No. 617,574. Patented Jan. 10, 1899.

F. E. D'HUMY.

BULLETIN BOARD.

(Application filed Aug. 28, 1897.)

(No Model.) 7 Sheets—Sheet 1.

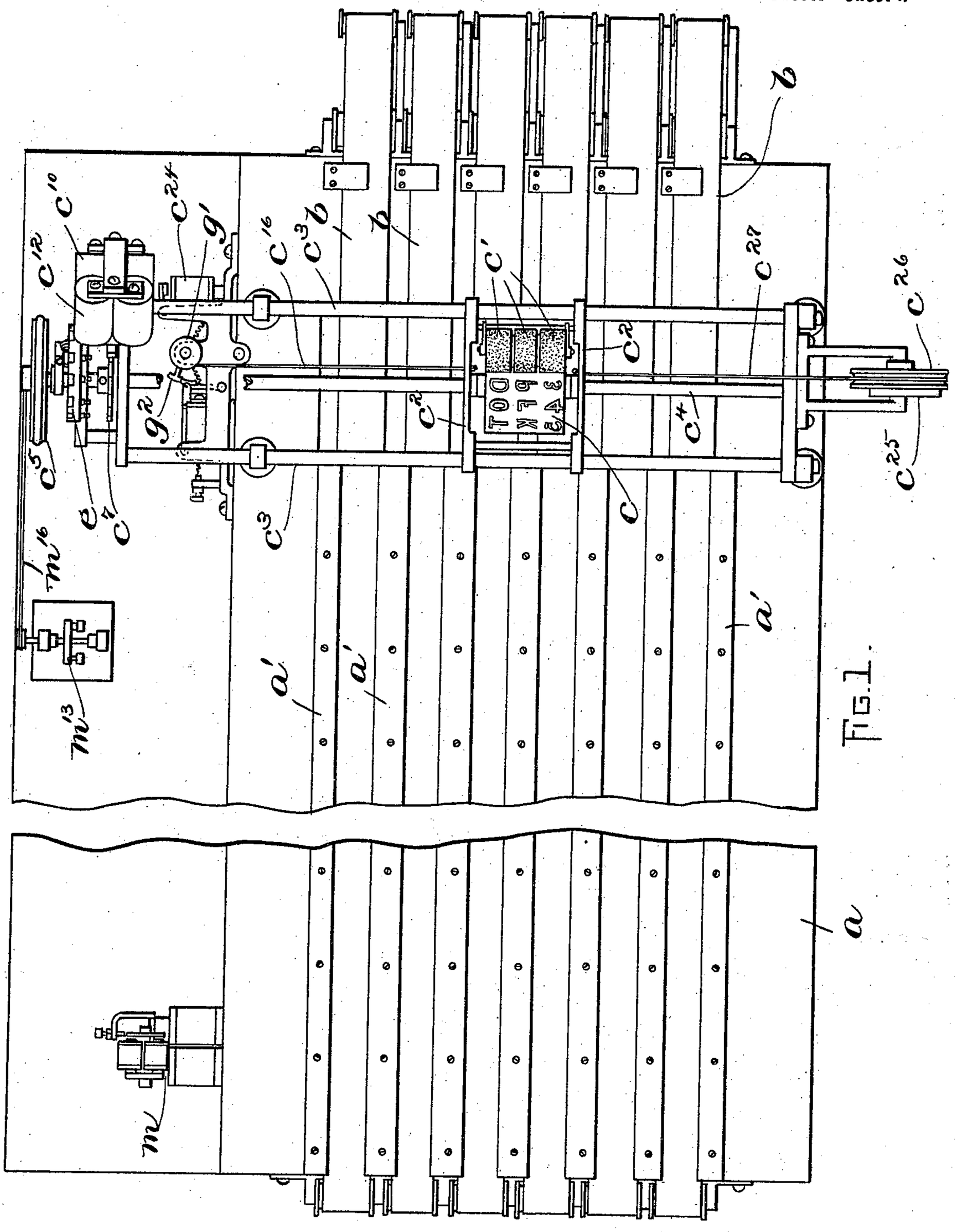

FIG. 1.

WITNESSES:
E. Batchelder
P. W. Pezzetti.

INVENTOR:
F. E. d'Humy
by Wright Brown Quinby
Attys.

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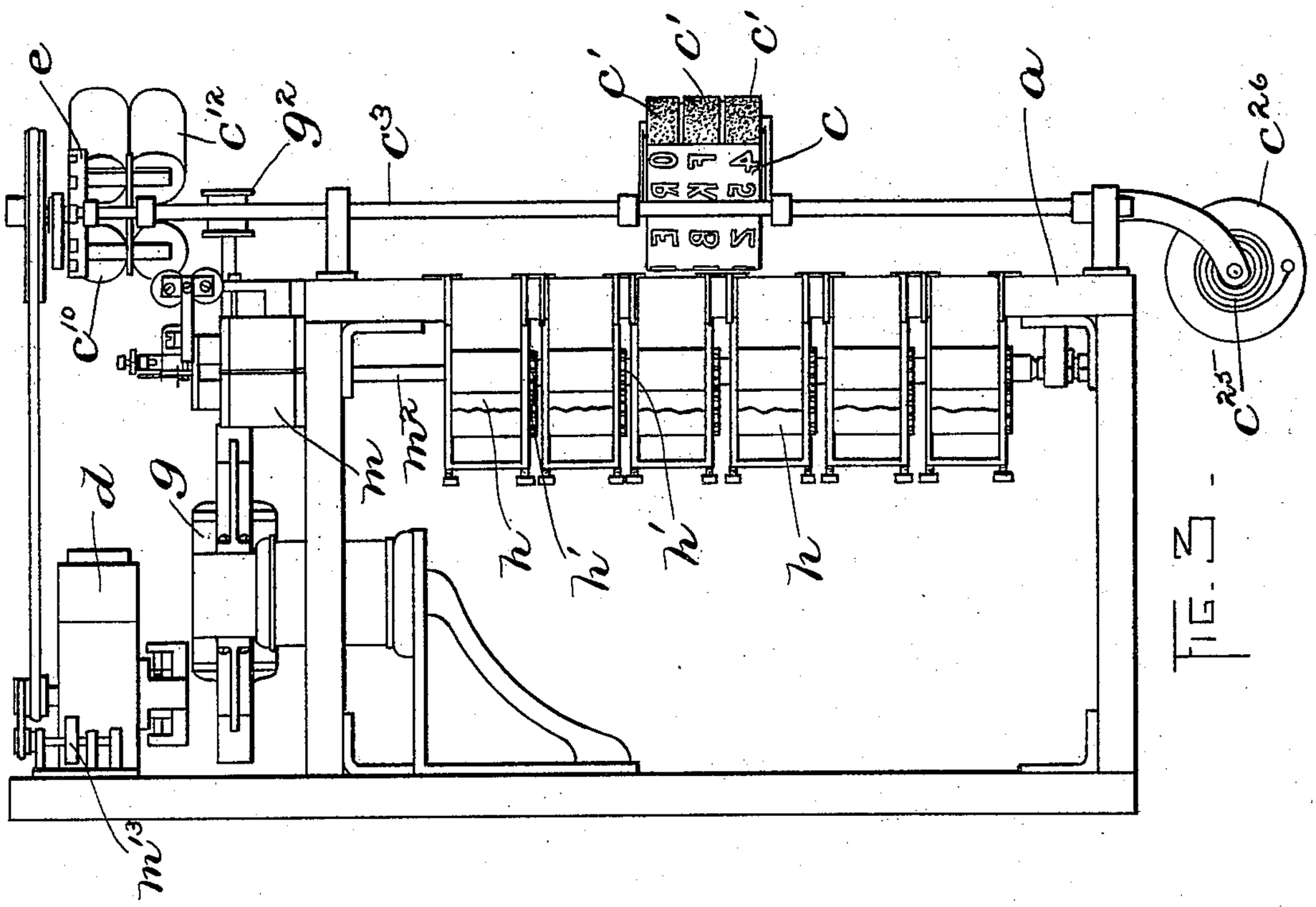

FIG. 2.

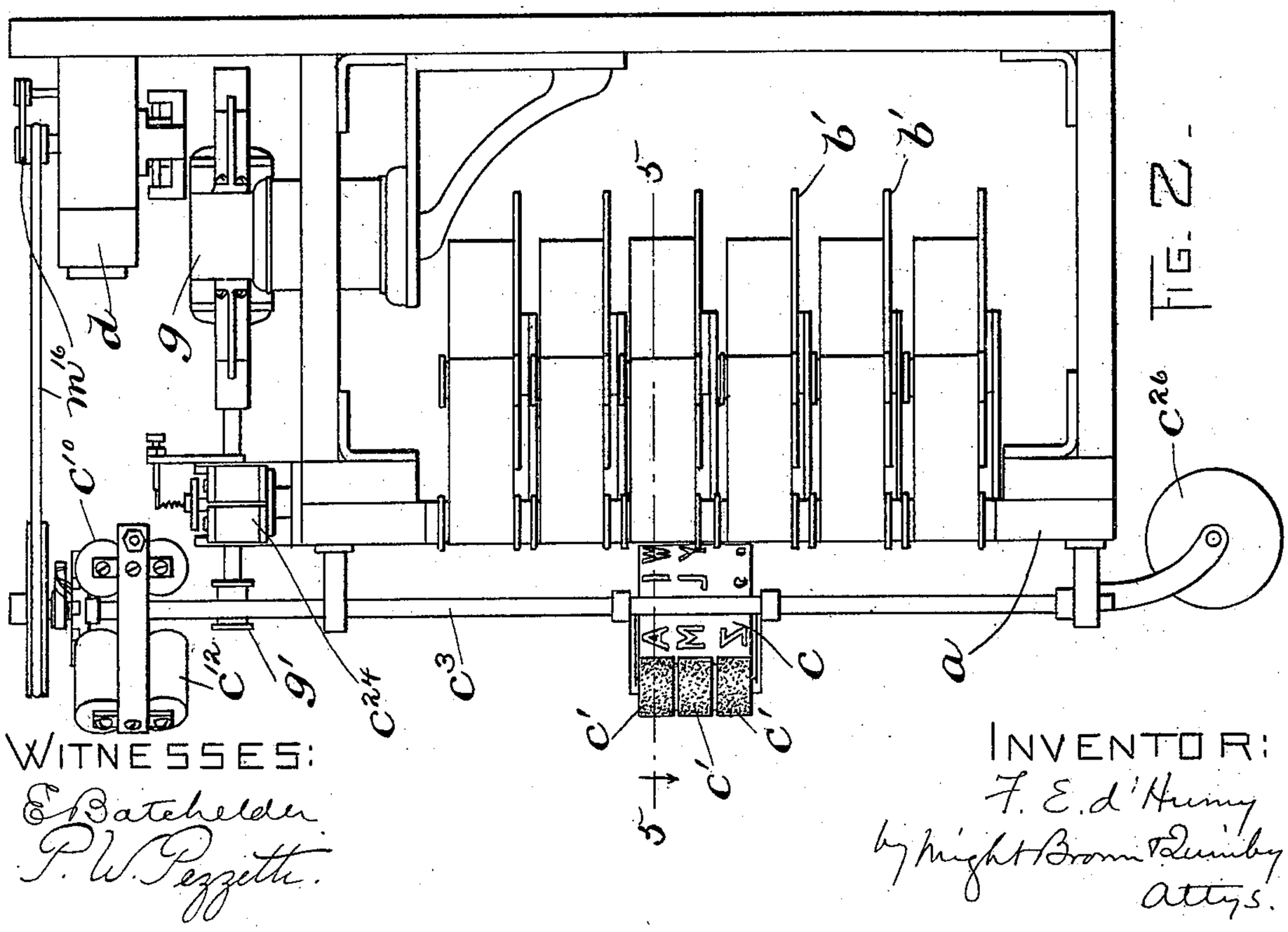

FIG. 2.

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FIG. 4.

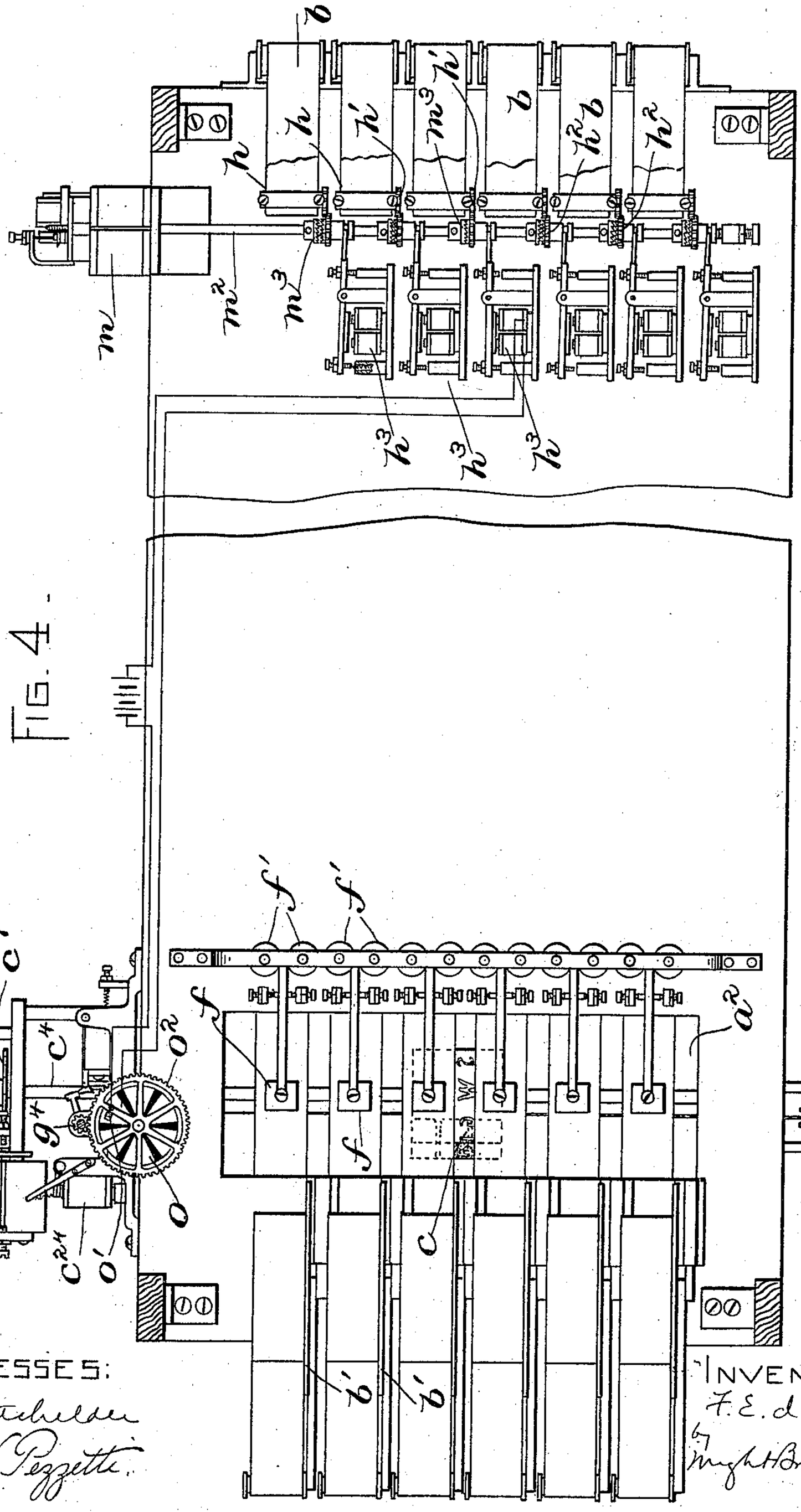

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FIG. 5.

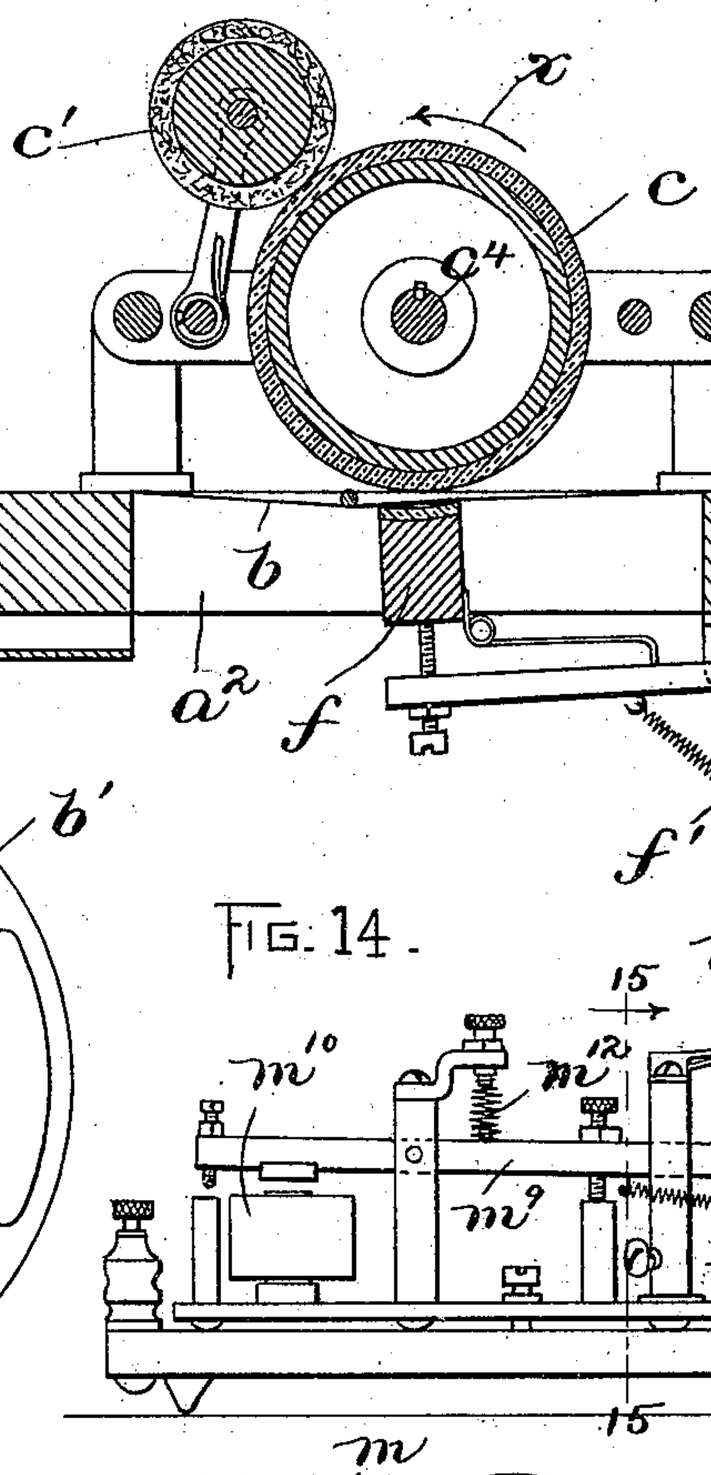


FIG. 14.

FIG. 15.

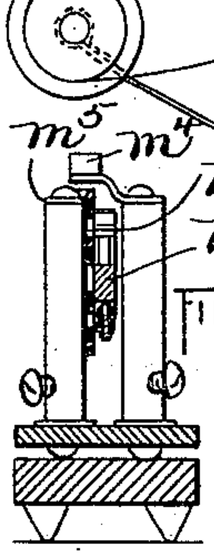


FIG. 11.

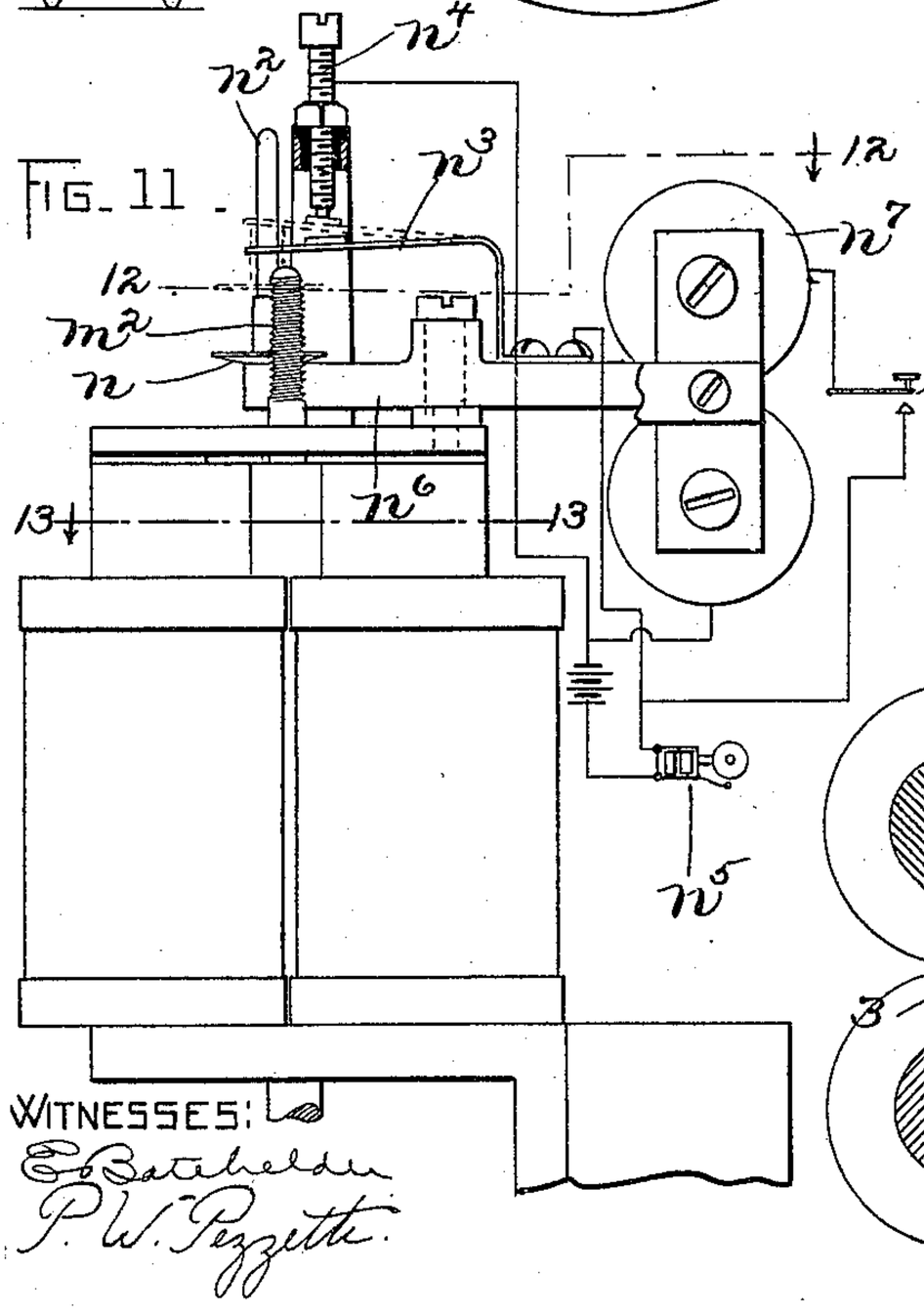


FIG. 12.

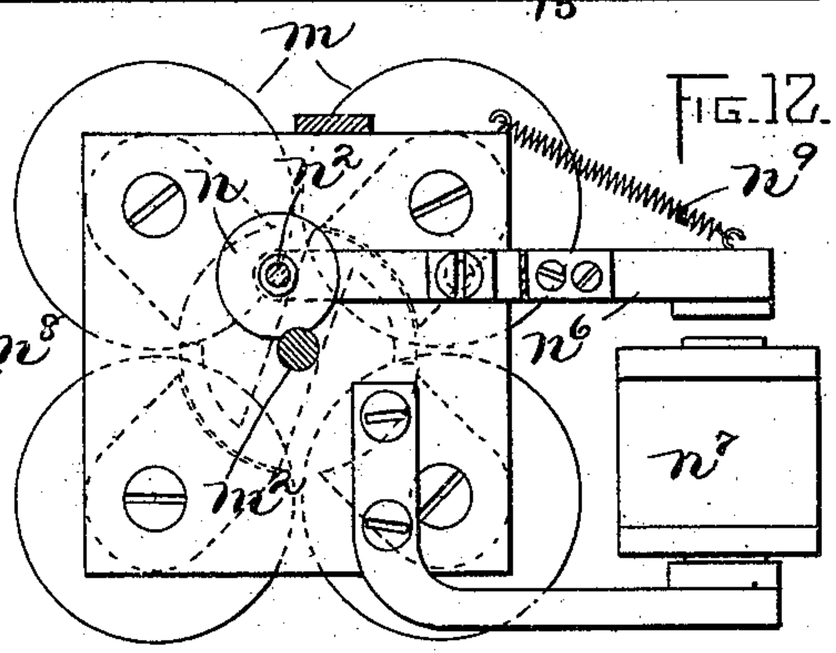
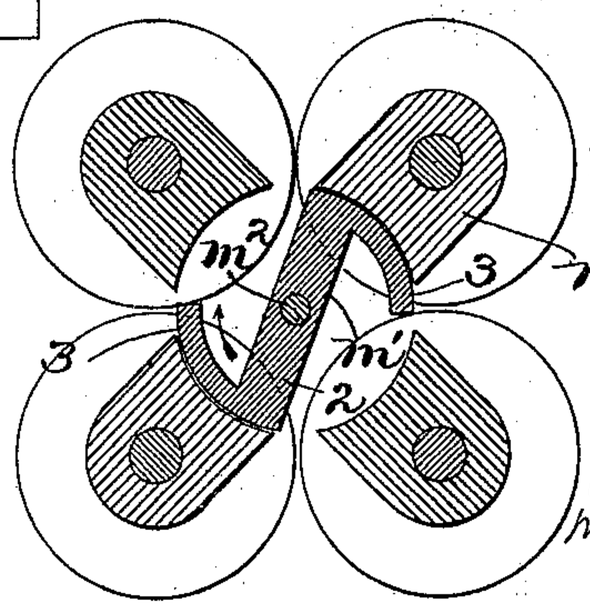


FIG. 13.



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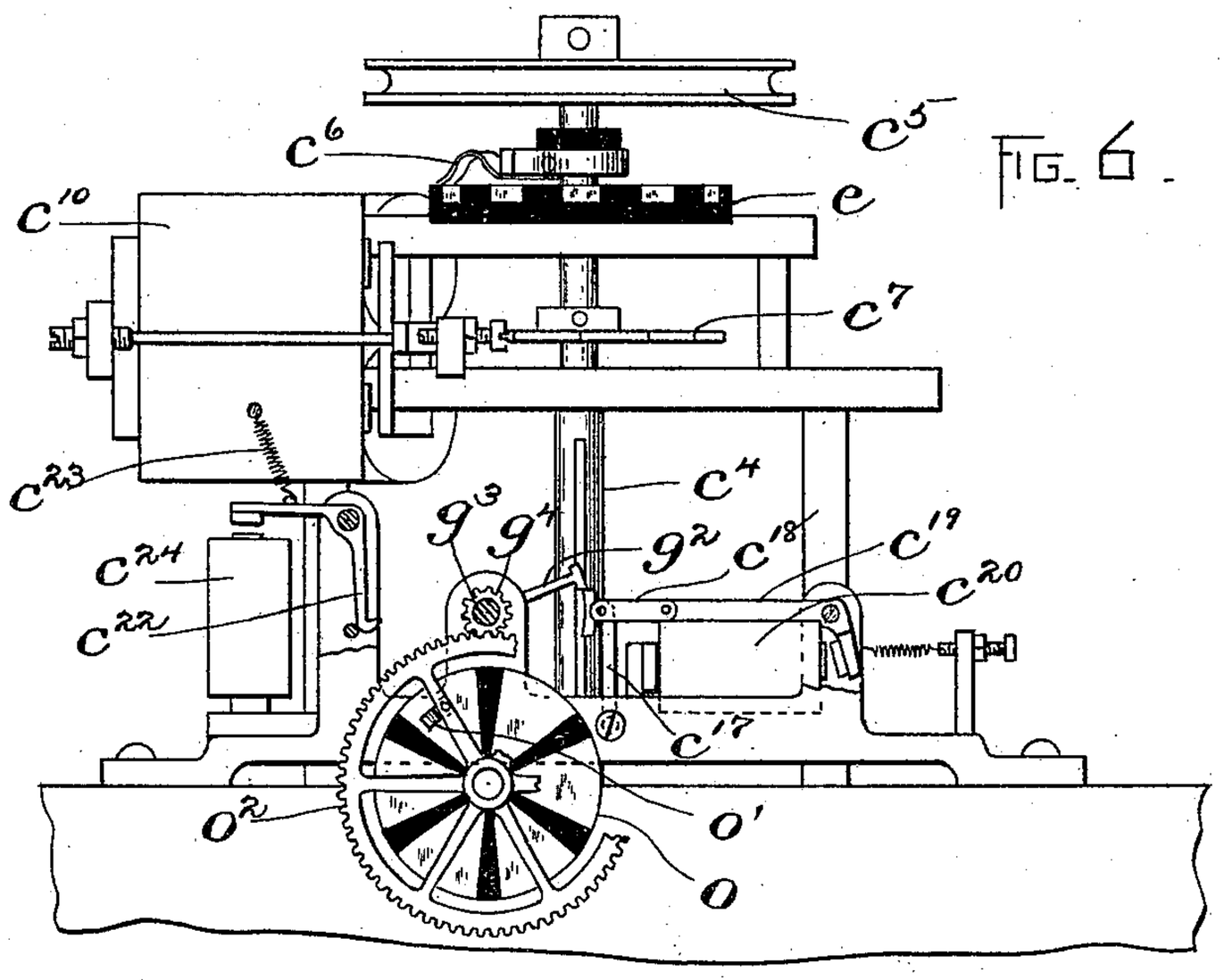


FIG. 6.

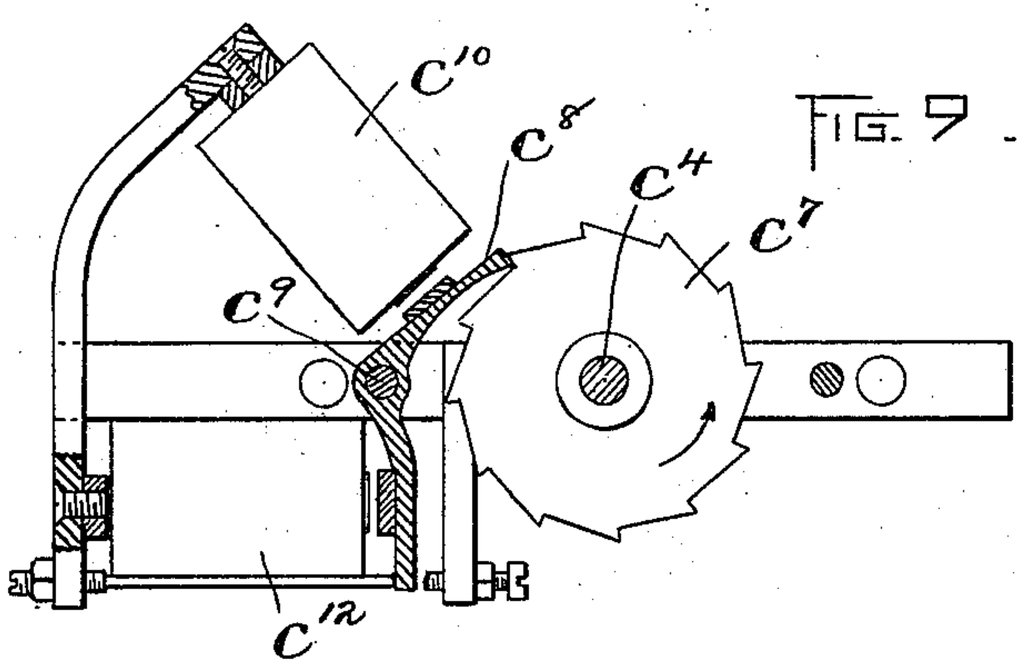


FIG. 7.

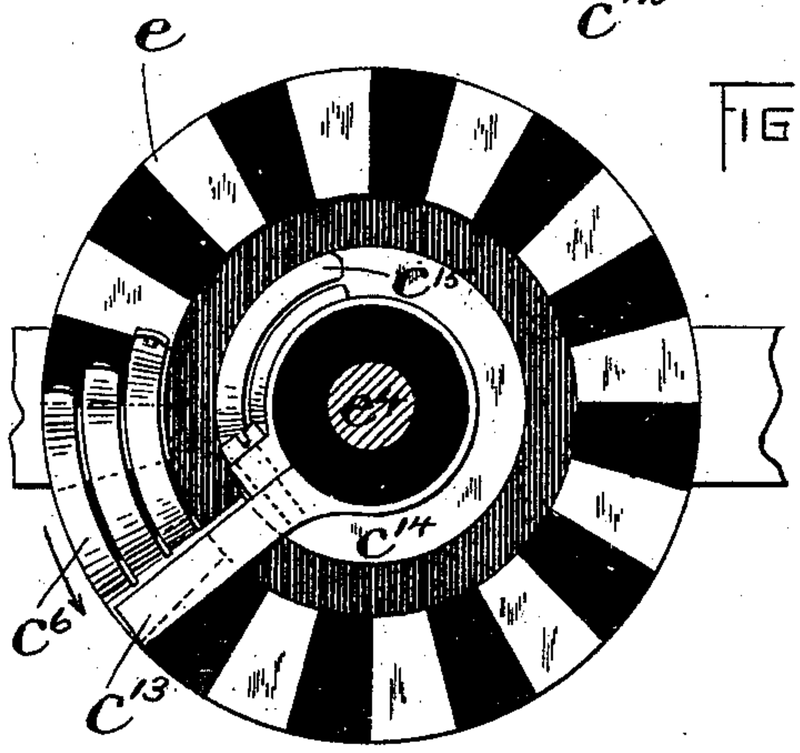
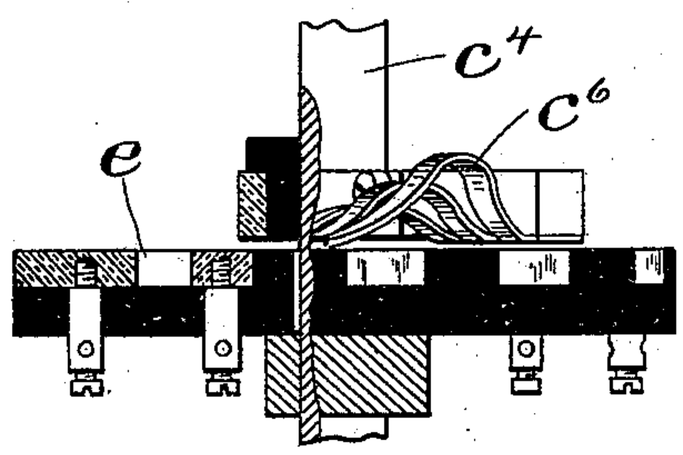


FIG. 8.



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No. 617,574.

Patented Jan. 10, 1899.

F. E. D'HUMY.

BULLETIN BOARD.

(Application filed Aug. 28, 1897.)

(No Model.)

7 Sheets—Sheet 6.

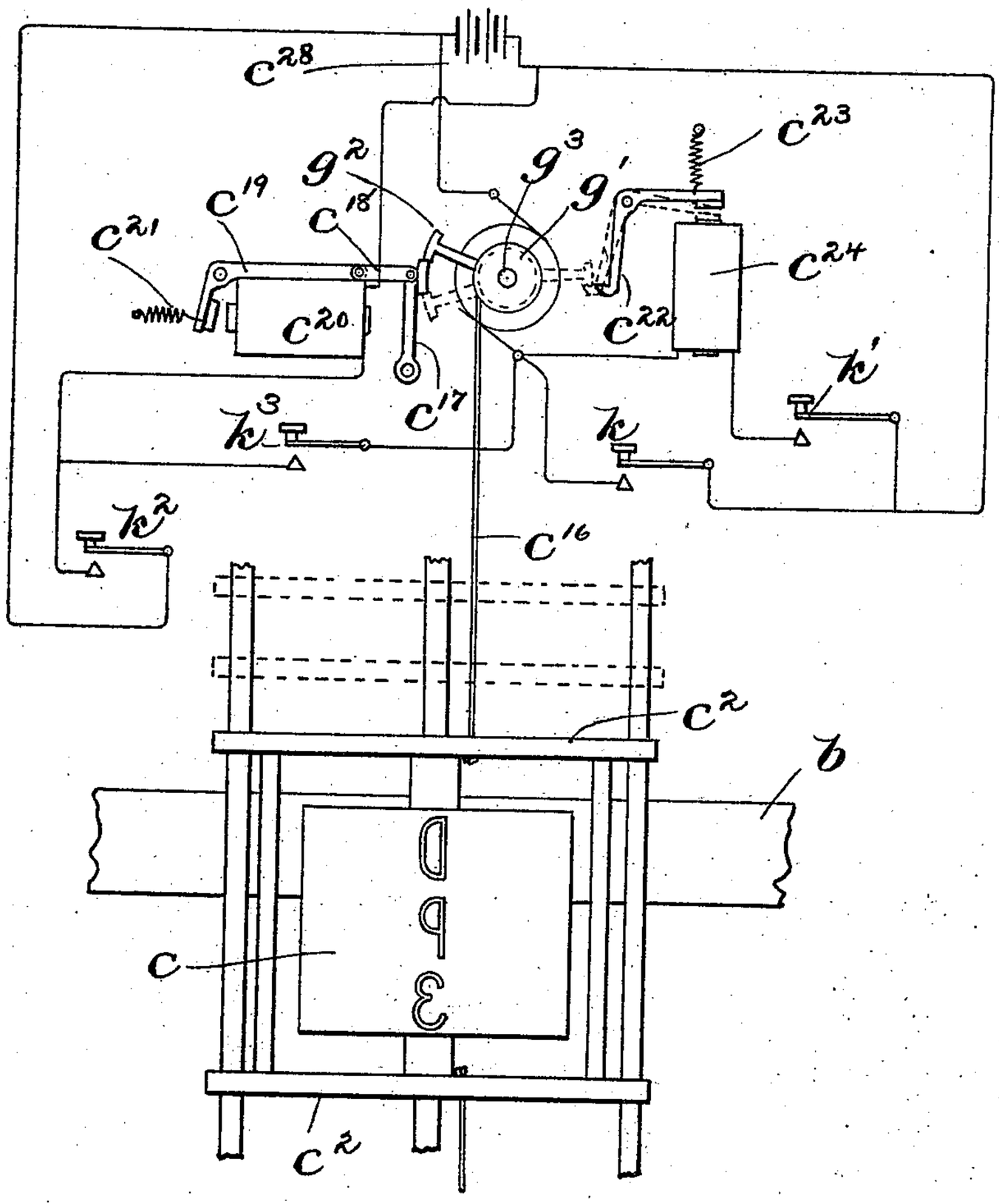

FIG. 10.

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BULLETIN BOARD.

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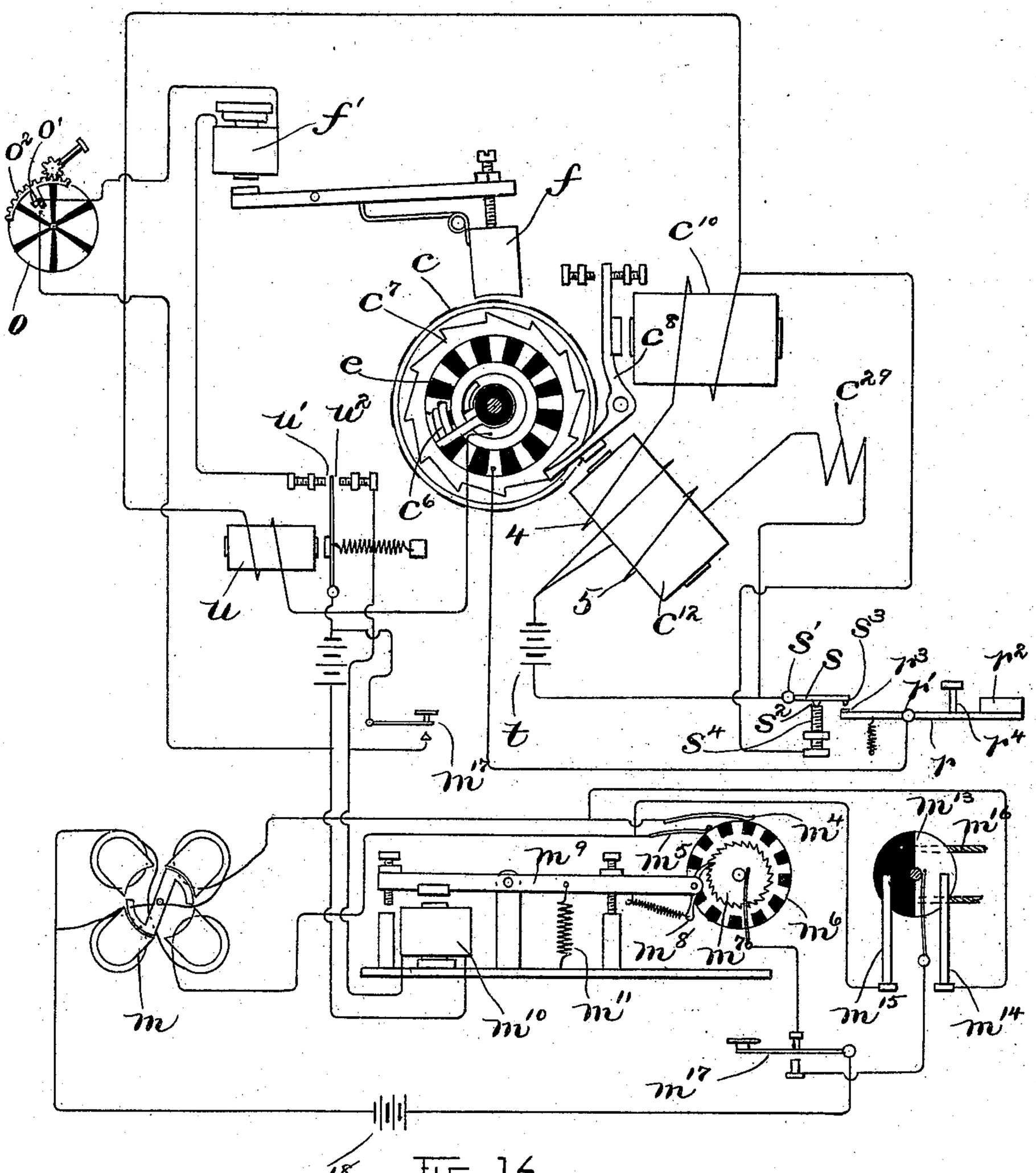

FIG. 16.

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UNITED STATES PATENT OFFICE.

FERNAND E. D'HUMY, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO ERNEST M. FISHER, OF SAME PLACE.

BULLETIN-BOARD.

SPECIFICATION forming part of Letters Patent No. 617,574, dated January 10, 1899.

Application filed August 28, 1897. Serial No. 649,803. (No model.)

To all whom it may concern:

Be it known that I, FERNAND E. D'HUMY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Bulletin-Boards, of which the following is a specification.

This invention relates to an improved display device or bulletin-board appropriate for the public exhibition of news or other subject-matter in condensed form, as is now done at newspaper establishments by means of bulletin sheets or posters, blackboards, and the like.

The invention consists in a display-board and mechanism under the control of an operator, whereby the news or other subject-matter may be printed in legible characters and exhibited upon the board as fast as it is printed.

In the apparatus illustrated in the accompanying drawings a board is employed across the face of which run horizontally a number of tapes or strips of paper which unwind from reels at one end of the board and are drawn along by suitable mechanism at the other end, which gives an intermittent spacing movement to the tapes. The latter may be held taut against the face of the board or may be retained in grooves which leave most of the front surface exposed to view. Upon these tapes printed characters are written at the will of an operator by manipulating a keyboard whose keys are arranged in convenient juxtaposition, as in our modern typewriters. The printing is done at the right-hand end of the board and on any line of tape desired, but usually on the top line first and then on the next below, and so on down in succession. As each character is printed the tape which is being printed upon moves from right to left a given space and travels in this way until the first character printed reaches the left-hand end of the board, when the line is complete. The operator is notified by the automatic ringing of a bell that the line is full, or nearly full, whereupon he completes the word or syllable and then by manipulating a certain key or keys starts the printing mechanism at work upon a new line. The printing is done by movable platens cooperating with a revoluble and vertically-movable type-wheel on whose periphery the characters are distributed in one or more rows. Said type-wheel is splined to a vertical shaft, on which is a friction-pulley belted to a continuously-running motor. The shaft carries a ratchet-wheel, in juxtaposition to which is a detent controlled by magnets which are operated from the keyboard. The type-wheel rotates freely except when said ratchet is engaged by the detent, and this engagement can be effected at any point in its rotation with the aid of a sunflower-disk having segments corresponding to the characters. In this way any character on the wheel may be imprinted on the tape by depressing its corresponding key in the keyboard. Provisions are made whereby the type-wheel may be slid up or down its shaft to a position opposite any one of the lines of tape, and where the type is distributed on the wheel in two or more lines, as is the case when the characters are of a large size, provisions are made for bringing any one of the type-lines into the proper printing relation to that line of tape.

Of the accompanying drawings, forming a part of this application, Figure 1 represents a front elevation of a bulletin-board constructed in accordance with my invention. Fig. 2 represents an end view thereof, looking from the right in Fig. 1. Fig. 3 represents an end view looking from the left. Fig. 4 represents a rear elevation of the board proper. Fig. 5 represents a horizontal section on the line 5 5 of Fig. 2. Fig. 6 represents an enlarged view of the parts shown in the upper left-hand portion of Fig. 4. Fig. 7 represents a top plan view of the stationary commutator surrounding the type-wheel shaft. Fig. 8 represents a side view thereof with parts in section. Fig. 9 represents in plan and section the ratchet-wheel on the type-wheel shaft, the detent controlling the same, and the magnets which operate the detent. Fig. 10 represents a diagrammatic view of the mechanism and electrical connections for raising and lowering the type-wheel. Fig. 11 represents a side elevation of the spacing-motor for propelling the tapes and the signaling mechanism connected therewith. Fig. 12 represents a horizontal section on the line 12 12 of Fig. 11. Fig. 13 represents a horizontal section on the line 13 13 of

Fig. 11. Fig. 14 represents a side elevation of the relay for operating the spacing-motor. Fig. 15 represents a section on the line 15 15 of Fig. 14. Fig. 16 represents a diagrammatic view of the mechanisms and electrical connections for rotating the type-wheel and for operating the spacing-motor and printing-platens.

The same reference characters indicate the same parts in all the figures.

Referring to the drawings, the letter *a* designates a display-board having on its face a number of raised parallel strips of metal *a' a'*, secured by screws and forming grooves in which run paper tapes *b b*, the metallic strips being wide enough apart to expose to view most of the paper. The tapes may be as many in number as desired and are of a width depending upon the size of the characters to be printed. The several tapes (here shown as six in number) are unwound from reels *b' b'*, situated at the right-hand end of the board, and after passing across the face of the board and around rollers b^2 b^2 at the left-hand end thereof they are wound partly around spools having a surface of rubber or other suitable material at *h h*. The several spools are rotated by suitable mechanism, to be hereinafter described, in such a manner as to advance the tapes step by step or run them along continuously, as desired by the operator.

c designates the type-wheel, which in the present instance is shown as mounted in front of the board; but it will be understood that the exact position of the type-wheel is immaterial. For instance, it might be shifted around the end of the board to the right and the tape-reels *b'* and other mechanism shifted correspondingly. The type-wheel is provided on its periphery with types or characters, including the letters of the alphabet, the numerals from "0" to "9," and the necessary punctuation-marks, the said types or characters as here shown being distributed in three rows for the sake of compactness. It will be understood, however, that more or less than three rows of characters might be used on the type-wheel and that the number of characters is also subject to variation according to requirements.

c' c' designate inking-rolls adapted to bear against the type and distribute ink thereon, the said rolls being mounted, together with the type-wheel, in a sliding frame or cage consisting of two cross-bars c^2, which embrace vertical guide-rods c^3 c^3, secured in front of the board *a*, and vertical bars joining the said cross-bars.

The type-wheel *c* is loosely splined to a vertical shaft c^4, with which it rotates in the direction of the arrow *x*, Fig. 5, and to the top of said shaft are rigidly affixed, one below the other, a friction-pulley c^5, a contact trailer or brush c^6, and a ratchet-wheel c^7. A magnetically-controlled detent c^8 occupies positions in and out of the path of the ratchet-wheel teeth, being adapted to arrest the revolution of the shaft and type-wheel when in engagement with said ratchet-wheel and to allow the same to rotate freely when out of engagement therewith. The pulley c^5 is belted to a continuously-running electric motor *d*, Figs. 2 and 3, situated behind the board *a*, and the construction of said pulley is such that the motion of the type-wheel shaft and the parts attached to it may be arrested without stopping the motor, and when said shaft is again released it will immediately be set in rotation. The number of teeth in the ratchet-wheel is equal to the number of characters distributed annularly on the type-wheel *c*. For instance, on the type-wheel here shown there are supposed to be thirty-six characters distributed in three rows of twelve each, the characters in each row being in vertical alinement, so that there are twelve teeth in the ratchet-wheel. The engagement of the detent c^8 with any one of the teeth on said wheel will therefore determine a rotary position of the type-wheel corresponding to three of the printing characters, and the vertical position of the type-wheel will determine which of the three is imprinted upon the tape, as hereinafter explained. The detent c^8 is pivoted at c^9 to a stationary stud and is operated by two electromagnets c^{10} c^{12}, which may be termed the "ratchet-magnets" and whose armatures are secured to the arms of the detent on either side of its pivot.

e designates a twelve-part stationary sunflower-disk surrounding the shaft c^4 and having an upper surface composed of alternate segments of metal and insulating material. The brush or trailer c^6, which operates on said disk, is affixed to an arm c^{13}, which is secured by a collar to an insulating-ring fastened securely on the shaft. An inner metallic ring c^{14} is maintained in electrical connection with the trailer-arm and outer brush by a brush c^{15}, which travels around with the arm.

Behind each line of tape is a pivoted platen consisting of a platen-block *f*, adjustably secured on one end of a pivoted arm or lever, to the other end of which is affixed the armature of an electromagnet *f'*. Said platens project through a recess a^2 in the board *a* behind the vertical path of the type-wheel in such a position as to press their respective tapes against said type-wheel when actuated by their magnets *f'*, and thereby cause the type-wheel to print upon the tapes.

The sliding frame c^2 c^2, carrying the type-wheel, is controlled in its vertical movement by a cable c^{16}, which winds over a drum *g'*, affixed to the shaft of an electric motor *g*, Figs. 2 and 3. The motor-shaft also carries an arm g^2, Fig. 10, which coöperates with magnetically-controlled detents to arrest the drum and shaft when desired, thereby determining the vertical position of the type-wheel.

c^{17} designates a pivoted detent whose upper end swings in and out of the path of the arm g^2. It is connected by a link c^{18} with a bell-

crank lever c^{19}, at whose lower end is affixed the armature of an electromagnet c^{20}. A spring c^{21} serves to normally hold the stop portion or head of the detent in the path of the arm g^2. The end of said arm normally rests on top of the detent-head by reason of the weight of the type-wheel and cage, and the length of cable c^{16} and diameter of drum g' are such that when said arm is in this position the top line of type on the type-wheel is always opposite one of the paper tapes b.

c^{22} designates a bell-crank detent which is normally held by a spring c^{23} out of the path of the arm g^2, but is adapted to be moved into said path by the energizing of an electromagnet c^{24}, being provided for that purpose with a bar of soft iron at one end, which acts as the armature of said magnet. When neither of the detents c^{17} or c^{22} is in the path of the arm g^2 and no current is passing through the motor, the type-wheel and cage descend by their own weight and with the assistance of a spiral spring c^{25}, Figs. 1 and 3, pulley c^{26}, and cable c^{27}. A nearly-complete right-hand revolution of the drum g', causing the arm g^2 to come in contact with the under side of the head of detent c^{17}, raises the type-wheel and brings the lower line of type opposite the tape b. The intermediate or middle line of type is brought into printing position when the drum turns slightly less than half a resolution and brings the arm g^2 into contact with the detent c^{22}.

Fig. 10 illustrates an arrangement of contact-keys and electrical connections for accomplishing the several vertical movements of the type-wheel. c^{28} designates a convenient source of electrical energy, such as a battery, for supplying current to the motor and magnets. Supposing the type-wheel to be in its normal position, with the top row of type opposite one of the lines of tape, should it be desired to print a character which is on the bottom row of type the operator depresses the key k and completes a circuit through the motor g only. This causes the armature of said motor and the drum g' to revolve until the arm g^2 strikes against the head of the detent c^{17} on its under side, which arrests the drum and motor and brings the lower line of type into printing position. With his finger still on the key k the operator depresses a key on the keyboard corresponding to the character to be printed, and as soon as the impression is made he releases both keys and the type-wheel falls back into its former position unless the next character to be printed is on the bottom line also, in which case he keeps the key k depressed until said character is printed. Should it be desired to print with the middle line of characters, the operator depresses the key k', which completes a circuit through the motor and the magnet c^{24}. The detent c^{22} is thereby brought into the path of the arm g^2, and the drum revolves until said arm strikes the detent, which arrests the type-wheel with its middle line of type opposite the tape. With the key still depressed the desired character is then printed and the key is released, as before. Should it be desired to drop the type-wheel one line of tape, the operator depresses the key k^2 for an instant and immediately releases it. This momentarily completes a circuit through the magnet c^{20}, which draws back the detent c^{17} for an instant and allows the drum to turn backward just one revolution, unwinding a length of cable equal to the distance between two tapes. If instead of being depressed momentarily the key k^2 is held down, the type-wheel will fall until said key is released or until the cage reaches its lowermost position. If it is desired to raise the type-wheel several lines of tape or up to the top line, a key k^3 is depressed and a circuit completed through the motor and the magnet c^{20}. The detent c^{17} is thereby drawn back, and the motor winds up the cable and raises the type-wheel until said key is released or the cage reaches its topmost position. In practice the keys k k' k^2 k^3 are mounted on the main keyboard.

The spacing mechanism which controls the movement of the tapes is organized as follows: m designates an electromagnetic motor having an armature m', affixed to a vertical shaft m^2. The four field-coils of said motor are provided with pole-pieces m^3, facing horizontally, and are connected in two circuits with opposite coils in the same circuit and wound so as to give opposite polarity to their pole-pieces. The armature m' (see Fig. 13) is without winding and composed of soft iron. Its shape, as seen in Fig. 13, is somewhat like that of a letter **S** or a reversed letter **Z**—that is to say, in horizontal section it consists of a straight cross-piece 2, affixed to the shaft, and two flanges 3, extending laterally from opposite sides of the cross-piece at its ends, the said flanges being curved in the arc of a circle and conforming to the curvature of the four pole-pieces. The armature turns in the direction of the free edges of the flanges. The faces of the armature, which include the length of the flanges 3 and the width of the cross-piece 2, are, as will be observed, longer than the faces of the pole-pieces m^3, so that when the armature occupies the position shown in Fig. 13, with the rear edges of the armature-faces substantially even with the rear edges of the pole-faces, the free edges of the flanges 3 project a considerable distance toward the next succeeding pair of pole-pieces. The effect of this construction will be readily understood. By alternately energizing the two pairs of field-coils the armature m' will be rotated in a step-by-step manner in the direction of the arrow, Fig. 13, a distance of one-quarter of a revolution at a time. It is obvious that by employing three or more pairs of coils instead of two and altering the proportions of the pole-pieces and armature-faces to correspond the armature could be made to rotate one-sixth or a smaller fraction of a revo-

lution at a time. The action of the armature in the above-described motor is precise and well adapted to the spacing of the tapes *b*.

Arrangements are made whereby the motor *m* may be caused to operate upon any one of the tapes *b* according to the vertical position of the type-wheel *c*. Such arrangements are as follows: The friction-rollers at *h h* are provided with gear-wheels *h'*, which are continually in mesh with loose gear-wheels h^2 on the motor-shaft m^2. The latter are provided with crown clutch-teeth adapted to engage the similar teeth formed on fixed clutch members m^3, which are keyed to said shaft. Each loose wheel h^2 is grooved and engaged with a lever attached to the armature of an electromagnet h^3, so that the passage of a current through any of the magnets h^3 will cause the corresponding loose clutch-wheel to engage its complemental fixed wheel on the shaft, and the corresponding tape will then be operated upon by the spacing-motor. The several magnets h^3 are electrically connected through a battery with the several segments of a six-part stationary commutator *o* and with a trailer *o'*, which is carried by a revolving gear-wheel o^2 and which successively contacts with the several segments of said commutator. The shaft g^3 of the motor, which controls the rise and fall of the type-wheel *c*, is provided with a pinion g^4, which meshes with the teeth of the gear-wheel o^2. The numbers of teeth in the pinion and gear-wheel are in the ratio of one to six in the present instance, so that six complete revolutions of the pinion will cause the trailer on the gear-wheel to make one revolution. The parts and electrical connections are accordingly so arranged that when the type-wheel *c* is located opposite a particular tape in order to print thereon the spacing-motor *m* is also put in operative relation with that tape and with no other. These conditions may be seen in Fig. 4 with regard to the third line of tape from the top of the board.

The shifting of the current in the coils of the spacing-motor *m* is accomplished by two brushes m^4 m^5, Figs. 14 and 16, each connected with one set of coils in said motor. These brushes bear upon a commutator m^6, which is built up of alternate segments of metal and insulating material, the metal segments being all electrically connected to each other and to one pole of a battery, the other pole of which connects with both sets of coils in the motor. The brushes are so spaced that one brush rests on a metal segment when the other rests on an insulating-segment. On the shaft of the commutator is a ratchet-wheel m^7, having as many teeth as there are segments of both kinds in said commutator and being engaged by a pawl m^8, mounted at one end of a pivoted lever m^9, whose opposite end carries the armature of an electromagnet m^{10}. A spring m^{11}, Fig. 16, or m^{12}, Fig. 14, normally holds the armature away from its magnet and depresses the pawl end of the pivoted lever. Said magnet m^{10}, which is under control from the keyboard, as will presently be explained, imparts a step-by-step motion to the commutator, and thereby shifts the current from one set of coils to the other set in the motor *m*, causing the before-described spacing action of said motor's armature. If it should become necessary on account of mistakes in the printing or for other reasons to run off a length of tape without printing thereon, it is desirable to cause a rapid revolution of the motor-armature in place of its usual intermittent motion. To this end I provide an auxiliary commutator m^{13}, Fig. 16, composed of one metal segment and one insulating-segment and having two brushes m^{14} m^{15}, connected with the two sets of coils in the motor *m*. The said commutator is mounted on a shaft and is placed in rapid rotation by means of a belt m^{16} from the continuously-running motor *d*. (See Figs. 1 and 3.) By depressing a key m^{17} current from the battery m^{18} may be shifted from the ratchet-commutator m^6 to the commutator m^{13}, and the rapid rotation of the latter and consequent rapid shifting of current in the spacing-motor coils will cause a continuous rotation of the armature of said motor as long as the key is held down.

The shaft m^2 of the spacing-motor is extended upwardly, as shown in Fig. 11, and its upper portion screw-threaded. A disk traveler *n*, mounted on a vertical spindle n^2, is provided with a thin edge which normally engages the thread on shaft m^2. As said shaft is rotated the traveler is gradually raised and in its ascent presses against a contact-spring n^3. The said spring is raised until it reaches an adjustable contact-screw n^4, which completes an electric circuit and rings a bell n^5, placed in any convenient position where the operator can hear it. The parts are so arranged that the circuit is completed just before the end of a line is reached in the printing, a convenient number of spaces being left for the completion of a word or syllable.

The spindle n^2 on which the traveler moves is mounted at one end of a pivoted lever n^6, to the other end of which is affixed the armature of an electromagnet n^7. When the operator has finished a line, he depresses a key n^8, which energizes the magnet, causes it to attract its armature, and swings the traveler out of contact with the screw-threaded motor-shaft m^2. Said traveler thereupon falls by the influence of gravity to its original position, the key n^8 is released, and a spring n^9 causes the pivoted arm to swing back and bring the traveler again into engagement with the screw-threaded shaft.

Fig. 16 represents, diagrammatically, the connections of one of the character-keys on the operating-keyboard, with the type-wheel, trailer, and sunflower-disk, the spacing mechanism, and one of the printing-platens. *r* designates a stiff metal lever having a fulcrum *r'*, a finger-piece r^2, and a contact-point r^3.

s designates a shorter metal lever having a fulcrum s' and contact-points s^2 and s^3. The point s^2 normally rests upon a contact-screw s^4. The lever r is normally held by a spring against a stop r^4, as shown; but when the finger-piece is depressed the contacts r^3 and s^3 come together, and the short lever s is lifted away from the contact s^4. s' is connected with one pole of a battery t, whose other pole is connected with the two ends of the differentially-wound ratchet-magnet c^{12}. The two halves of the coil of said magnet are wound in opposite directions and designated by the numerals 4 and 5, respectively. From the winding 4 the circuit continues through the other ratchet-magnet c^{10} and after that divides, one part going to the contact s^4 and the other to a relay u, whose armature controls the spacing mechanism and the platen f. From the relay-magnet u the circuit continues to the trailer c^6 on the type-wheel shaft. The other half, 5, of the winding of magnet c^{12} is connected, through a resistance c^{29}, with the battery t, so that there is a current flowing through this half of the winding continuously. A wire from r' connects key-lever r with a segment of the disk e. Tracing connections with the key r and lever s in their normal positions, it will be found that current flows from the battery through both windings of the differential coil. Under these conditions the magnet c^{12} is demagnetized, since its windings are in opposite directions. The resistance c^{29} is introduced to compensate for the resistances of the ratchet-magnet c^{10} and the relay-magnet u; but the resistance of the former is so great as compared with that of the latter that the differential coil is practically balanced, with only the coil c^{10} in circuit on the side of the winding 4. At the same time then that the one ratchet-magnet c^{12} is demagnetized the other ratchet-magnet c^{10} is magnetized. The ratchet-wheel c^7 is therefore locked and does not rotate because engaged by the detent c^8. Now if the key r is depressed the lever s is raised, and the winding 4 and coil c^{10} are cut out of circuit. At the same time the pole of the battery is transferred from the contact s^2 s^4 to the contact r^3 s^3. Noting the effect of this change, the magnet c^{10} becomes demagnetized, while the magnet c^{12} becomes magnetized because its balance is destroyed. This unlocks the ratchet-wheel, and the type-wheel, ratchet, and trailer revolve until said trailer comes into contact with the disk-segment connected with the depressed key r. This completes a circuit by way of the trailer through the relay and two ratchet-magnets restoring the balance in the differential coil of the magnet c^{12} and magnetizing the magnet c^{10}. The detent c^8 is attracted and arrests the ratchet-wheel and type-wheel c, with the character corresponding to the depressed key facing the printing-tape. Simultaneously the relay-magnet u attracts its armature and completes a circuit at u' through the platen-magnet f', causing the latter to press the platen f against the tape and print the character thereon. The drawing of the relay-armature to the left breaks a contact at u^2 and demagnetizes the spacer-controller magnet m^{10}, allowing the pawl m^8 to take a new tooth on the commutator-ratchet m^7. When the contact u^2 is again made upon the release of the key r, the magnet m^{10} attracts its armature and moves the commutator m^6 ahead one segment, causing the spacing-motor m to advance the tape in readiness for the next character.

m^{17} designates a special spacing-key which in practice occupies a position on the general keyboard, as do all of the other keys hereinbefore mentioned.

The connections of all of the character-keys are similar to those of the key r, (illustrated in Fig. 10,) each key corresponding to one of vertical rows of characters on the type-wheel and being connected with one of the metal segments on the disk e.

It will be noted in Fig. 16 that the platen-magnet f' is connected to a segment of the commutator o and to the trailer o' in the same way as any one of the magnets h^3, Fig. 4. The remaining platen-magnets are connected to the other segments in like manner, so that only that platen which is behind a tape faced by the type-wheel is operable from the keyboard.

Having thus explained the nature of my invention and described a way of constructing and using the same, although without having attempted to set forth all the forms in which it may be embodied or all the modes of its use, I declare that what I claim is—

1. A display-board, a plurality of independently-movable tapes adapted to have successive portions of their length exposed on said board, and means for printing on said tapes.

2. An apparatus of the character specified, comprising a display-board, a plurality of tapes mounted thereon, a step-by-step device for moving said tapes, means for throwing said device into and out of operative relation with any of the tapes, and means for printing on said tapes.

3. An apparatus of the character specified, comprising a display-board, a plurality of tapes mounted thereon, independent propelling devices connected with the several tapes, a vertical shaft, an intermittently-operating device connected with said shaft for rotating the same in a step-by-step manner, means for throwing said shaft into and out of connection with the propelling device of any tape, and means for printing on the tapes.

4. An apparatus of the character specified, comprising a display-board, a plurality of tapes mounted thereon, independent propelling devices connected with the several tapes, a motor, a series of clutches connected with said motor and with the tape-propelling devices, and a series of electromagnets for operating said clutches.

5. An apparatus of the character specified,

comprising a display-board, a plurality of tapes mounted thereon, means for moving each tape independently of the others, a vertical shaft, a rotary and vertically-movable type-wheel mounted thereon, means for rotating said type-wheel, and means for moving said type-wheel vertically to cause it to register with any one of the tapes.

6. A display-board, a plurality of independently-movable tapes disposed horizontally, a revoluble and vertically-movable type-wheel having printing characters distributed in horizontal rows on its periphery, means for producing a step-by-step vertical movement of said type-wheel in either direction to cause the same to register successively with any one of the tapes, and means for producing a step-by-step movement of said type-wheel to bring any one of the rows of characters opposite a tape.

7. A display-board, a plurality of horizontally-extending tapes, a vertically-movable type-wheel adapted to register with any one of said tapes, and means for pressing said tapes against the type-wheel.

8. A display-board, a plurality of horizontally-extending tapes, a vertically-movable type-wheel adapted to register with any one of said tapes, a magnetically-operated platen located behind each tape and adapted to press said tape against the type-wheel at a predetermined time, and means whereby each platen is caused to operate only when the type-wheel registers with its tape.

9. A display-board, a plurality of tapes, a type-wheel adapted to register with any one of said tapes, independent motive elements connected with the several tapes, and means whereby only that element is made operative which corresponds to the tape with which the type-wheel registers.

10. A display-board, a plurality of tapes, a type-wheel adapted to register with any one of said tapes, a platen located behind each tape, motive elements for advancing each tape independently, and devices whereby only that platen and only that motive element is made operative which corresponds to the tape with which the type-wheel registers.

11. A display-board, a plurality of independently-movable tapes, a spacing-motor having field-coils arranged in pairs and having an **S**-shaped armature such as m', a commutator device having a step-by-step movement for successively energizing the pairs of field-coils to cause a step-by-step revolution of the armature, and an independent commutator device having a continuous movement for successively energizing the pairs of field-coils to cause a continuous revolution of the armature.

12. A display-board, a plurality of independently-movable tapes, means for actuating said tapes in a step-by-step manner, and a signaling device controlled by said actuating means and adapted to give a signal after a predetermined progress of any of said tapes.

13. A rotary shaft having a screw-threaded portion, a loosely-mounted traveler adapted to engage said portion and to be moved thereby longitudinally of the shaft, contact members adapted to be operated by said traveler, and an electromagnet having an armature connected with the traveler, said magnet being adapted to move said traveler out of engagement with the shaft, whereby it may be returned to its initial position.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 19th day of August, A. D. 1897.

FERNAND E. D'HUMY.

Witnesses:
C. F. BROWN,
E. BATCHELDER.