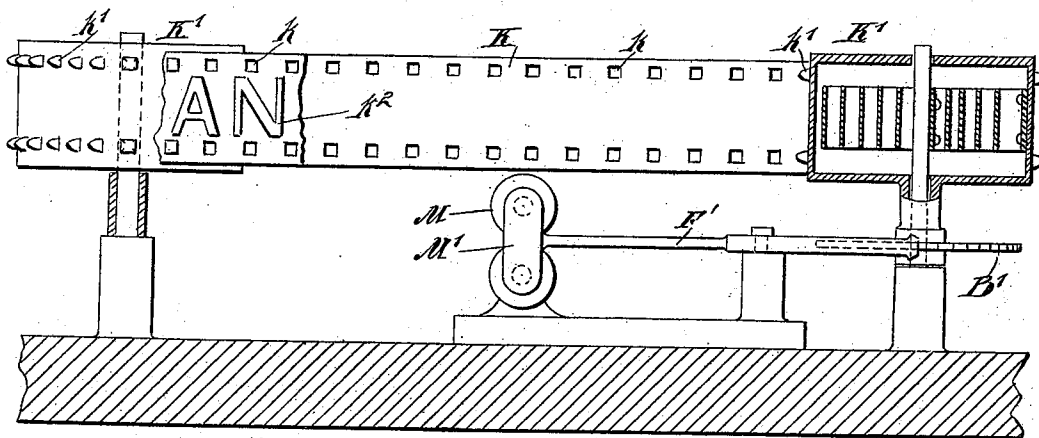
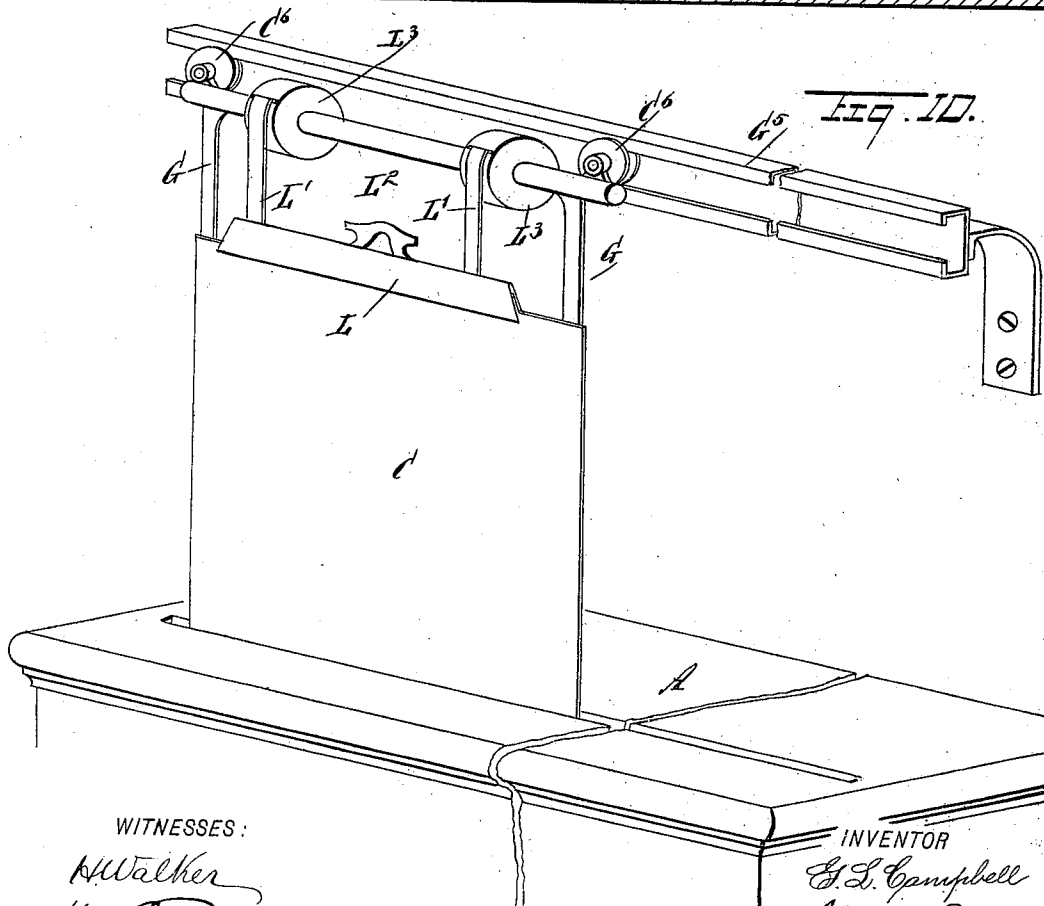


Fig. 10.



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UNITED STATES PATENT OFFICE.

GEORGE L. CAMPBELL, OF DUSHORE, PENNSYLVANIA, ASSIGNOR TO HIMSELF, CONRAD KRAUS, WILLIAM KRAUS, HENRY KRAUS, GARRETT E. DONAHOE, HORACE N. OSLER, EDWARD S. GAREY, ALPHONSUS WALSH, HORACE G. MAY, B. HARVEY WELCH, C. WILLIAM WODDROP, THEODORE A. BOAK, JOHN D. REESER, MARTIN E. HERMANN, AND J. LOOMIS CHRISTIAN, OF SAME PLACE.

ELECTRIC PRINTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 619,667, dated February 14, 1899.

Application filed October 30, 1897. Serial No. 656,925. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. CAMPBELL, of Dushore, in the county of Sullivan and State of Pennsylvania, have invented a new and Improved Electric Printing-Machine, of which the following is a full, clear, and exact description.

My invention relates to an improvement in electrically-operated printing devices, having for its special object the printing of bulletins in public places, and so constructed and connected that a large number of such devices may be simultaneously operated from a central point.

The invention comprises a frame carrying a sheet of paper with the proper mechanism attached thereto for rolling the paper from one roller to another.

It also comprises mechanism by which the frame carrying the paper is given a traversing motion in order that a line may be printed upon the paper.

The invention also comprises a type-wheel which is rotated by an electromagnet and a type-impressing mechanism, also operated by an electromagnet, the two magnets being in the same circuit, but the latter being operated only by a current which is of greater strength than the normal.

The invention consists of certain combinations and details of construction, which will be pointed out hereinafter and defined in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front sectional elevation taken upon the line 1 1 of Fig. 2. Fig. 2 is a side sectional elevation taken upon the line 2 2 of Fig. 1. Fig. 3 is a sectional plan taken upon the line 3 3 of Fig. 2. Fig. 4 is a detail plan view of the ratchet-wheel and its operating pawl and lever. Fig. 5 is a detail plan view of the magnet operating the type-impressing mechanism and the parts comprising said

mechanism. Fig. 6 is a partial elevation showing the mechanism for giving a traversing motion to the frame carrying the paper. Fig. 7 is a partial front elevation of the device, showing the dial and pointer which indicate the position of the type-wheel. Fig. 8 is a diagram showing the electrical connections for the different parts. Fig. 9 is an elevation, partially in section, showing a type-band which may be substituted for the type-wheel shown in the other views; and Fig. 10 is a perspective view showing a modified form of construction for the paper-carrying frame by which the sheet of paper is brought outside the case, so that it may be cut off and preserved.

While my device may be operated for many other purposes, the principal purpose for which it is designed is the printing of bulletins—such as weather reports, reports of athletic games, and sporting news generally. With this end in view the device will be set up in public places where large numbers of people may have access thereto. A series of the devices will be connected up and operated from a central office.

The device is incased in a suitable box or casing A, which has in the front thereof a glass plate A', immediately behind which is a sheet of paper, upon which the bulletin is printed. This sheet of paper C is mounted in a frame G, which is provided with means by which it is traversed in front of the type-wheel. This frame is provided with two rollers C' and C², the latter being placed at the top of the frame and provided with spring rotating mechanism or any suitable mechanism by which the sheet of paper may be rolled up. The lower roller C' is the one which has the paper wound thereon when the device is first started. The roller C' is mounted in the lower end of the frame G and is provided at one end with a toothed wheel C². This roller C' is normally prevented from rotating by means of the spring-arm or pawl C', which engages the space between the teeth and pre-

vents rotation. This spring is of such construction as to prevent rotation of the roller C' through the influence of the spring in the roller C³. It is, however, sufficiently weak
 5 that if a slight increased power is applied to the roller C' the same may be rotated.

The frame G is provided at top and bottom with a series of guiding and supporting rollers C⁴, which engage with top and bottom
 10 tracks G⁴. The upper rollers C⁴ are supported upon springs C⁵, so as to insure a close contact with the tracks without binding. Mounted upon the frame G is a bar H, the upper
 15 surface of which is toothed, as clearly shown in Fig. 6. This bar H is parallel to the lower rollers C⁴ and at a short distance to one side thereof. Alongside of this bar is a second
 20 bar H⁴, supported upon links H³, pivoted thereto and to the lower portion of the bar H. The normal position of the bar H⁴ is, with its
 25 upper surface, on a level with or below the bottom of the teeth on the bar H. The links H³ in this position are inclined to the vertical, so that when the bar H⁴ is moved horizontally
 30 to bring the links H³ into vertical position the bar H⁴ will be raised until it rises above the tops of the teeth on the bar H.

Alongside of the track upon which the frame travels is an electromagnet I. This magnet
 35 has its armature h³ mounted upon a shaft h², which shaft has an arm H² extending upward close alongside the bar H. At its upper end this lever or arm H² carries a pawl h, which
 40 rests upon the upper edge of the bar H. The free end of the pawl h is wide enough to extend over both the bars H and H⁴. When the bar H⁴ is raised by being moved horizontally, so as to straighten the links H³, the pawl
 45 h will then be raised so as to clear the teeth upon the bar H. To prevent backward movement of the bar H and the frame G to which it is attached, a pawl H', mounted upon a
 50 fixed arm, is provided, the face of the pawl being of such width as to cover both arms H and H⁴. The magnet I and its armature are so placed that when the armature is attracted the lever H² will be moved so as to feed the
 55 bar H and the frame G one tooth-space. It will be seen that the frame will thus be moved along by a step-by-step motion until it has reached the end of its travel.

At each side of the casing within which the device is mounted and in line with the bar H⁴ are placed adjustable stops g³, designed to en-
 60 gage the end of the bar. The stop at one end will engage the bar to raise it, and thus free the pawls h and H'. The frame will then be drawn back to its opposite position through the action of a cord G', attached thereto and
 65 passing over pulleys G³, mounted upon one side of the casing, and of a weight G², attached to the opposite end of the cord. When the bar H⁴ is raised through contact with one of the stops g³, it will be held in this position by
 a spring h, secured to the frame, acting upon a squared lower end of one of the links H³. When upon the return of the frame the op-

posite end of the bar H⁴ strikes the other stop g³, the bar H⁴ will be pushed backward and lowered to its normal position, as shown in
 70 Fig. 6. This drops the pawls h and H', so that the traversing device is ready for operation again. This return movement of the frame causes a feeding movement of the paper
 75 in the following manner: Mounted upon one side of the casing and in line with the teeth upon the wheel C² is an arm or lever g. This lever, as shown in the drawings, is in
 80 the form of a bell-crank lever, pivoted at its center to a bracket g', mounted upon the casing. The lower end of the lever g is acted upon by a spring g⁵, designed to hold the
 85 same in one direction, the position of the lever in this direction being determined by an adjusting-screw g². The outer end of the lever g is so placed that upon the return of the
 90 frame G the lever will engage one of the teeth upon the wheel C². The under surface of the lever is inclined, so that it will rotate the wheel a distance equal to the pitch of the
 95 teeth. The arm C⁷, which prevents rotation of the wheel C², being a spring-arm will yield under the influence of the power applied by the lever g. In this way the roll of paper C is advanced a distance corresponding to the
 100 distance between consecutive lines of the printing.

The type from which the printing is done is mounted upon the periphery of a wheel B, which is mounted upon a vertical spindle b.
 105 Mounted upon this same spindle and beneath the wheel B is a ratchet-wheel B'. (Shown in detail in Fig. 4.) This wheel has a number of teeth corresponding with the number of characters upon the wheel B. Pivoted upon
 110 a vertical pivot F², close alongside the ratchet-wheel B', is a yoke F, having a lever F' attached to the same and extending rearwardly therefrom. The arms of this yoke embrace
 115 the ratchet-wheel B' and terminate in teeth adapted to engage the teeth of the wheel. The distance between the points of the teeth on the yoke is sufficient to allow one of the
 120 teeth to clear the wheel when the other tooth is in engagement therewith. The relationship between the working faces of the teeth on the yoke and the teeth on the wheel is peculiar.
 125 The working faces f upon the teeth of the yoke are made at such an angle relative to the teeth of the wheel that when the bases of the yoke-teeth are in engagement
 130 with the points of the wheel-teeth the points of the yoke-teeth will be slightly removed from engagement with the faces of the wheel-teeth. This is clearly shown in Fig. 4. The
 135 object of this construction is to cause the faces of the yoke-teeth when the yoke is oscillated to cause a forward rotation of the wheel B an amount slightly greater than one-half the tooth pitch. By reason of this construction the rotation of the toothed wheel is made sufficient so that the point of the opposite yoke-tooth will fall upon the proper side of the points of the wheel-teeth, so as to

cause a continuous forward rotation of the wheel. Were it not for this construction it would not be feasible to produce a constant forward rotation. The result would otherwise be simply a slight oscillating movement. The yoke F by reason of this construction acts both as an escapement to control the rotation of the wheel and as operating-pawls to cause its rotation.

Mounted close alongside the yoke F is an electromagnet E, the armature of which is fastened to the outer end of the lever F' of the yoke F. A spring e , attached to the lever and to a screw e' , causes the return movement of the lever. By means of this mechanism the ratchet-wheel B' and the type-wheel B, which is connected thereto, may be given a continuous step-by-step forward movement by means of a series of electrical impulses which are conducted through the magnet E. By this means the wheel may be rotated so as to present any character desired to the printing apparatus. The ratchet-wheel B' may be provided with a spring-detent or friction-arm F³ to prevent its being moved except under the influence of the magnets. The frame carrying the type-wheel B is provided with an arm B⁵, the outer end of which is turned up and extends close in front of the outer face of the wheel at the point where the printing is to be done. The central portion of this outer end is slotted, so as to form a space through which the proper character may reach the paper in printing. It also forms a guard to prevent printing by the adjacent characters.

The impressing or printing is done by means of the lever D. This lever carries a hammer upon its lower end, adapted to strike upon the paper and force the same against the proper character upon the wheel B. The lever is pivoted at d to a bracket or arm fixed upon a support A² in the casing A. The lever D is returned to its normal or inoperative position by means of a spring d^2 . The upper end of the lever D is connected by a link D' to the upper end of an arm D², mounted upon or carried by the armature D⁴ of the magnet D³. This magnet D³ and the magnet E, which operates the yoke F, are both in the same or main-line circuit. The diagram showing the electrical connections is illustrated in Fig. 8. In this diagram, J represents a local ground for the main-line circuit. The other end of the line extends to the central station, where it is grounded. The spring controlling the lever D is made of such construction that the armature-lever D² will not be attracted by the magnet D³ when the normal current is passed through the main line. In consequence of this the lever is not operated every time the yoke F is vibrated. When the yoke F has been vibrated a sufficient number of times to bring the proper character into printing position, a current is switched into the main line of sufficient strength to overcome the tension of the spring d^2 , and the armature D⁴ is

then attracted and the hammer upon the lever D is caused to strike the paper and print the character.

The magnet I, which operates the step-by-step traversing mechanism of the paper-carrying frame is in a local circuit. This local circuit is provided with a battery (represented by J' in Fig. 8) and includes as a part of the circuit a movable member of the type-impressing mechanism. As shown in the drawings and the diagram, this movable member consists of the arm D², fixed upon the armature of the magnet D³. The circuit is from the pivot of the armature to a stop-pin or adjusting-screw d^3 , normally in contact with the armature-lever D². In the diagram this circuit is shown as containing a cut-out switch J². This circuit is normally a closed circuit. When the circuit is broken by the action of the type-printing mechanism, the armature of the magnet I and the lever H², which is connected therewith, are retracted by the spring (not shown) of the armature. This motion is sufficient to draw the pawl h back a sufficient distance to engage another tooth on the bar H. When the circuit is closed after a letter has been printed, the lever H² is drawn forward again, thus advancing the frame G a distance equal to one tooth of the bar H or one letter-space.

On the face of the case, as shown in Fig. 7, may be provided a dial-plate b^4 , having around its periphery characters corresponding to the characters upon the periphery of the type-wheel B. The pivot b , carrying the type-wheel B, carries one of a set of bevel gear-wheels b' , the other being mounted upon a horizontal shaft b^2 , which extends through the face of the case centrally of the dial b^4 , and at its outer end carries a pointer b^3 , set so that it points to the character corresponding to the one which is in printing position upon the wheel B. By this means the position of the wheel B may be observed at any time and a check may be had upon the operation of the device.

It is evident that a type-band mounted upon two wheels may be substituted for the type-wheel, as described and illustrated. This construction is illustrated in Fig. 9. In this case two wheels K' are mounted upon vertical axes at a suitable distance apart. They are preferably provided with sprocket-teeth k' upon their peripheries. In the drawings two rows of these teeth are shown, one upon each edge of the wheel. About these wheels is passed a type-belt K, provided with holes k , adapted to receive the teeth k' . Upon the outer surface of this belt are placed the letters or characters k^2 . The method of operation of this mechanism is the same as that described for the wheel B. It consists of a magnet M, corresponding with the magnet E, having its armature M', mounted upon the end of the lever F', forming a part of the yoke F, and acting upon the toothed wheel B'.

In Fig. 10 a construction is shown in which

the case stops short of the upper end of the frame G, and the construction of the frame is slightly modified. The upper guide-rollers C⁶ travel in a channel-beam G⁵, which is supported upon arms connected with the case A. For the upper roller, which carries the paper, is substituted a shaft carrying the pulleys L³, to which are attached bands L', to the lower ends of which is attached a paper-clamp L. This clamp is placed over the upper end of the sheet of paper C and holds the same while it is fed forward. Thus a certain amount of the sheet of printed paper is above the upper end of the case, where it is accessible and may be cut off and preserved, if desired.

My device is one which may be operated and taken care of by any person of ordinary intelligence. The peculiar feeding and controlling mechanism by which the type-wheel is operated and controlled is of such a nature that absolute synchronism of a number of machines may be maintained. It is impossible to rotate the type-wheel without operating the armature of the magnet, and it is equally certain that the wheel will be given a forward movement at each vibration of the armature. The device is consequently one which is suitable for installation in public places and where it is not possible to maintain an operator. It may therefore be used for distributing bulletins of all kinds. It will find a large field in distributing news of base-ball and other athletic contests, races, local and sporting news, stock reports, and, in fact, all manner of information.

The device is operated by any form of mechanism which will transmit an electrical impulse. The operating mechanism has not been shown in connection herewith because such mechanisms are numerous and well known, and any form of mechanism which will create such impulses may be used.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. An electric bulletin, comprising a frame having paper-carrying rollers mounted thereon and means for traversing the frame, positive means acting upon one of the paper-carrying rollers to rotate it, a spring-held locking means acting upon the other roller, and a lever adapted to engage the latter roller to give it a partial rotation, substantially as described.

2. An electric bulletin, comprising a frame having paper-carrying rollers mounted thereon and means for traversing the frame, positive means acting upon one of the paper-carrying rollers to rotate it, a toothed wheel upon the other roller, a spring-catch engaging said wheel to hold it in adjusted position, and a lever in the path of said wheel, adapted at one end of its traverse to engage a tooth thereof to give the wheel a partial rotation, substantially as described.

3. An electric bulletin, comprising a frame having paper-carrying rollers mounted there-

on and means for traversing the frame, positive means acting upon one of the paper-carrying rollers to rotate it, a toothed wheel upon the other roller, a spring-catch engaging said wheel to hold it in adjusted position, a pivoted lever in the path of said wheel, adapted at one end of its traverse to engage a tooth thereof to give the wheel a partial rotation, a stop upon one side of said lever, and a spring holding the lever normally against said stop but permitting the lever to be swung away therefrom, substantially as described.

4. An electric bulletin, comprising a frame having carrying and guiding rollers thereon, a track for the rollers, paper-carrying rollers mounted on the frame, positive paper-feed mechanism for one of said rollers, a toothed wheel upon the other paper-carrying roller, a spring-held stop for the same, a lever engaging a tooth of said wheel to move it one space by the forward motion of the frame, and means for giving the frame a reciprocating traverse, substantially as described.

5. An electric bulletin, comprising a frame having carrying and guiding rollers thereon, a track for the rollers, paper-carrying rollers mounted upon the frame, positive paper-feeding mechanism for one of said paper-carrying rollers, a toothed wheel upon the other paper-carrying roller, a spring-held stop for the wheel, a lever engaging a tooth of said wheel to move it one space by the forward motion of the frame, a weight-return for the frame, and an electrically-operated forward-feeding mechanism therefor, substantially as described.

6. An electric bulletin, comprising a frame carrying a sheet of paper, traversing guides therefor and traversing mechanism comprising a toothed bar upon the frame, a plain bar alongside thereof whose top surface is normally below the teeth on the toothed bar, links carrying the plain bar and normally lying at an angle with the vertical, a spring engaging one of the links to hold the links in a vertical position and the bar raised, a pawl extending across both bars, means for reciprocating said pawl, and fixed stops in the path of the plain bar by which the latter is raised to free the pawl and lowered to allow the pawl to engage the toothed bar, and a positive return-feed for the said frame, substantially as described.

7. An electric bulletin, comprising a frame carrying a sheet of paper, traversing guides therefor and traversing mechanism comprising a toothed bar upon the frame, a plain bar alongside thereof whose top surface is normally below the teeth on the toothed bar, links carrying the latter bar, and normally lying at an angle with the vertical, a spring secured to the frame and engaging one of the links to hold the bar raised, a pawl extending across both bars, means for reciprocating said pawl, fixed stops in the path of the plain bar by which the latter is raised to free the pawl and lowered to permit the pawl to en-

gage the toothed bar, and a positive return-feed for the said frame, consisting of a cord attached to the frame and passing over pulleys, and a weight suspended on said cord, substantially as described.

8. An electric bulletin, comprising a frame carrying a sheet of paper, traversing guides therefor, and traversing mechanism comprising a toothed bar upon the frame, a plain bar alongside thereof whose top surface is normally below the surface of the teeth on the toothed bar, links carrying the latter bar and normally lying at an angle with the vertical, a yielding spring-catch engaging said links to hold them vertical, a pawl extending across both bars, means for reciprocating said pawl, a stop in the path of the plain bar by which the latter is raised to free the pawl, and a positive return-feed for said frame, substantially as described.

9. In an electric printing-bulletin, the combination with a casing, of a paper-carrier mounted to travel in the casing and provided with a rack, a plain bar alongside of the rack, links pivoted to the carrier and plain bar, an electromagnet, a pawl extending across both rack and bar and operated from the armature of the electromagnet, and a stop at each end of the casing and adapted to be engaged by the ends of the plain bar to raise and lower it, substantially as described.

10. In an electric printing-bulletin, the combination with a casing, of a frame mounted to travel in the casing and provided with paper-carrying rollers at its upper and lower portions, a rack on the frame, a plain bar alongside of the rack, links pivoted to the frame and bar, an electromagnet, a pawl extending across both rack and bar and operated from the armature of the electromagnet, a stop at each end of the casing adapted to be engaged by the ends of the bar to raise and lower it, and means for operating one of the paper-rollers on the return movement of the frame, substantially as described.

11. In an electric printing-bulletin, the combination with a casing, of a traveling frame in the casing, and provided with paper-carrying rollers in its upper and lower portions, a rack on the frame, a plain bar alongside of the rack, links pivoted to the frame and bar, an electromagnet, an arm on the shaft of the armature of the electromagnet, a pawl on the said arm and extending across both rack and bar, a stop at each end of the frame and with which the ends of the said bar engages, means for returning the frame, and means for operating one of the paper-rollers on the return movement of the said frame, substantially as described.

12. In an electric printing-bulletin, the combination with a casing, of a frame traveling in said casing, paper-rollers mounted in the

frame, one at the top and the other at the bottom, a pawl-and-rack mechanism for operating the frame in one direction, means for returning the frame, means for disengaging the pawl from the rack on the return movement of the frame, a toothed wheel on one of the paper-rollers, and a pivoted and spring-pressed lever carried by a bracket on the casing and adapted to engage the teeth of the wheel to turn the same on the return movement of the said frame, substantially as described.

13. In an electric printing-bulletin, the combination with a casing, of a frame traveling in said casing, paper-rollers mounted in the frame, one at the top and the other at the bottom, a rack on the frame, a plain bar arranged alongside of the rack, links pivoted to the frame and bar, an electromagnet, a pawl extending across the bar and rack and operated from the armature of the electromagnet, means for returning the frame, stops one at each end of the casing with which the ends of the bar engage to raise and lower it, a toothed wheel on one of the paper-rollers, and a pivoted lever adapted to engage the paper-roller on the return movement of the frame, substantially as described.

14. In an electric printing-bulletin, the combination with a traveling frame, and means for operating the same, of paper-rollers mounted in the frame one at the top and the other at the bottom, a toothed wheel on one of the paper-rollers, a spring-pawl engaging the said wheel to prevent rotation of the same, and a pivoted and spring-pressed elbow-lever engaging the toothed wheel on the return of the frame to turn the said wheel, substantially as described.

15. An electric printing-bulletin, comprising a traveling frame, paper-rollers mounted in the frame, a rack on the frame, a plain bar supported by links alongside of the rack, a pawl engaging the rack, an electromagnet, the armature of which operates the said pawl, stops with which the bar engages, means for automatically returning the frame, means for operating one of the paper-rollers on the return movement of said frame, a movable type-carrier arranged adjacent to the paper-carrying frame, an electromagnet, means for operating the type-carrier from the electromagnet, a pivoted and spring-pressed lever adapted to force the paper against the type of the carrier, an electromagnet, and a connection between the said lever and the armature of the electromagnet, substantially as described.

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