

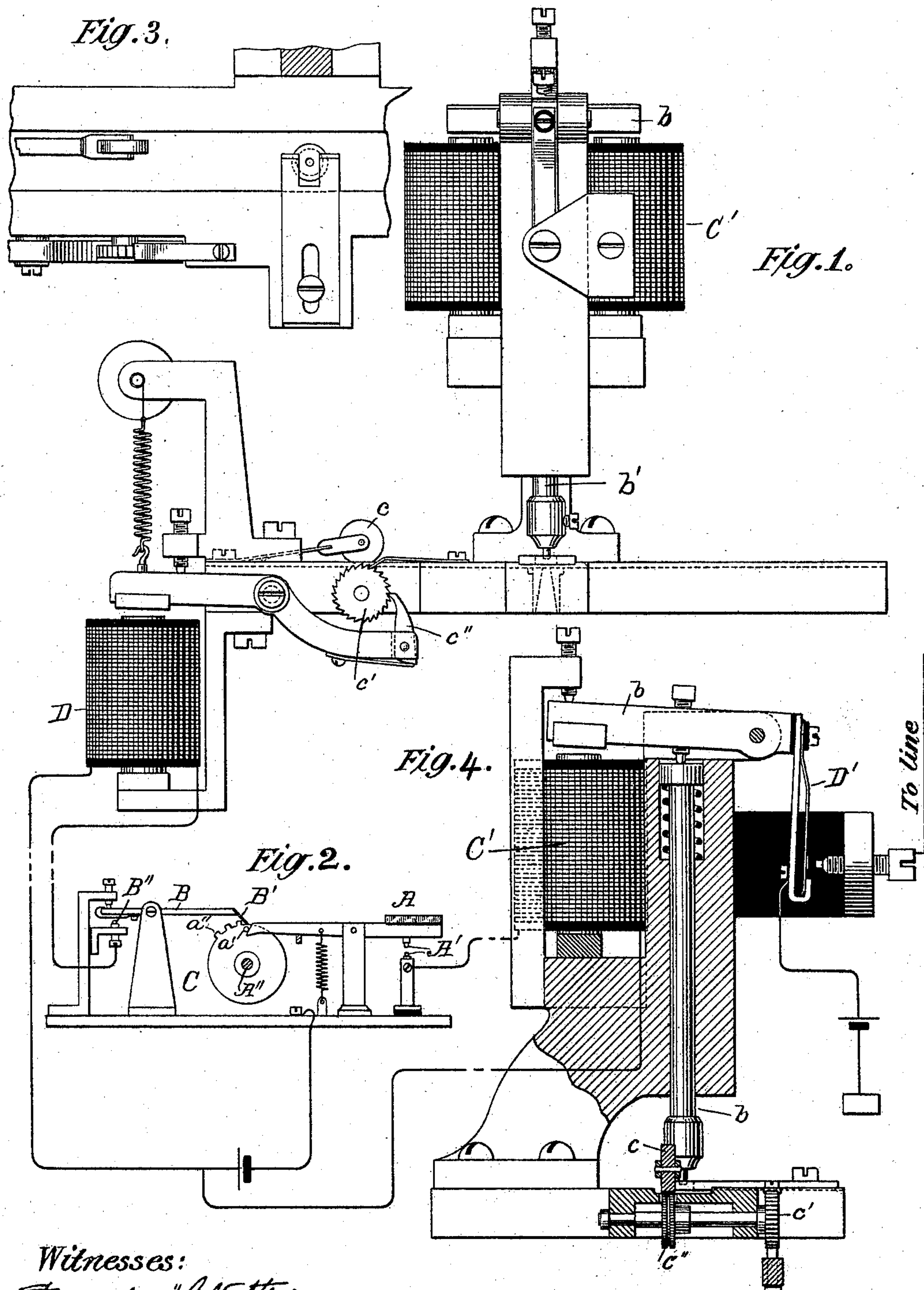
(No Model.)

6 Sheets—Sheet 1.

C. G. BURKE.
PERFORATOR FOR ELECTRIC TELEGRAPHS.

No. 584,722.

Patented June 15, 1897.



Witnesses:
Raphael Vetter
Edwin B. Hopkinson.

Charles G. Burke, Inventor
by *Wm. Curtis Rags* Att'ys

(No Model.)

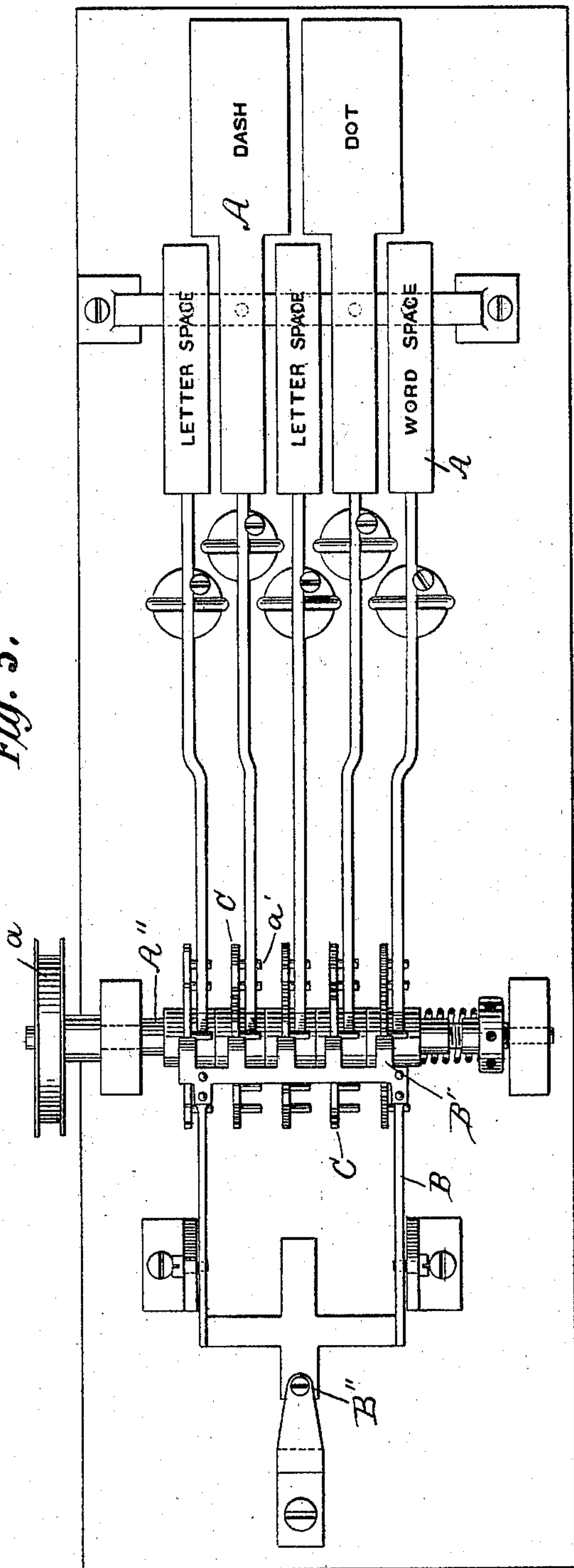
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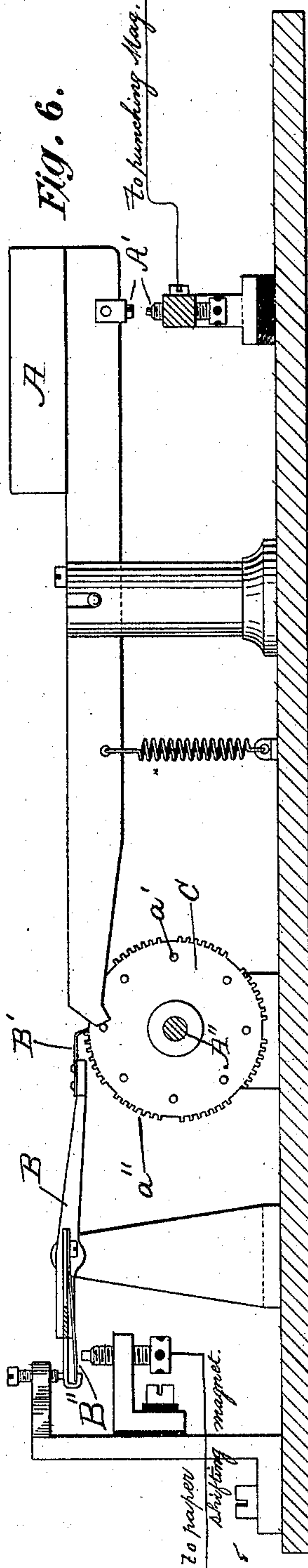
Patented June 15, 1897.

Fig. 5.



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Fig. 6.



Charles G. Burke, Inventor
by Kerr, Curtis Page Attys

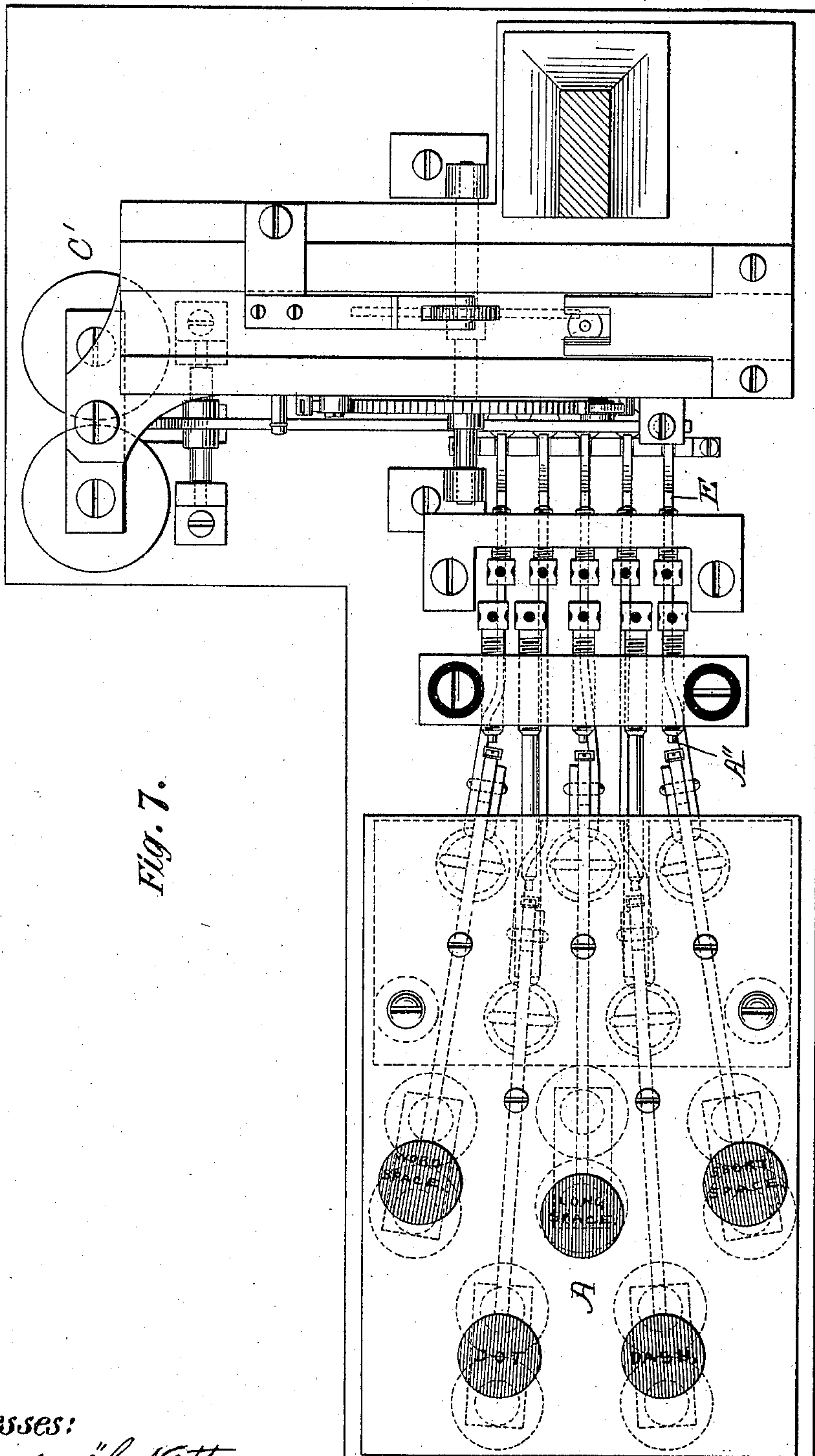
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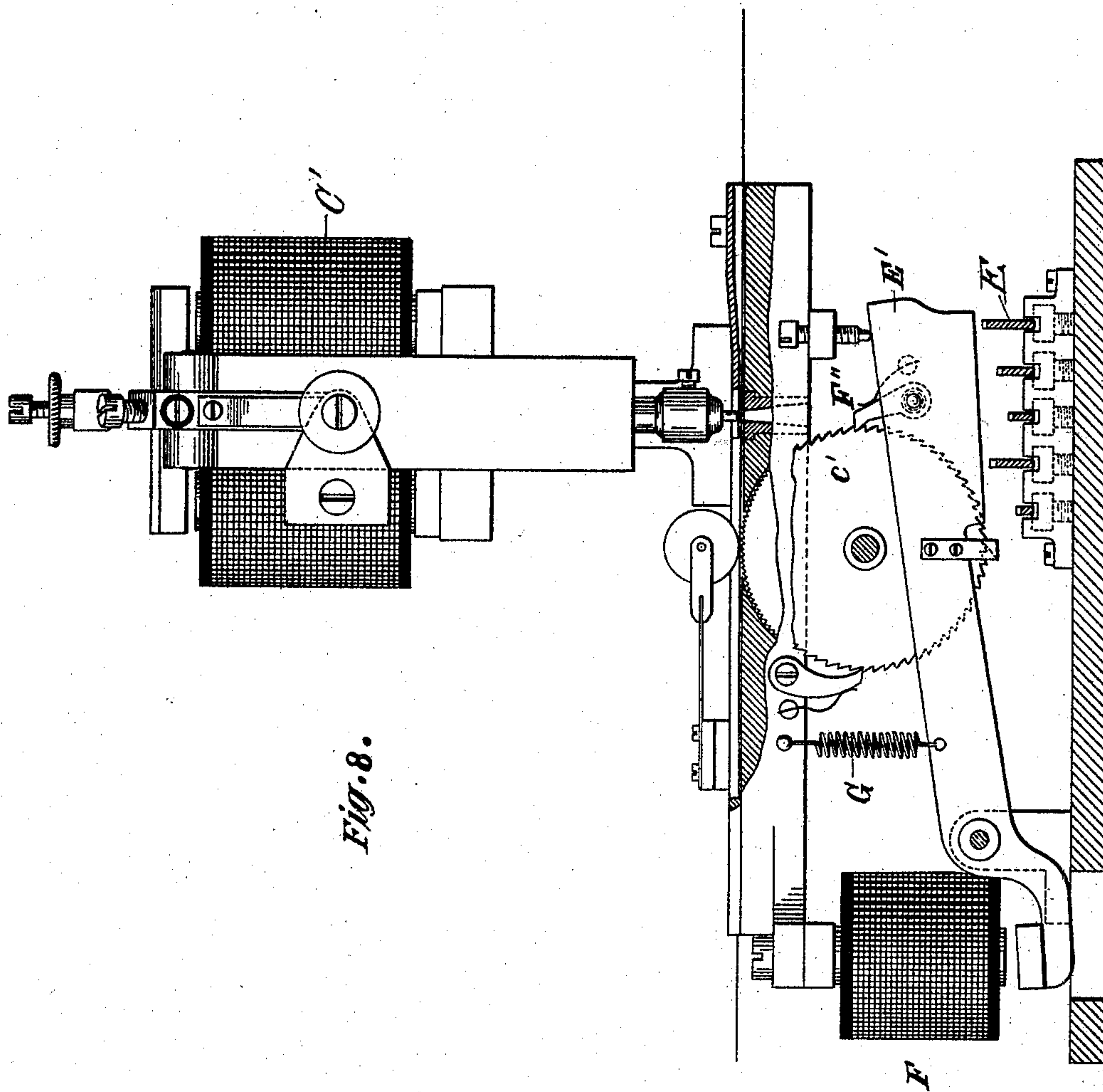


Fig. 8.

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(No Model.)

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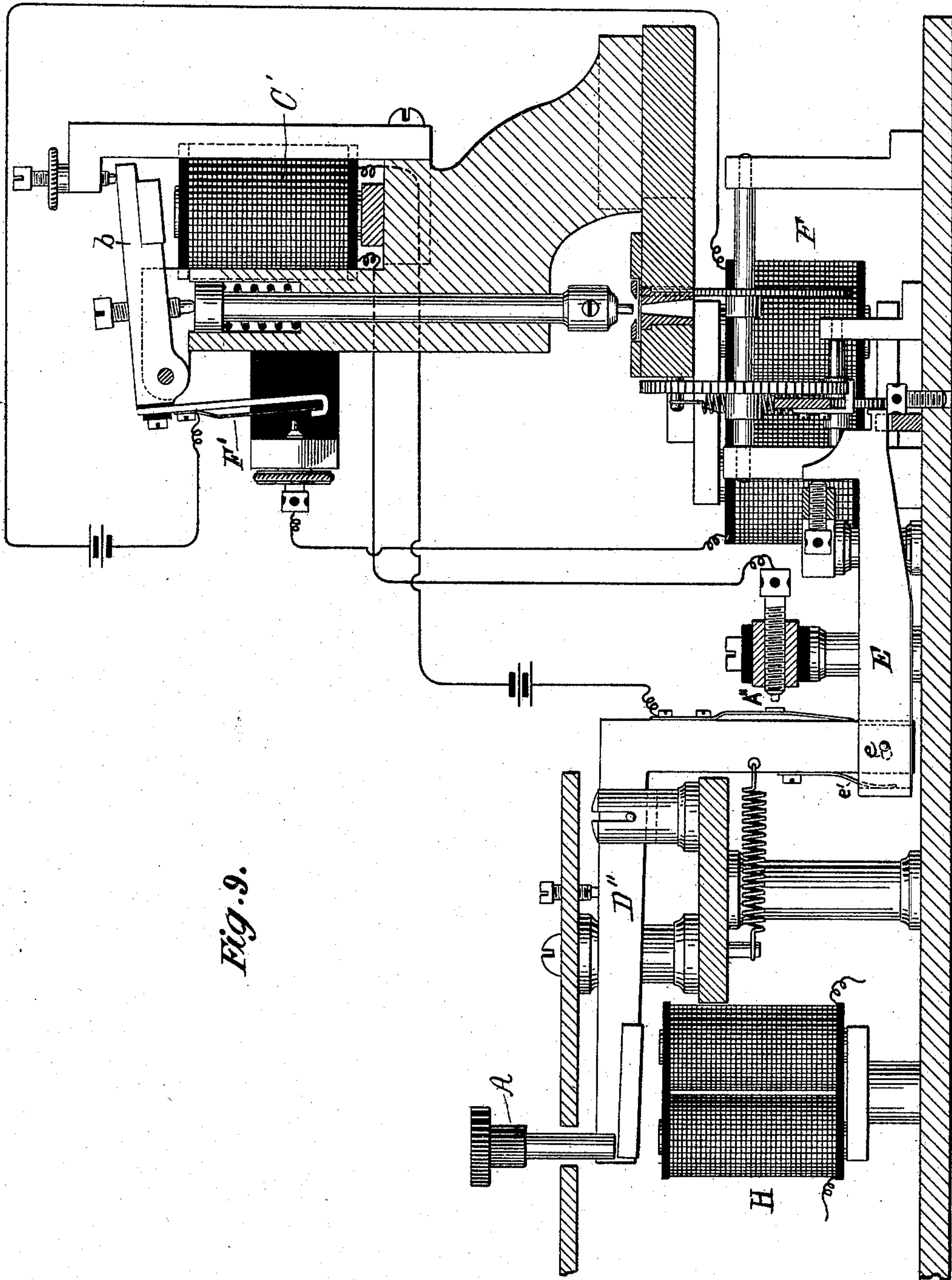


Fig. 9.

Witnesses:
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Charles G. Burke, Inventor
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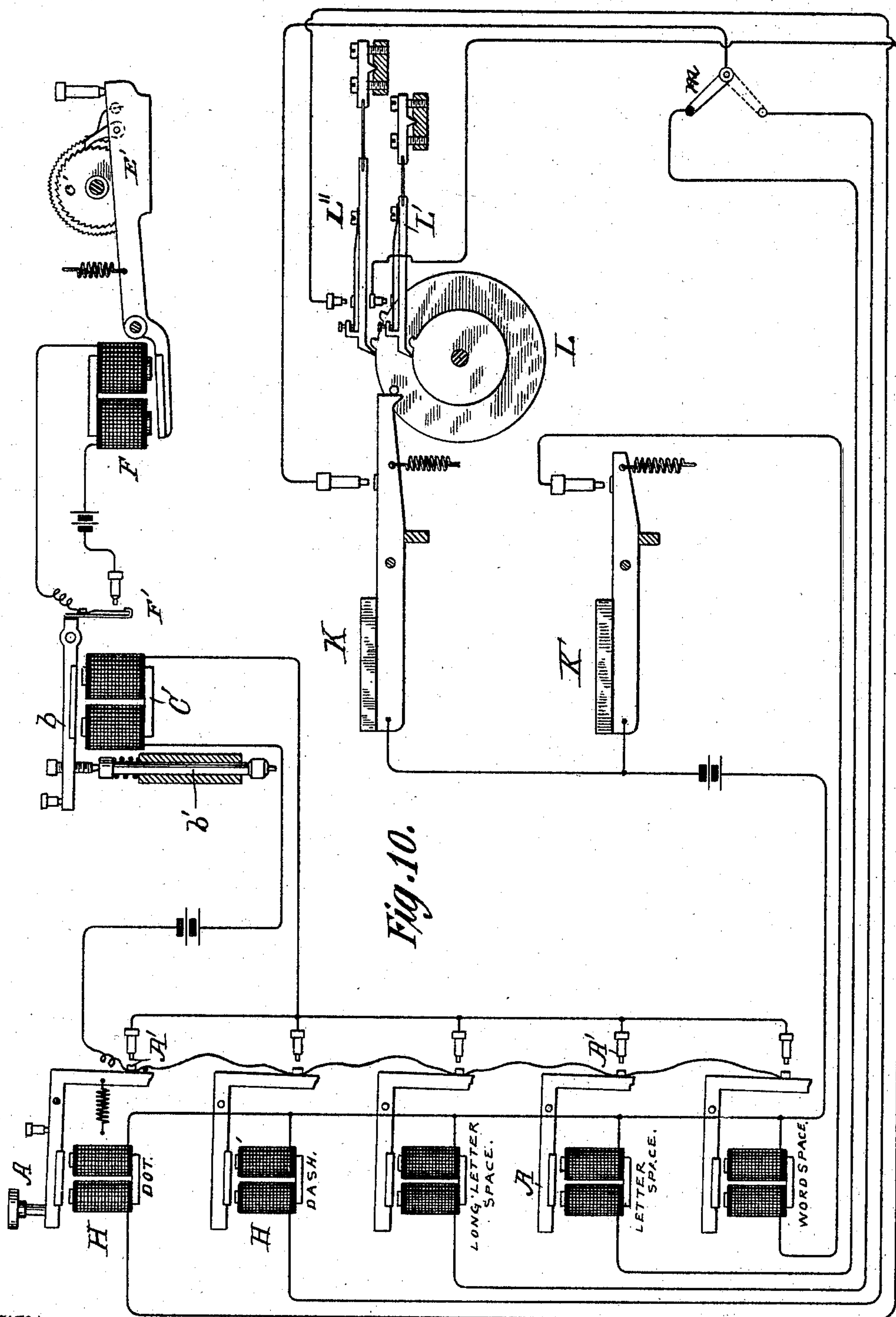
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Patented June 15, 1897.



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UNITED STATES PATENT OFFICE.

CHARLES G. BURKE, OF BROOKLYN, NEW YORK.

PERFORATOR FOR ELECTRIC TELEGRAPHS.

SPECIFICATION forming part of Letters Patent No. 584,722, dated June 15, 1897.

Application filed September 4, 1896. Serial No. 604,858. (No model.)

To all whom it may concern:

Be it known that I, CHARLES G. BURKE, a citizen of the United States, residing at Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Perforators for Electric Telegraphs, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

10 The subject of my present application is an improvement in apparatus for perforating a strip or fillet of paper for use in transmitting telegraphic signals, the nature and objects of which will be understood from a general statement of the system of telegraphy for which it is more especially designed.

In telegraphic systems generally electric impulses are transmitted over the line to a receiving or recording instrument, which is operated or controlled in such manner thereby as to indicate or record in some manner the receipt of the impulses.

In systems which admit of the use of the Morse code, in which the impulses are of shorter and longer duration, the corresponding record is in the form of a series of dots and dashes. In the case of submarine and other lines which have a large static capacity, however, it has heretofore been found impracticable to employ this code and the transmitted and recorded impulses have been of uniform duration, but of opposite direction, and the record has appeared as a wavy line; but in all cases the record is a record of the impulses, which constitute the signals or the elements of the same.

I have devised a system of telegraphy for use on lines or circuits of high static capacity which avoids the objections to the methods heretofore followed and which renders practicable the transmission of signals and their receipt and record in the characters of the Morse code, and this system I have made the subject of another application of even date herewith. According to my improved system I transmit over the line electrical impulses of uniform duration, but at varying intervals, and by means of such impulses I define the limits of the characters representing letters, figures, and spaces. I also arrange or construct the receiving instruments so that they may indicate or record the intervals between

such impulses, and thereby produce a record when the duration of these intervals is properly varied which is in the characters of the Morse code—that is, dots and dashes.

In order to transmit the impulses at proper intervals, and to maintain them of uniform duration, I have found it desirable to employ a perforated strip in connection with a suitable transmitter, the perforations of which strip shall determine the duration of such impulses and their relative position or distance apart in a straight line, or the intervals between them. In such a strip the perforations extend in a single line along the paper, and the spaces between them will be greater or less, according as they are intended to represent dots, dashes, spaces between letters, or spaces between words.

It is my object in the present invention to provide a mechanism which will rapidly and accurately produce these perforations, and the apparatus which I have devised for this purpose I shall now describe by reference to the accompanying drawings.

Figure 1 is a side elevation of my improved perforator. Fig. 2 is a similar view, though partly in diagram, of the system of keys for operating the same. Fig. 3 is a top plan view of the part of Fig. 1 which constitutes the path of the paper strip. Fig. 4 is an end view of Fig. 1, showing most of the operative parts in section. Fig. 5 is a plan view of the keyboard and parts connected therewith. Fig. 6 is a side view and part section of the same. Fig. 7 is a plan view of a modified form of keyboard and perforator. Fig. 8 is a view, partly in elevation and partly in section, of the said perforating mechanism. Fig. 9 is a longitudinal section of Fig. 6. Fig. 10 is a diagram illustrating a further modification.

Figs. 1 to 6 illustrate the apparatus in its simplest form. A A are the keys or levers, which are marked to distinguish them as "dot," "dash," &c. The depression of any one of these keys brings together two contacts A' and closes the circuit to the punching-magnet. I therefore term these the "perforator keys or levers," since their operation controls directly the punching or perforating of the strips. It also releases one of a series of disks C C, which are mounted on a shaft A",

constantly rotated by a driven pulley *a*, but frictionally connected with said disks, such release being effected by the disengagement of the end of the key-lever with one of a series of pins *a'* set in the side of the disk.

Each disk has a series of groups of teeth or projections *a''* on its periphery, one group in each space between two pins *a'*.

B is a pivoted lever or frame with trailers *B'*, that normally rest upon the peripheries of the disks between the groups of projections thereon, and it is oscillated by the rotation of any one of the disks by the passage of a group of projections under the trailer. The number of oscillations will depend upon the number of teeth in the group, and as this varies on each disk each key, when depressed for a period long enough to permit one group of projections to pass under a trailer, will produce a definite number of oscillations of the frame B. This movement of the frame is utilized to operate a circuit-closer *B''*, which controls the paper-feed and moves the paper after a perforation through the space required by the key depressed.

Normally and when the disks are locked the trailer *B'* stands at a little distance from the group of projections, so that the operator has time to make and break the circuit of the punching-magnet before the paper begins to feed.

C' is the paper-punching magnet, which operates a pivoted armature-lever *b*, that depresses a spring-retracted plunger *b'*, carrying a punch. The connections between the keys and the punching-magnet are shown in Figs. 2 and 4.

The paper strip passes under the punch in a groove in the bed-plate of the perforator and between a roller *C''* and a presser-roll *c*.

The shaft of the friction-roll *C''* carries a ratchet-wheel *c'*, which is actuated by a pawl *c''* and an electromagnet D, this latter being in circuit with the circuit-closer *B''*, so that the roll *C''* will be rotated to advance the paper strip through an arc corresponding to the number of teeth or projections in the group that passes under the trailer *B'*.

In my system I preferably employ four characters—that is to say, the record of signals received is composed of four elementary characters, the dot, the dash, the letter-space, and the word-space. All of these are alike except in length, although I sometimes dispense with the letter-space and use instead an elongated final perforation or two perforations close together in its place, in which case the letters in the record will be separated from each other, not by a distinct mark or character, but by a blank distinguishably longer than that which divides the elements or parts of a letter.

In practice I have found it convenient to use disks and feed-wheels with teeth cut to the uniform distance apart of one thirty-second of an inch, and for the characters I found the following proportions to produce the

best results: for a dot a movement of three teeth or three thirty-seconds of an inch, for a dash five teeth, for a letter-space seven teeth, and for a word-space nine teeth. For the elongated final impulse sometimes employed for letter-spacing a movement of but one tooth is provided for. The diameter of the punch is preferably two thirty-seconds of an inch, from which it will be seen that the space between perforations representing a dot in the transmitting-strip will be one thirty-second, that for a dash three thirty-seconds, and so on.

It will be seen that as the feed of the paper depends upon the number of teeth which pass under the trailer and as this number is proportional to the length of the character a greater time will be required to feed the paper for a dash than a dot, and so on. Hence an operator using the instrument pauses after each depression of a key just long enough for the perforation to be made and the paper to be fed. It has been found in practice that this becomes so mechanically exact that the movements of the punch correspond closely with the proper periods for the transmission of signals. I therefore utilize the perforator when there is occasion for it as a transmitter by attaching a circuit-closer *D'* to the armature-lever and sending impulses over a line thereby.

Figs. 7 to 9 illustrate a modified form of perforating apparatus and that which is generally used in practice. The keys A in this case are attached to right-angled levers *D''*. When a key is depressed, the first effect is to close, through the contacts *A''*, the circuit of the punching-magnet *C'*. Its further movement thrusts forward a bar E, with which it is connected by a pin *e*, working in a slot so as to afford a certain play or lost motion, and a spring *e'*, which presses upon the bar E, tending to maintain the pin at one end of the slot.

The forward movement of the bar E brings its end under a pivoted armature-lever *E'*, which is operated by a magnet F in a local circuit controlled by a circuit-closer *F'* on the armature-lever of the punching-magnet and which magnet is energized when the said lever has been attracted.

The lever *E'* carries a pawl *F''*, that engages with the ratchet *c'* of the paper-feed roller, and is retracted by a spring G, operating when so retracted to turn the ratchet-wheel *c'* through an arc determined by the extent of angular motion of the lever.

Each key A has a corresponding bar E, and the parts of these bars which are brought under the lever *E'* are of different widths corresponding to the length of feed which each key is designed to impart. The points of contact on the bars are formed as notches, into which the lever *E'* is forced by the magnet F, so as to prevent the bars E from going backward until the lever *E'* has been retracted.

Upon depressing any given key the corre-

sponding bar E is thrust forward before the armature-lever E' comes down, and limits its downward movement. Then when the key is raised and the circuits broken the spring

5 G retracts the lever E' and feeds the paper through a space determined by the width of the bar E.

In order that those unfamiliar with the Morse alphabet may be enabled to prepare the perforated strips, I sometimes combine with the perforator-keys electromagnets H for depressing them, which magnets are controlled by circuit-closing wheels released and stopped by keys corresponding to and designated by letters of the alphabet and figures. I have shown two of a series of these keys, which correspond with letters and figures in Fig. 10 at K K'. When one of them is depressed, it releases a disk L, upon different

20 parts of which rest the ends of levers L' L''. In the path of lever L' are projections that correspond to, say, dots, while in the path of lever L'' are similar projections corresponding to dashes.

25 The levers L' L'' are circuit-closers which control the circuits of magnets H under the dot and dash keys, respectively, so that on each disk there will be arranged one or more projections which will lift and depress the two levers L' L'' in the desired order for actuating the dot and dash keys. There will be in like manner a key K', which closes the circuit for the word-spacing magnet, and a key for letter-spacing which, by a switch m, may

35 be connected with either letter-spacing key, as may be desired.

The apparatus which I have now described may be greatly varied in construction without departing from the invention which underlies the same.

40 What I claim as my invention is—

1. The combination in a perforating apparatus for automatic telegraphy, of a paper-punch and feed mechanism for the paper and

45 a ratchet connected with the feed mechanism, a lever and pawl engaging with the ratchet, a

series of keys, all of which when depressed operate the punch and the feed mechanism, and a series of bars of varying widths connected with the keys and adapted to be interposed by the depression of the latter in the path of the lever of the feed mechanism whereby the extent of play or angular movement of said lever will be different for different keys, as set forth.

2. In a perforating mechanism for electric telegraphy, the combination with a singe die or punch, of a series of perforator-levers, all of which operate when depressed to actuate the punch, and each of which when depressed imparts a movement of different extent to the paper, of a series of keys corresponding to letters and figures, automatic circuit-closers adapted to be set in motion by the operation of said letter-keys, electromagnets for operating the perforator-levers and circuit connections between the automatic circuit-closers and said electromagnets whereby the depression of a letter or figure key sets in motion its corresponding circuit-closer causing it to operate one or more of said perforator-keys in the order necessary for producing the perforations and spaces corresponding to the letter or figure of the key depressed, as set forth.

3. In a perforating-machine, the combination of a feeding mechanism for the strip, a punch or die, an electromagnet for operating the punch, a series of keys or levers controlling circuits which include the said electromagnet, a series of electromagnets which operate the said keys or levers, a series of automatic circuit-closers which control the circuits in which the last said magnets are situated, and a series of keys corresponding to letters or figures, and arranged to control the movements of the said circuit-closers, substantially and for the purposes as hereinbefore set forth.

CHARLES G. BURKE.

Witnesses:

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