

July 28, 1931.

A. WEAVER

1,815,996

TELEGRAPH READING MACHINE

Filed June 29, 1929

2 Sheets-Sheet 1

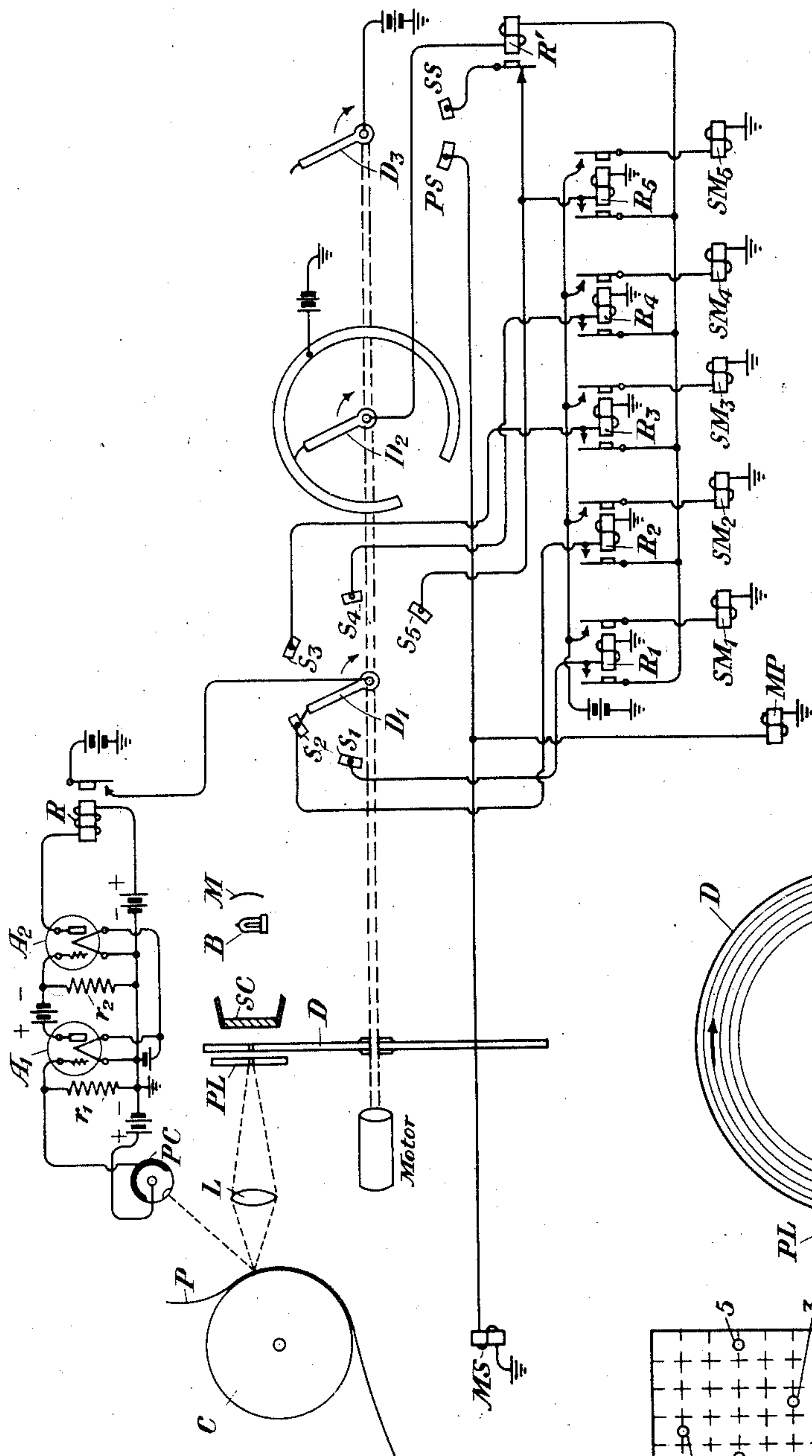


Fig. 1

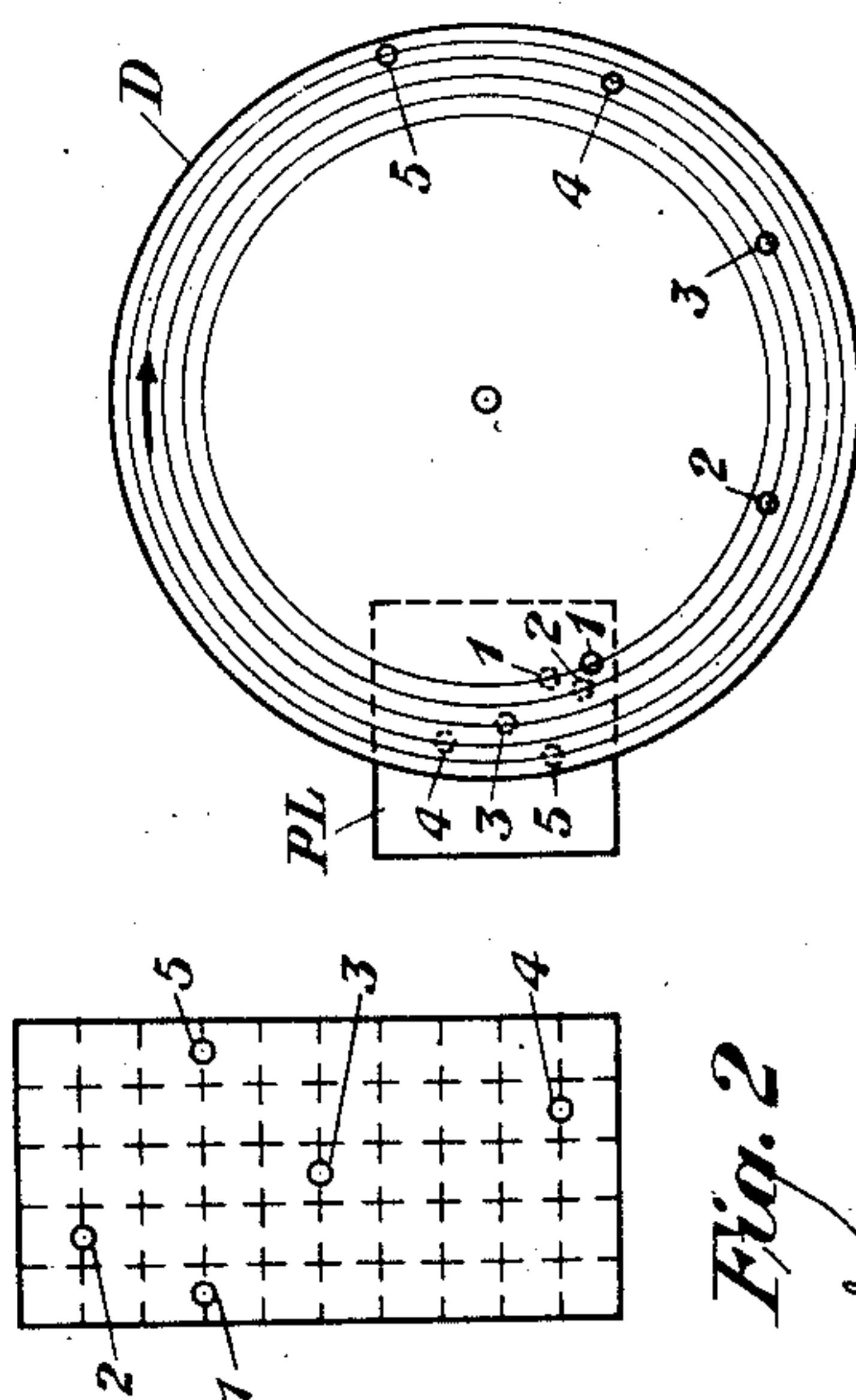


Fig. 2

Fig. 3

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2 Sheets-Sheet 2

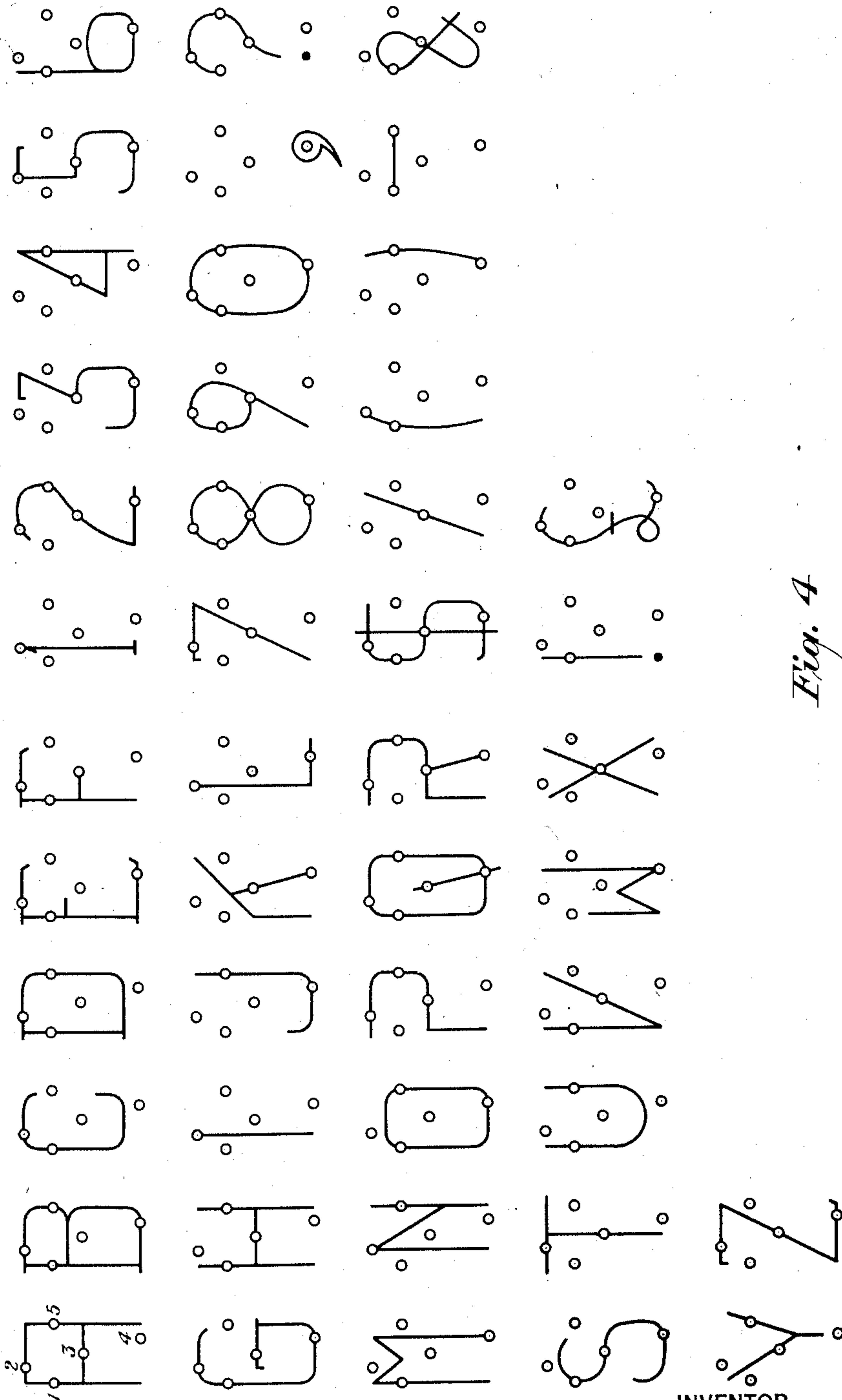


Fig. 4

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TELEGRAPH READING MACHINE

Application filed June 29, 1929. Serial No. 374,909.

This invention relates to the transmission of intelligence by telegraph, and more particularly to the conversion of printed characters into a telegraph code.

5 The principal object of the invention is the "reading" of printed characters and their translation into the units of a telegraph code in the manner which is simplest and the most consistent with the efficient use of "line
10 time."

In the operation of a printing telegraph service, for instance, the message or copy to be transmitted is handed to an operator in the printer room, and this operator then
15 either punches a tape or sends the message out directly over the line in the telegraph code.

In accordance with the present invention, the copy may be slipped into a machine—
20 which may be termed a "telegraph reading machine," and the remaining operations will be automatic.

In general, I employ a photo-electric cell and certain novel arrangements for exam-
25 ining the area covered by a printed character, and cause the operation of the photo-electric cell resulting from the inspection of the area of the character to control the operation of a plurality of selecting elements, which form a part of a perforator or a trans-
30 mitter (both well known in the art of printing telegraphy), to produce the code symbols to be transmitted over a telegraph line.

The invention will be clearly understood
35 when the following description is read with reference to the accompanying drawings. Figure 1 of the drawing shows diagrammatically the arrangement of apparatus and circuits employed in one desirable embodi-
40 ment; Fig. 2 shows the area covered by a character and indicates one novel feature of my inspecting method; Fig. 3 shows in detail one element more generally disclosed in Fig. 1; and Fig. 4 shows certain fixed sub-areas

of the area covered by the various characters and indicates the manner in which the code for each character is determined.

I select a definite number of fixed sub-areas of the area covered by a character and
50 pass the line or lines forming each character through one or more of these fixed sub-areas. In connection with the method to be specifically discussed hereinafter and the particular arrangement disclosed, I choose
55 five sub-areas and employ a five-unit code. The five sub-areas may be examined simultaneously or in sequence, but in the preferred form of my telegraph reading machine I examine the sub-areas in sequence.
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With reference to the drawing, a sheet of paper P, upon which it is assumed that characters are printed, is held in place on a carriage C, which is preferably similar to that of a standard typewriter. The light from
65 a source B, with which is associated a mirror M, passes through a diffusing screen SC, which may be ground glass, and eventually through a lens L to fall upon the area of the character which is being read. In order
70 that the fixed sub-areas may be illuminated in sequence while no other portion of the large area is illuminated, I employ a disk D and a plate PL. The location of the sub-areas selected is to be noted in Fig. 2. Fig.
75 3 shows clearly that the disk D has pierced through it five holes, 1, 2, 3, 4 and 5, differently spaced from the periphery of the disk. The plate PL likewise has five holes
80 through it so located that when the disk D revolves, the pair of holes designated by like numerals will line up to pass light to the five sub-areas in sequence.

A photo-electric cell PC is located to re-
85 ceive any light reflected from the paper area under examination. It will of course be understood that if the beam of light falls upon a sub-area which is uncovered by a line of a character, the cell PC will receive light and
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will be operated, whereas if the beam of light falls upon a sub-area covered by the character, the cell PC will not respond, or in another sense, will respond in the opposite direction. Any suitable amplifier may be included in the output circuit of the cell PC. In the particular circuit arrangement disclosed in Fig. 1, I employ a two-stage vacuum tube amplifier comprising the three-electrode vacuum tubes A_1 and A_2 and the usual resistances r_1 and r_2 . A relay R has its winding included in the plate-filament circuit of the tube A_2 , the contact of this relay being normally open. It will be readily understood by those skilled in the art that with the particular amplifier arrangement disclosed, if an uncovered sub-area is illuminated, there will be a decrease of current in the plate-filament circuit of the tube A_2 and the relay R will be unoperated, but if a covered area is inspected, the plate-filament current of the tube A_2 will increase, the relay R will operate, and the contact of that relay will be closed.

The disk D is caused to revolve by the operation of a motor, and upon the same shaft are distributor arms D_1 , D_2 and D_3 . The distributor having arm D_1 is provided with five small segments S_1 , S_2 , S_3 , S_4 and S_5 spaced in correspondence with the spacing of the holes in disk D. In association with the distributor I provide relays R_1 , R_2 , R_3 , R_4 , R_5 and R' , and associated with these relays are the magnets SM_1 , SM_2 , SM_3 , SM_4 , SM_5 , MP and MS. Magnets SM_1 , SM_2 , SM_3 , SM_4 and SM_5 are the selecting magnets forming a part of a perforator or a transmitter, as is well understood in the art of printing telegraphy. The operation of my reading machine will be understood from the following description:

Let it be assumed that the disk D operates to pass a beam of light to sub-area No. 2 of the character area being examined, and that the distributor arm D_1 is in contact with segment S_2 . If the sub-area No. 2 is covered by a line of the character, the relay R will operate and battery will be connected to relay R_2 , the contact of relay R being connected to the distributor arm D_1 as shown. Relay R_2 operates, locks up through its left-hand contact and the distributor having arm D_2 , and energizes the selecting magnet SM_2 . Similarly, if any other sub-area is covered, a circuit will be completed through distributor arm D_1 and the corresponding segment of the distributor to the proper relay, and the corresponding selecting magnet will be energized, whereas if any sub-area is uncovered, the corresponding relay and the corresponding selecting magnet will not be operated.

When all the five sub-areas have been inspected, the distributor arm D_2 will reach an

open space, as is clearly shown in the drawings; the relay locking circuit will be broken; and any of the relays R_1 to R_5 which have been operated, will be released.

The third distributor arm D_3 is associated with two small segments SS and PS. If none of the relays R_1 to R_5 has been operated, it becomes necessary to produce a spacing signal, and this may be accomplished by providing for the operation of selecting magnet SM_5 , for instance. It will be noted that as long as distributor arm D_2 makes contact with the large segment, the operation of any of the relays R_1 to R_5 will cause the operation of relay R' , and the circuit from segment SS to relay R_5 will be broken at the open contact of relay R' . If, however, no one of the relays has been operated, the relay R' remains in its unoperated condition, and when distributor arm D_3 makes contact with segment SS, battery is connected to relay R_5 and the selecting magnet SM_5 is energized to produce the spacing signal. The segment PS of the third distributor is so positioned that after the selecting magnets have been operated, battery will be connected to the magnet MP, which may function as a punching device.

The connection from distributor segment PS to the magnet MS, which may function as a spacing magnet, serves to indicate the manner in which provision may be made for spacing, "line feed" and "carriage return" operations. For a disclosure of these arrangements, well known in the art, reference may be had to U. S. Patent No. 1,664,652 to Watson and Weaver.

It will be seen from an examination of Fig. 4 of the drawings that if a five-unit code is employed calling for the selection of five fixed sub-areas, all of the letters of the alphabet, the numerals and the commonly used punctuation marks, as well as certain other generally used characters, may be made each to pass through one or more of the sub-areas, giving a distinctive code combination for each letter or other character; it will be noted, however, that with the use of the five-unit code, certain characters must be changed somewhat from the form which is standardized. However, the characters necessarily modified remain quite recognizable, and it is of course evident that the use of a code of five units instead of a greater number of units results in the more efficient use of "line time." If the use of "line time" is not of first importance in a given case, a code having a number of units greater than five may be employed, with the corresponding modification of the disk D, the plate PL, and the distributor segments, and a closer approach obtained to the standard alphabet.

The following table should be read with reference to Fig. 4 of the drawings, and will show clearly the feasibility of employing my

methods and means of telegraph reading in conjunction with the use of a five unit code.

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Upper case	Lower case	Code	Upper case	Lower case	Code
A	?	123 5	Q	8	12345
B	0	12 45	R	2	2345
C	(	12	S		1 34
D		12 5	T	7	23
E	£	12 4	U	-	1 5
F	9	123	V	&	1 3
G	\$	1234	W	,	4
H		1 3 5	X	/	3
I	1	2	Y	4	3 5
J	)	45	Z	5	234
K	3	34	Space		5
L		2 4	C. R.		1 345
M	6	1 4	L. F.		345
N		2 5			
O		1 45			
P		23 5			

C. R. Carriage return.
L. F. Line feed.

I have not discovered in connection with this invention the equivalent of the standard typewriter carriage shift.

While the invention has been specifically disclosed for the purpose of illustration, it is to be understood that many changes may be made from the specific disclosure within the scope of the appended claims.

What is claimed is:

1. The method of "reading" characters and converting them into a telegraph code, which consists in examining a plurality of fixed sub-areas of the area covered by a character, controlling the operation of a single light-sensitive device in accordance with the characteristics of the sub-areas examined, and operating selecting means in accordance with the operation of the light-sensitive device.

2. The method of "reading" characters and converting them into a telegraph code, which consists in examining in sequence a plurality of fixed sub-areas of the area covered by a character, controlling the operation of a single light-sensitive device in accordance with the characteristics of the sub-areas examined, and operating selecting means in accordance with the operation of the light-sensitive device.

3. A device for converting characters into a telegraph code, comprising a single light-sensitive device, a source of light, means for examining a plurality of fixed sub-areas of the area covered by a character and for controlling the operation of said light-sensitive device in accordance with the characteristics of the sub-areas examined, a plurality of selecting elements, and means for controlling the operation of said selecting elements in accordance with the operation of said light-sensitive device.

4. A device for converting characters into a telegraph code, comprising a single photo-electric cell, a source of light, means for examining in sequence a plurality of fixed sub-areas of the area covered by a character and for controlling the operation of said photo-

electric cell in accordance with the characteristics of the sub-areas examined, a plurality of selecting elements, and means for controlling the operation of said selecting elements in accordance with the operation of said photo-electric cell.

5. A telegraph reading machine comprising a single photo-electric cell, a source of light, means for examining a plurality of fixed sub-areas of the area covered by a character and for controlling the operation of said photo-electric cell in accordance with the characteristics of the sub-areas examined, a plurality of selecting elements, a distributor arrangement adapted to control the operation of said selecting elements, and means associated with the output circuit of said photo-electric cell for controlling the circuits completed through said distributor arrangement.

6. A telegraph reading machine comprising a single photo-electric cell, a source of light, means for examining in sequence a plurality of fixed sub-areas of the area covered by a character and for controlling the operation of said photo-electric cell in accordance with the characteristics of the sub-areas examined, a plurality of selecting elements, a distributor arrangement adapted to control the operation of said selecting elements, and means associated with the output circuit of said photo-electric cell for controlling the circuits completed through said distributor arrangement.

In testimony whereof, I have signed my name to this specification this 28th day of June, 1929.

ALLAN WEAVER.

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