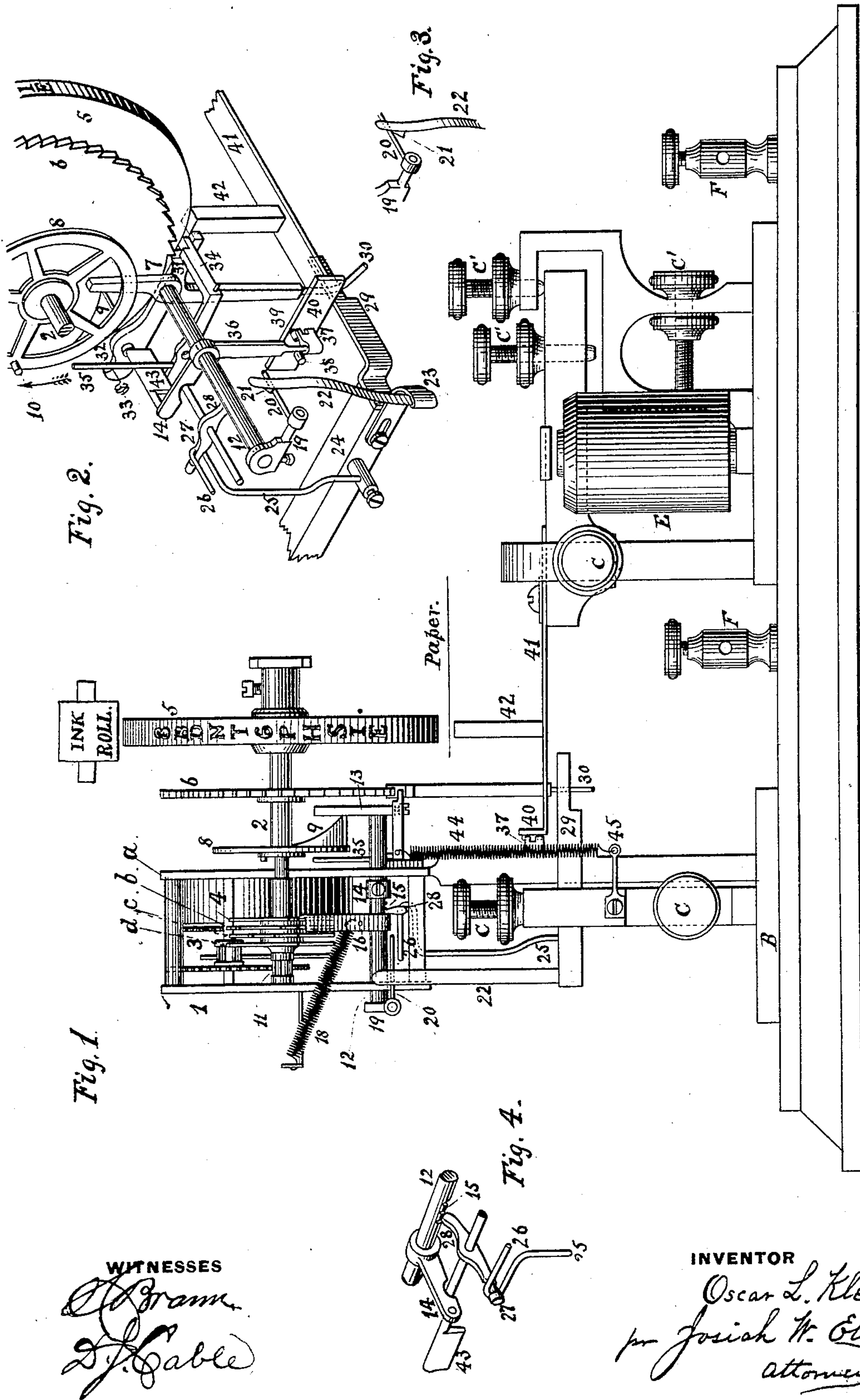


O. L. KLEBER.  
PRINTING TELEGRAPH.

No. 521,170.

Patented June 12, 1894.

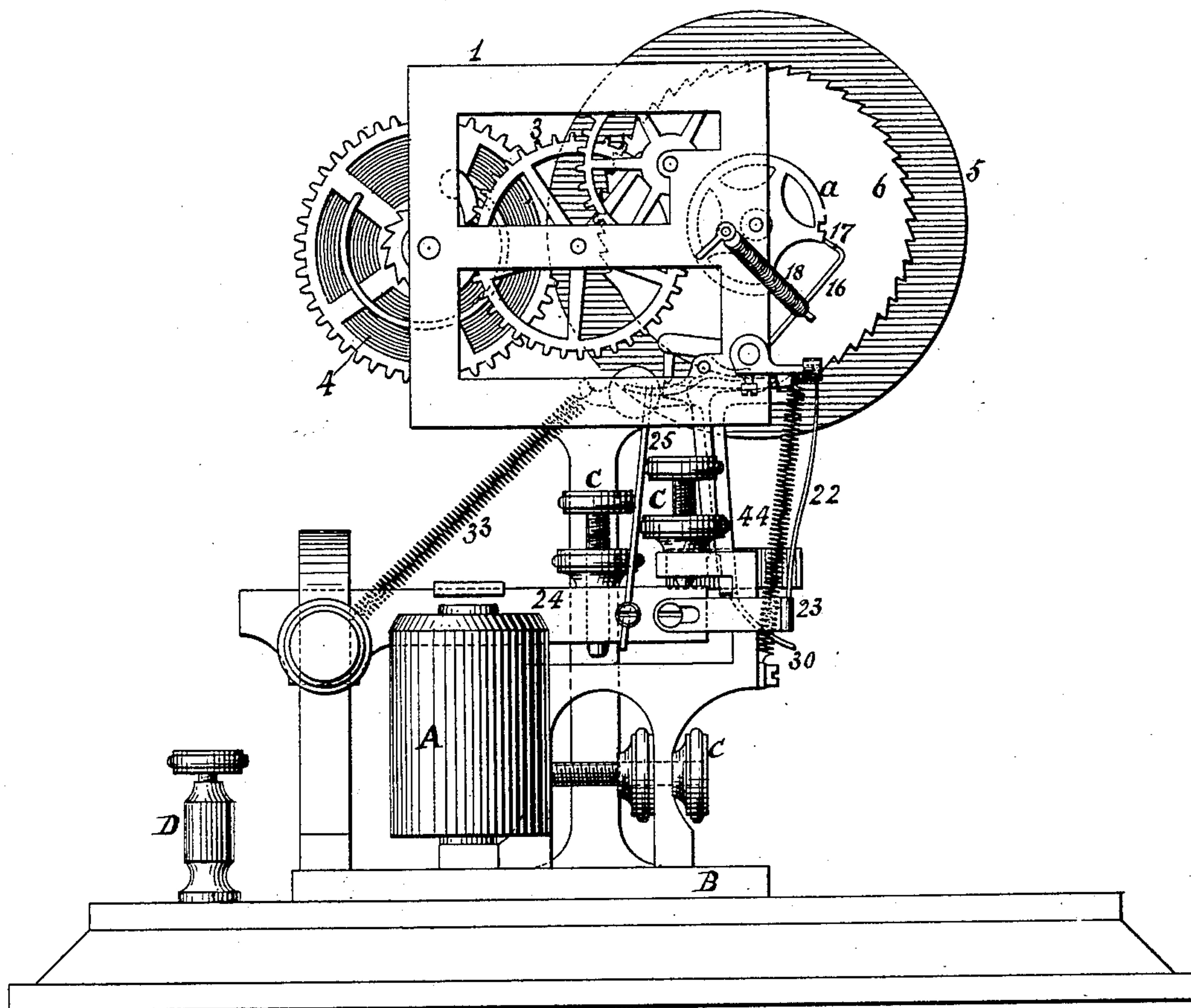


O. L. KLEBER.  
PRINTING TELEGRAPH.

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Patented June 12, 1894.

*Fig. 5.*



WITNESSES

*D. Gram*  
*D. J. Cable*

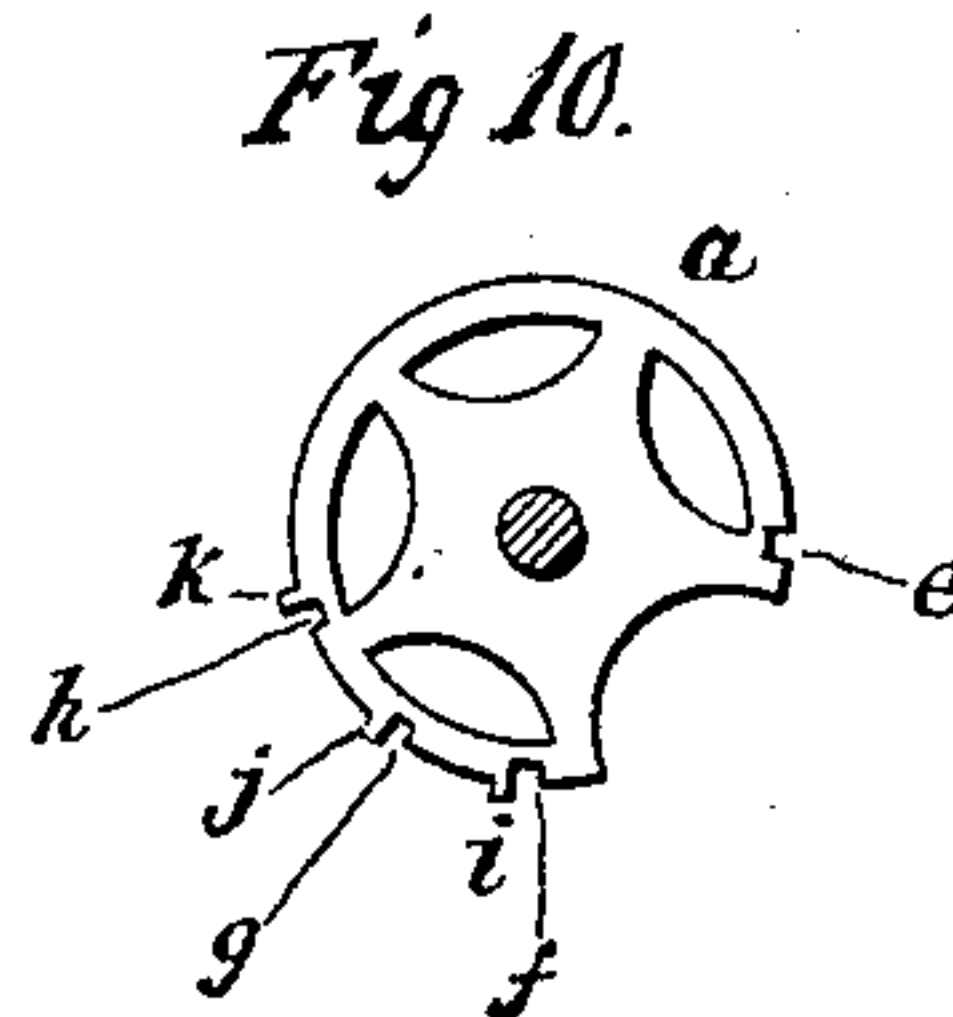
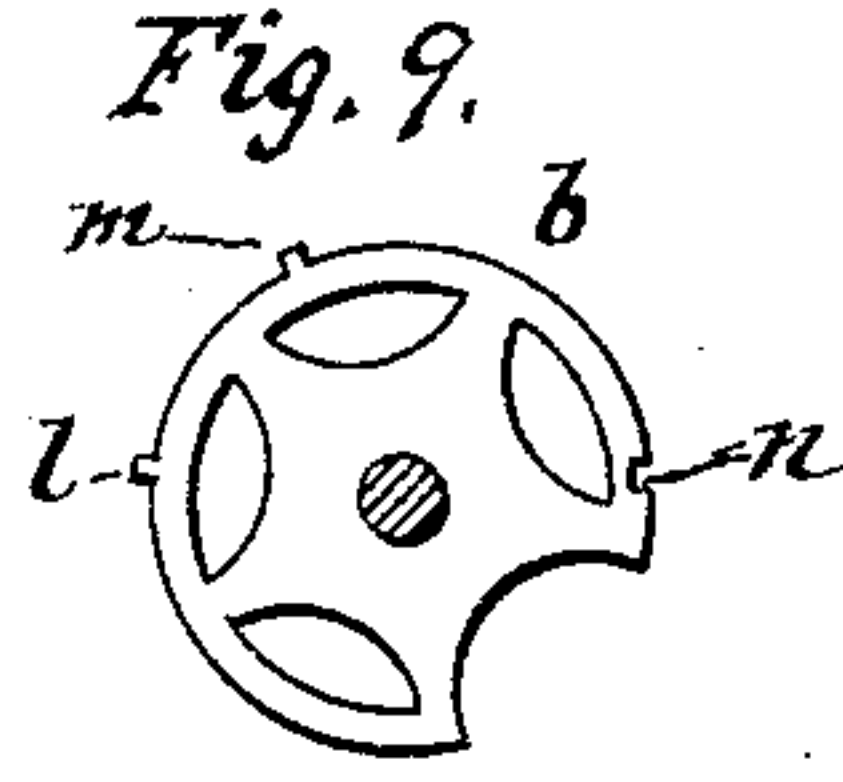
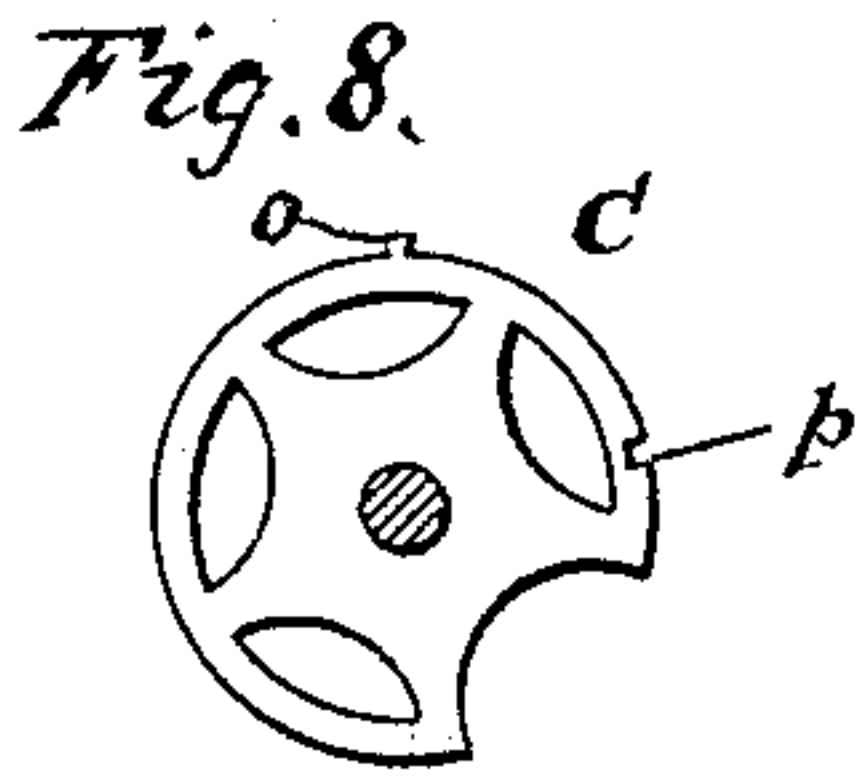
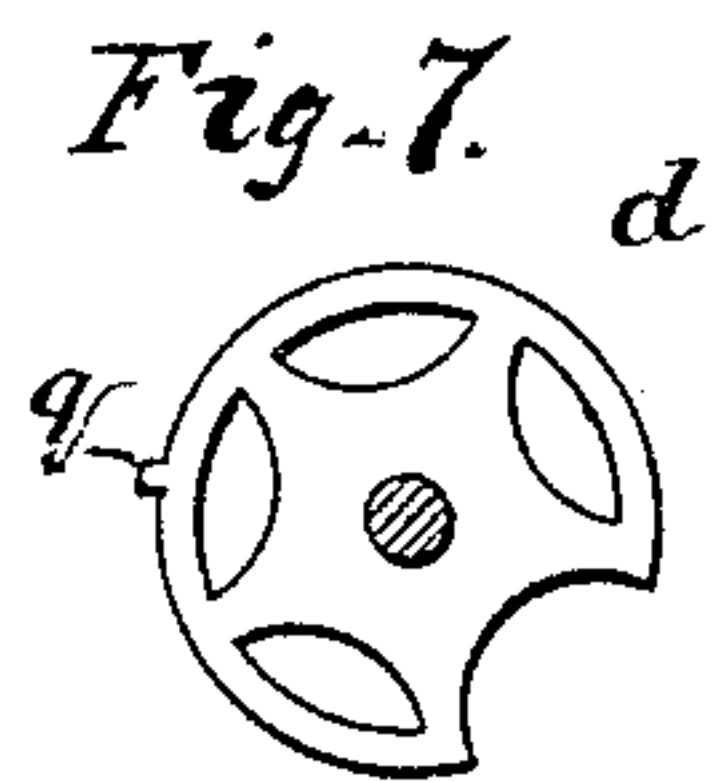
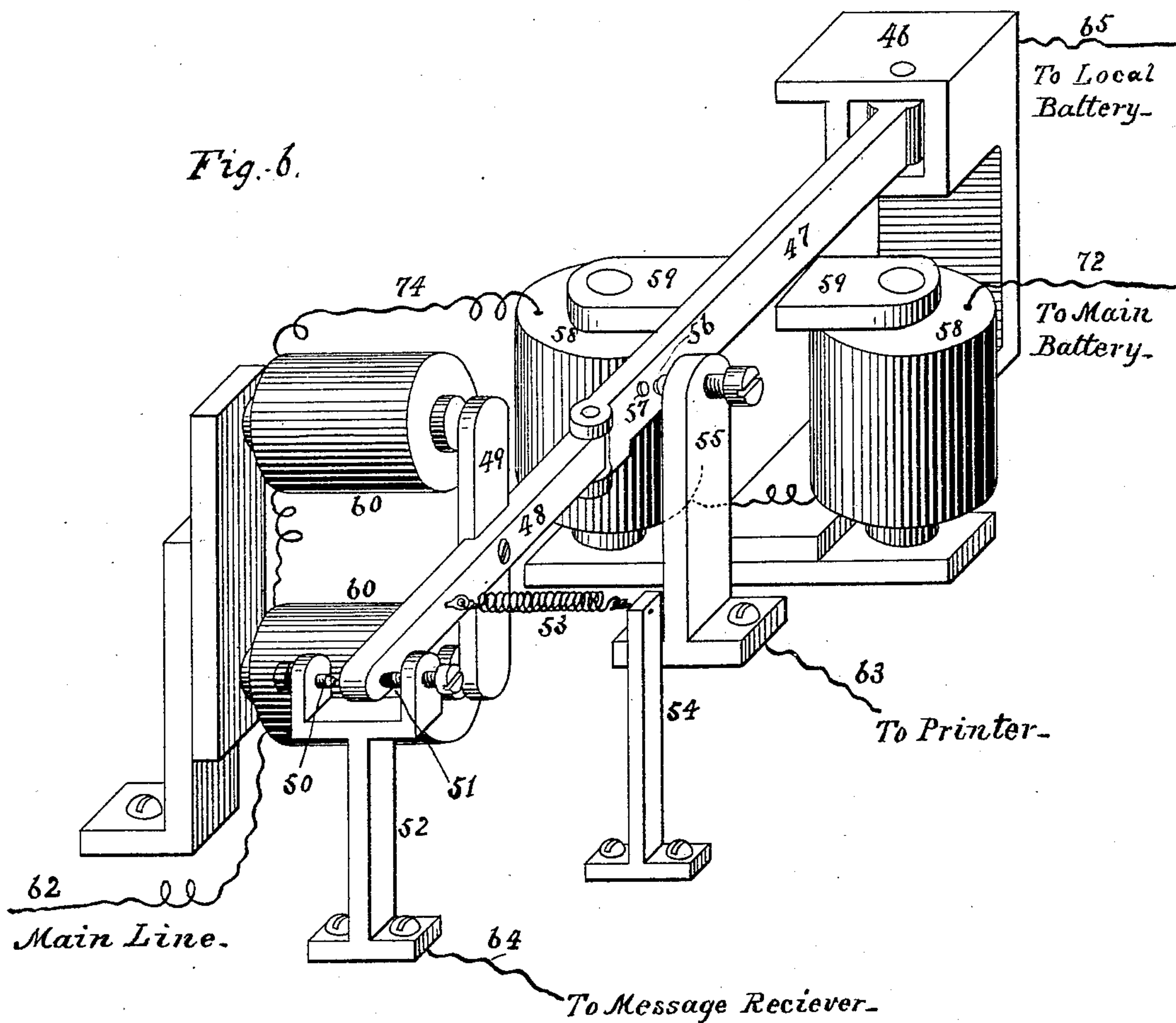
INVENTOR

*Oscar L. Kleber*  
*per Josiah W. Ellis*  
*attorney*

O. L. KLEBER.  
PRINTING TELEGRAPH.

No. 521,170.

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WITNESSES  
*D. Gram*  
*L. Cable*

INVENTOR  
*Oscar L. Kleber*  
*per Josiah W. Ellis*  
Attorney-



(No Model.)

4 Sheets—Sheet 4.

O. L. KLEBER.  
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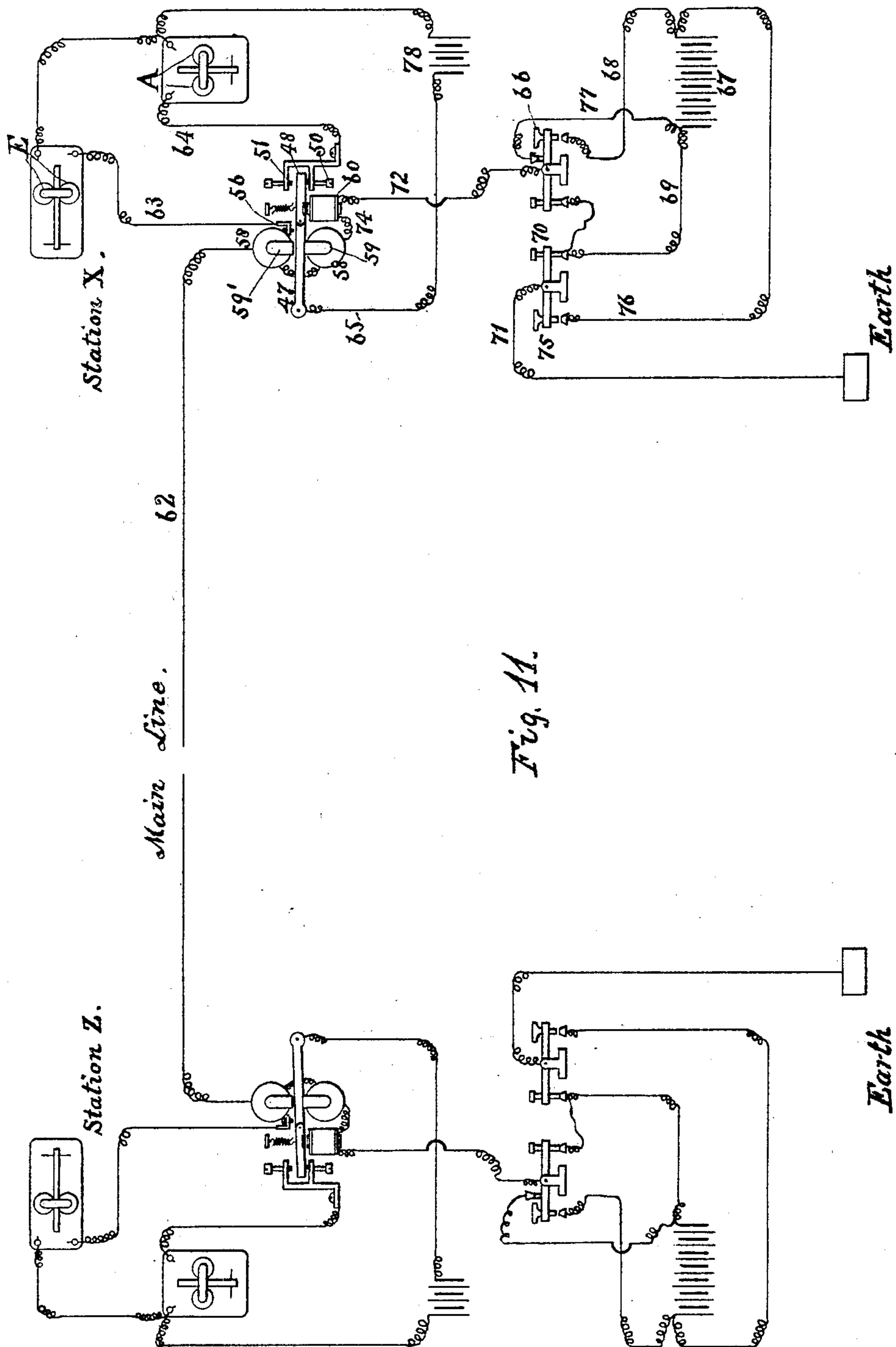


Fig. 11.

WITNESSES

*[Signature]*  
*[Signature]*

INVENTOR

*Oscar L. Kleber*  
*per Josiah H. Ellis*  
*attorney*



# UNITED STATES PATENT OFFICE.

OSCAR L. KLEBER, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR OF ONE-HALF  
TO R. J. STONEY, JR., AND HENRY BRAUN, OF SAME PLACE.

## PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 521,170, dated June 12, 1894.

Application filed April 13, 1893. Serial No. 470,237. (No model.)

*To all whom it may concern:*

Be it known that I, OSCAR L. KLEBER, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Printing-Telegraphs, of which the following is a specification.

My invention consists of a systemized class arrangement and grouping of telegraphic signals, consisting of dots and dashes with corresponding class groups of alphabetical letters, numeral characters, punctuation marks, and other intelligible signs in combination with an organized mechanism whereby transmitted telegraphic signals are caused to produce, translate singly and separately print such letters of the alphabet, numeral characters, &c., and in such order as is required to form words and sentences at the opposite end of an electric line corresponding and agreeing with the message sent or transmitted. Which systemized arrangement and grouped telegraphic characters and peculiar grouping of the letters of the alphabet, together with the method of effecting requisite and rapid changes of position of the letters of the alphabet, &c., so as to make them correspond to Morse or other signals sent. And means employed to accomplish such results will be readily understood from the following description taken in connection with the accompanying drawings, wherein—

Figure 1 represents a front elevation of the mechanism designed to operate my improved system and print alphabetic letters on the reception of Morse or similar telegraphic signals; Fig. 2, a perspective view of a portion of the same device which has certain parts broken away and removed; Figs. 3 and 4, detached portions of details of said mechanism; Fig. 5, a side elevation of the principal operative parts of my improved printing telegraph; Fig. 6, an enlarged perspective view, showing the construction of such a pole changer as is made use of in my improved printing telegraph. Figs. 7, 8, 9, and 10 represent separate side views of peculiar shaped disks or wheels employed to select the desired alphabetical letter, numeral character, &c.; Fig. 11, a plan of an organized system of electrical devices used in operating my

improved printing telegraph by means of a single main line.

To give my invention bodily form and put the same to practical use, I construct a suitable frame 1, and erect in proper bearings thereon a long shaft 2, rotatable by means of cog wheels or gearing 3, actuated by a spring 4, or any suitable force or power. Rigidly secured to said shaft 2 so as to revolve therewith is a type-wheel 5, having around its periphery projecting alphabetical and numeral characters arranged with respect to each other after the manner and for the purposes presently described. Next in order on said shaft and rigidly affixed thereto is a circular plate 6, which has its periphery serrated nearly all the way around, leaving a blank space 7 between the end and beginning of said serration. Rigidly affixed on said shaft 2, is a plain wheel 8, which has a cam or incline 9 projecting from its face, and a pin 10 on its opposite side. Within the frame and a suitable distance from said circular wheel 8, and rigidly affixed to the shaft 2, so as to revolve with it and the aforesaid wheels, are several selecting disks *a, b, c, d*, in consecutive order, of which the four shown are held to be sufficient for ordinary purposes. A small cog wheel 11, is also affixed to the shaft and is in gear with a train of larger wheels 3, for giving rapid rotary movement to said shaft 2, and the several disks and wheels thereon; the entire train of wheels, disks, &c., being actuated and set in motion by means of a coiled spring shown, 4.

Beneath and parallel to the rotary shaft 2, is located a rock shaft 12, which is adapted to rock at proper intervals and move in a longitudinal direction, back and forth, as desired. To the inner end of said rock shaft 12, and rigidly affixed thereto, is an upwardly projecting arm 13; on the same shaft 12 within the body of the frame is a similar arm 14 that projects backward a short distance and then extends at right angles and parallel to said rock shaft 12, and in the direction of the first mentioned arm 13.

Next in order across the under side of said rock shaft 12, are a series of transverse grooves 15, corresponding in their relative distances to that of the selecting wheels *a, b, c, d*, on the



main shaft 2. Immediately after said transverse grooves 15 and rigidly affixed to said rock shaft 12, is an upwardly extending flat finger 16, having at one corner of its upper end a thin continuation or projecting point 17. This portion of said finger laps over the periphery of such selecting disk as the finger may be in contact with, which temporarily prevents the finger from passing from one disk to the other by means of the spiral spring 18, which constantly tends to draw said finger and rock shaft side wise in one direction and keep the finger pressing against one of the selecting wheels. To the extreme outer end of said rock shaft 12, is permanently attached a forwardly projecting arm 19, which is provided with an extension 20, at right angles to said arm 19, and parallel to said rock shaft 12. Resting on said extension 20, is a catch 21, affixed to the upper portion or one end of thin, flat spring 22, the lower end of which is attached by a suitable device 23, to the free end of the armature bar 24, so as to give said flat spring 22 an upward and downward movement corresponding to the action of said armature bar 24. And in like manner attached to said armature bar 24 is an upwardly extending rod 25, that is bent for a short distance at right angles to its main portion and then turned back upon itself so as to form a long hook 26, that catches over one end of the rocking lever 27, the opposite end 28 of which is made to engage with the transverse notches 15 in the lower side of the aforesaid rock shaft 12, as shown more particularly in the detached drawings Fig. 4. To the end of the same armature bar 24, is also rigidly attached a bar 29, which extends along the front of the machine and at right angles to said armature bar 24 a sufficient distance to be immediately over the curved extension 30 of the downwardly projecting portion of a detent 31, adapted to catch in or engage with the teeth of the wheel 6. This detent 31, consists of a T shaped lever pivoted at a suitable point 32, and pulled down at its opposite and short end by means of a spiral spring 33. Pivoted at a suitable point is an angular lever 34, from the rear and short end of which is an upwardly extending rod 35 adapted to be momentarily operated on by the projecting stud 10 on the face of the wheel 8; by a downward continuation of this rod 35 connected to said angular lever 34, and virtually forming part of said rod, is an arm 36, fitted at its lower end with a forked catch piece 37, adapted to engage while in one position, with projecting pins 38 and 39 fastened to a horizontal plate 40, which is attached to one end of a second armature bar 41, and which has fixed thereon a vertical post 42, designed to press upward against the various type on the type wheel 5, as they come around and opposite thereto. The rear end of this angular lever 34 beyond the vertical rod 35, extends a short distance underneath, so as to be brought in contact with the angular portion 43 of the arm 14.

Attached to the forward end of the angular lever 34 is a strong spiral spring 44, having its lower end rigidly made fast to a projection 45 on a stationary portion of the armature frame. This spring is sufficiently strong to overcome the combined action of the hereinbefore mentioned springs 18 and 33.

The selecting disks *a, b, c, d*, are of uniform size and each disk has a lunette shaped recess formed in its edge by a removal of that portion, and each disk is also provided with radially projecting teeth or short cogs, and with correspondingly shaped depressions. For instance, the disk *a* is provided with four depressions respectively *e, f, g, h*, and with three teeth marked *i, j, k*; as shown in the drawings Fig. 10. The disk *b* is provided with two radial teeth *l, m*, and one depression *n*, as shown in drawings Fig. 9. The disk *c* has one tooth *o* and one depression marked *p*, arranged as shown in Fig. 8. The disk *d* has one tooth *q* as shown in Fig. 7.

The several disks *a, b, c, d*, as hereinbefore stated, are all arranged and securely fixed on the shaft 2, so as to revolve therewith, each disk being a little distance from the one next to it, but all occupying such relative circumferential positions as that their lunette shaped recesses shall coincide and be in the same plane. The unlettered portion of the type wheel and the blank portion 7 of the cog wheel, 6, correspond to, and are of proportionate size with the lunette shaped recesses in the disks *a, b, c, d*.

The alphabetical letters and numeral characters are arranged around the type wheel 5, commencing in the following order, to wit: E, I, S, H, P, 6, because their telegraphic symbols and representatives are respectively indicated by one dot, two dots, three dots, four dots, five dots, and six dots, which is absolutely essential and necessary in a printing device of this character. And the other letters and numerals are correspondingly arranged to agree with such groups and classification of telegraphic code signals as may be found most convenient and effectual in practice.

The armature bar 24, and its immediate connections are actuated by an energized electro-magnet A, erected on a suitable stand B, which armature is provided with the usual adjusting screws C and suitable binding posts D. And the printing armature 41 is also actuated by an electro-magnet E which has suitable adjusting screws C' and binding posts F. To operate these several electro-magnets separately by a current of electricity transmitted along a single main line, I use in this connection one or more polarized relays, shown in an enlarged perspective view in drawings Fig. 6. This polarized relay, consists of a permanent magnet 46, having pivoted to a pole thereof one end of a long iron lever 47; to the opposite or free end of this lever is pivoted a brass continuation 48 of said lever; to about the middle of which and cross-wise



thereof is a fixed iron armature 49. The end of this brass portion most remote from its pivotal connection with lever 47, is adapted to swing in a horizontal plane a short distance between two adjustable points 50 and 51, the latter of which is insulated in the top of a forked post 52. A spring 53 attached to a post 54 and to said brass bar 48, tends to draw the same toward and against the insulated point 51.

In or near the top end of a post 55 is an adjustable screw or point 56, that the lever 47 at intervals comes in contact with, and this point of contact on said lever is provided with a platinum plug 57. On each side and near the middle of the lever 47 are electro-magnets 58, each of which is provided at its upper end with a short pole piece 59, that projects toward the aforesaid lever 47.

Suitably mounted near the cross armature 49, on the bar 48, are electro-magnets 60. These electro-magnets are connected by means of the usual insulated wire, one of the terminal ends of which is in communication with an electrical battery, the other being in connection with the main line 62. From the post 55 a wire 63 extends to the printing device; and from post 52 a wire 64 extends to the message receiver. Another wire 65 goes to a local battery. To describe the operation of this polarized relay I will refer to the diagram of the entire electrical system used in operating my improved telegraphic apparatus, which is delineated in drawings Fig. 11. By pressing down key 66, the line is put in communication with main battery 67 by wire 68, which is connected to the negative pole of said battery, the electrical current will then flow along wire 69 to back of closed key 70, and by wire 71 to earth; the current will then flow by wire 72 to coils 60, then by wire 74 to coils 58, and as the bar 47 is permanently magnetized, the action of the current in spools 58 is such that the pole 59 will attract said bar, and pole 59' on spool 58 will repel it, thus connecting bar 48 with point 50, and by means of wire 64 to message receiver or sounder A, which is designed to operate the alphabetical selecting device hereinbefore described, without in any manner affecting the electro-magnet E used for operating the printing device; and which operation of said selecting device can be continued for any length of time and during any number of impulses so long as the polarity of the poles 59 remains unchanged, because the bar 47 by reason of its pivotal connection with the magnetized brass bar 48, will enable the coils 60 to effect a movement of the cross armature 49 and bar 48, without changing the position of the bar 47; the attraction of the poles in spools 60 being such as to cause the cross bar 49 to move in that direction, drawing the end of the bar 48 against the point 50, whereby the several impulses of the current from the main battery 67 are directed into the electro-magnets A of the selecting device, and bring

into play a like action in the local battery 78. By releasing key 66, and pressing down key 75, the point of contact at 70 is broken, and the current passes by wire 76 to the negative pole of the battery 67 and through same to its positive pole, then through wire 77 to top of key 66; thence by wire 72 through coils 60, then by wire 74 to electro-magnets 58, which establishes a polarity therein on its way to the main line 62; a reversal of the electrical current brings about a change of polarity in the magnet 58 and causes the bar 47 to shift its position and come in contact with point 56, whereby the current will flow from battery 78 along the line 63 to the magnet E of the printing device. This action of the magnetized bar 47 is such as to draw the cross armature 49 out of the field of attraction exerted by electro-magnets 60, whereby the electro-magnets A, and the selecting device operated thereby, become for the time inoperative. Thus it will be seen that by operating key 66, such electrical impulses may be sent over the connecting wires as will operate the selecting device only. That portion of the system at the opposite end of the main line, designated as station Z, is precisely like that just described at station X, and is affected by every electrical impulse sent along the main line in the same manner and to the same extent.

Having described the construction of my improved printing telegraph, and an electrical system whereby the same may be operated over one main line at a distant point, I now proceed to describe the operation of said printing telegraph, the several parts of which are constructed substantially in the manner as hereinbefore set forth. By pressing down that key designed to send a current of electricity through the message receiver stationed at a distant point, it will by energizing the coil A, draw down the armature 24, which action will pull down the flexible spring 22, at the end of said armature, which by means of the catch 21, will also draw down a short distance, the arm 19 and extension 20, giving the rock shaft 12 a slight rotary movement in that direction. This action of the rock shaft will cause the upper end of the finger 16 to be drawn away from the rim of one of the selecting disks *a, b, c* or *d*, it may be in contact with at the same time the detent 31 is drawn away from one of the teeth of wheel 6, by the action of the bar 29 operating on the downwardly extending portion of 30 of detent 31. As the armature 24 continues to descend, it also draws down the rod 25 and actuates by means of its hook 26, one end of the lever 27, and causes its opposite end 28 to enter one of the grooves 15 cut in the under side of said rock bar, which holds the rock bar in such horizontal position as to prevent for the time the finger 16 from slipping or moving on to an adjacent selecting disk. At this instant the catch 21 on flexible spring 22 will slip off the extension 20 of the



arm 19 releasing the same, the spring 18 will immediately draw the finger 16 again in contact with the selecting disk it was formerly on, and which finger is prevented from leaving said wheel by a lateral movement by projecting point 17. If the impulse be one of short duration, such as is required to make a dot only, the armature will immediately return to its original position, thereby causing the end 28 of lever 27 to recede from the groove 15, at the same time raising bar 29 which rests on the curved end 30, thus allowing the spring 33 to actuate the detent 31 and cause it to engage with the wheel 6 which has rotated to that extent only, by means of the spring 4 and train of cog wheels in connection therewith. In a like manner the several short impulses sent over the line will liberate the mechanism and enable it to revolve cog by cog. If the message key be held down a length of time sufficient to transmit a longer impulse, the dash, the same action will be produced in the machine, excepting detent 31, is held free from the cogs in wheels 6 by bar 29 as long as the armature 24 is down, whereupon the shaft 2 and the wheels thereon will revolve until one of the projections on selecting disks come in contact with the end of the finger 16 thereby arresting further rotary motion of shaft 2. It will be seen, then, that when the armature 24 is down, the rock shaft 12 is prevented from moving longitudinally by reason of the lever 28 being in engagement with one of the grooves 15, and that when the armature 24 is up and the lever 28 withdrawn from the grooves, the rock shaft is prevented from moving lengthwise toward the spring 18, by means of the overlapping point or lip 17 resting against the side of the rim of that selecting disk it may be on, excepting one of the depressions on the selecting disk is opposite to the projection or lip 17, when the spring 18 will immediately draw the projecting point 17 of the finger 16 through said depression and against the face of the next adjacent selecting disk. The positions of the depressions *e, f, g, h, n, p*, and projections *i, j, k, l, m, o, q*, have been arranged and determined so as to meet the requirements of the alphabetical signals. As said before, the lunette shaped recesses of the selecting disks are all arranged with respect to each other in the same plane, hence depressions *n, p*, are graduated a distance from each other equal to the proportionate distance that one cog succeeds another on the toothed wheel 6. This arrangement of *e, n, p*, allows sending three successive dots or short impulses, the lip 17 on finger to pass in regular order through the aforesaid depressions *e, n, p*, the shaft 2 and wheels thereon moving at the same time to the extent of three cogs on wheel 6. In like manner the type wheel having moved to the same extent, has the letter *s*, on its periphery corresponding to three dots brought directly opposite and over post 42. To print that letter on a moving strip of paper or

message blank passing between the type wheel and the upright post 42, which strip of paper or message blank may be given suitable intermittent motion to receive and space off the several letters and words as they are received by any suitable mechanism adapted to the purpose, I depress printer key 75 which will energize electro-magnet E, thereby by pulling down one end of armature 41, causing its other end having attached thereto the post 42, to press upward and carries the paper between it and the typewheel against that particular letter, and thus print said letter on the paper. This upward action of that portion of the armature 41, carries with it the transverse plate 40, to the face of which are two projecting pins 38 and 39, the upward action of the plate and pins enables the forked catch piece 37 to pass from pin 39 to 38, while forced in that direction by the action of spring 44. Now, when armature 41 returns to its normal position, the plate 40 is carried down enabling the catch-piece 37 to escape the second pin 38, which operation will cause the angular lever 34 to press on the projecting portion of detent 31 and withdraw the detent from the teeth of cog wheel 6, at the same time the rear end of lever 34 comes in contact with and lifts the bent portion 43 of the arm 14 which is rigidly affixed to the rock shaft 12, the resulting motion of said rock shaft lifts the finger clear of the selecting disks *a, b, c, d*, and liberates the shaft 2 and wheels thereon, allowing them to rotate until the pin 10 on wheel 8 comes in contact with the vertical rod 35, which then moves that portion of the lever 36 forward, carrying with it the catch piece 37, to its original position in front of the pins 38 and 39, at the same time lifting the bent portion of the lever 34, freeing the detent 31, which will then engage the first tooth in the beginning of the serrations on wheel 6. It also frees the rear end of said lever 34, allowing the arm 14 to descend a short distance, and by that action enabling the rock shaft 2 to turn slightly on its axis in the same direction, and bring the finger 16 again in contact with the selecting disk *a*, which will always be the case by reason of the cam 9 on wheel 8 having come in contact with the arm 13, which forces the rock shaft endwise so as to bring the finger 16 to that exact position on the disk "*a*" which is the invariable starting point for each letter. The projection 17 on the finger 16 having been brought by this operation to the outside face of the selecting disk "*a*," will hold the rock shaft and its rigid attachment in the position necessitated by the action of cam 9, which has then passed a little beyond the arm 13. The position of the parts just described is that of the starting point for each letter. That being the case, now suppose it is desired to transmit in Morse characters the word "fate" and print the same in alphabetical letters at the opposite end of the line, I send one short impulse into the apparatus which makes a quick up and



down movement of the armature 24, which liberates wheel 6, by drawing down detent 31, and enables said wheel to move to the extent of one tooth, this rotary movement of shaft 2 will carry with it the several selecting disks *a*, *b*, *c*, *d*, which brings the depression *e* directly opposite to projection 17 of finger 16, thus the spring 18 is enabled to draw said projecting finger 17 through the depression *e* and against the face of disk *b*. By this operation one dot has been made, the type wheel at the same time having been rotated to an equal extent. In making the dash a long impulse is sent, the armature 24 is held down a greater length of time, thereby withdrawing the detent 31 and holding it away from the toothed wheel 6, for the same length of time. This continued downward action of said armature will have withdrawn the catch 21 from off the arm 20 on the rock shaft 12, which then permits the finger 16 to return to the same selecting disk "*b*" because the continued downward pressure of the armature keeps that point 28 of the lever 27 engaged with that groove 15 that coincides with disk "*b*," and prevents its escape therefrom. Now all wheels on shaft 2 will revolve until the cog "*m*" on disk "*b*" comes in contact with the finger 16, thereby arresting any further revolution of said wheels, hence a dash has been made. To make the final dot of character F, a quick impulse is given which pulls down the spring 22, which causes such action in the rock shaft as will enable its finger 16 to hop over the projection *m* on said disk *b*, while the wheel 6 moves to the extent of one tooth. These combined operations have moved the type wheel to the extent of bringing the letter F thereon immediately over upright post 42. An impulse is then sent through the printer key 75, which will energize electromagnets E which forces post 42 upward carrying the message paper against the letter F and permit them to fall away from the same on a break of the current. This action of the printer allows the wheels to rotate as hereinbefore stated, whereby the finger 16 is brought onto the disk "*a*" or place of beginning as hereinbefore described. The letter A being a mere repetition of the letter F, with the exception of the final dot, it is deemed unnecessary to describe the operation of the device in making the letter A. The printing therefore is effected just as the finger 16 arrives at the projection "*m*" on disk wheel *b*. The letter A therefore precedes the letter F on the type wheel, and in a similar way all letters and numerals are arranged around said type wheel with respect to their agreement with their telegraphic symbols.

Having shown how F and A are made, I proceed to make the letter T—a dash in the Morse code. As we depress and continue to hold depressed the armature 24, the lever 28 is made to engage for that time one of the grooves 15, coinciding with the selecting disk *a*, upon which the finger 16 rests. And as the

detent 31 is held down as before described, the wheels are liberated and revolve until projection *k* on disk "*a*" comes against the end of the finger 16. The type wheel at the same time traveling to such position with respect to post 42, as to bring directly over it the letter T. Then the printing device is operated to print the letter T and at the same time release the mechanism and enable the wheels to come around, and the finger resume its original position, at the point of beginning on the disk *a*. To make the letter E, a short, quick impulse is sent over the line, which will cause the detent 31 to leave the wheels to the extent of one cog, thereby shifting the type wheels one space and bringing the letter E directly over the post 42. From the above, will be seen the importance of commencing the series of letters and numerals in the manner partially shown on type wheel Fig. 1, to wit: E, I, S, H, P, 6, &c.

Having shown and described how the word "fate" is transmitted in Morse characters and printed in letters at the opposite end of the line, any word may in like manner be transmitted and printed, while at the same time the action of the sounder or magnet A is such as to enable any one skilled in the art to read the Morse characters by sound.

Without going through the entire and tedious array of letters and numerals, it may be briefly stated that each transmitted Morse signal will influence the disks and consequently the connected type wheel moving in unison therewith. As the letters and intermixed numerals on said type wheel are relatively so arranged as to correspond with certain points or positions on the disks and respond to Morse signals made thereon, it necessarily follows that the letter or numeral corresponding to its Morse signal must move and coincide in point of time and therefore take a predetermined position.

Having thus described my systemized class arrangement and grouping of Morse telegraphic signals in combination with classes or groups of alphabetical letters and intermixed numeral characters arranged according to their representative affinity or agreement, and also a means whereby Morse signals are sent from one end of a line and received and printed at the opposite end of the line in alphabetical characters, I wish it distinctly understood that I do not limit myself to the precise mechanical construction of the device shown and described, as it may be changed in that respect without departing from the spirit of my invention. Therefore

I claim—

1. In a printing telegraph, a rotatable shaft which has affixed thereon a wheel with alphabetical letters and numeral characters around its periphery, in combination with a toothed wheel and detent to engage therewith, a series of selecting disks of the character shown and described, a finger adapted to pass from one disk to another in the series, and check



rotation of the same, and a cam that will move said finger to its primary position or starting point on each revolution of said disks.

5 2. In a printing telegraph, a type wheel in combination with suitable means for rotating the same, a serrated wheel held in temporary check by a pivoted detent, a series of toothed selecting disks adapted to rotate in unison  
10 with said wheels, a finger that will move across the face of said disks and engage them separately, and an electro-magnet that will operate to raise said finger from the selecting disks and draw the detent from the toothed  
15 wheel.

3. In a printing telegraph, the combination consisting of a type wheel, suitable means for revolving the same, a toothed wheel and detent whereby said type wheel is temporarily  
20 held in check subject to the action of said detent, a series of selecting disks constructed and arranged with respect to each other as shown and described, a finger adapted to press against and move across the face or periphery of said disks, a projection on said finger that will retain the same against that particular disk it happens to be on and keep it there until one of the depressions in said disk is brought opposite said projection, and a  
25 means whereby it will slip through said depression and come against the side or solid portion of the next disk.

4. In a printing telegraph, a type wheel in combination with a series of four selecting  
35 disks each of which is provided with one or more radial projections and three with radial recesses or depressions, each disk fixed on the same shaft as the type wheel, so as to rotate therewith, and each selecting disk arranged side by side with respect to each other as that a depression in one disk will be, to the extent of its width, in advance of a depression in the next disk; a finger adapted to press against the periphery of said disks by  
40 means of a spring, a short hook attached to the armature of an electro-magnet that, when energized, will draw said finger momentarily from the disks and, by the slipping of said hook enable the spring actuated finger to regain its previous position.  
50

5. In a printing telegraph, a revoluble type wheel, in combination with a number of selecting disks which have radial projections and depressions, a movable finger that will  
55 operate to check rotation of said disks, a serrated wheel and detent in conjunction therewith to space off the rotary movement of said type wheel, an electro-magnet that, when energized, will draw said detent from the serrated wheel and thereby liberate the mechanism that gives rotation to the several wheels, an additional electro-magnet provided with an armature that will by its action, in one direction, force the printing stamp  
60 or post toward any letter or numeral on the type wheel opposite thereto and thereby cause

an impression or print of the same to be made on an interposed sheet or strip of paper.

6. A telegraphic instrument constructed and adapted to transmit and receive Morse  
70 telegraphic signals, and translate the same into alphabetical letters and numerical characters, and separately print them, in combination with an electrical generator, a main line of transmission, a polarized relay consisting  
75 of a permanently magnetized pivoted bar arranged between the poles of two electro-magnets, a non-magnetic bar pivoted to the free end of the permanent magnetic bar, an iron armature attached to the non-magnetic bar,  
80 and an electro-magnet for actuating said iron armature, to open and close the line of a local circuit by impulses sent over the main line of transmission.

7. A telegraphic instrument of the character described, in combination with an electrical generator, a main line of transmission, a pivoted magnetic bar arranged between the poles of two electro-magnets, each having opposite polarities, and in the main line a non-  
85 magnetic bar pivoted to the free end of the magnetic bar, an iron armature attached to the non-magnetic bar, an electro-magnet also in the main line for actuating said armature by electrical impulses sent along the main  
90 line whereby said non-magnetic bar at each electrical impulse is brought in momentary contact with points in the circuit of a local battery to produce like impulses in said local circuit.  
100

8. In a telegraphic instrument constructed and adapted to electrically transmit and receive Morse telegraphic signals and translate the same into alphabetical letters and numeral characters according to the signal sent,  
105 the combination of a type wheel, a serrated wheel, a detent operating in conjunction therewith to space off the movement of said type wheel, and a series of selecting disks one of which has three radial projections and  
110 four depressions. The next has two radial projections and one depression; the next one projection and one depression; and the last disk in the series has one projection only.

9. A telegraph instrument, of the character  
115 described in combination with a shaft adapted to rock on its axis, and move back and forth lengthwise, a projecting finger attached to said shaft; a spring for drawing the same in one direction and a revoluble cam, that  
120 will at proper intervals force the shaft and finger back to its original position or starting point.

10. A telegraphic instrument of the character described in combination with a shaft  
125 adapted to rock on its axis and move back and forth lengthwise, a spring for drawing said shaft in one direction, a series of notches or transverse grooves in said shaft, and a rocking lever one end of which is adapted to engage said grooves and temporarily prevent  
130 lengthwise movement of said shaft.



11. A telegraphic instrument of the character described in combination with a shaft adapted to rock on its axis and move back and forth lengthwise, a series of grooves in said shaft, a rocking lever that will engage said grooves, a finger projecting outward from the rock shaft to the selecting disks, a spring that will draw said rock shaft in one direction subject to the action of the rocking lever a projecting arm on one end of said shaft, a revoluble wheel provided with a pin that in its circular course will come in contact with such parts as actuate the rock shaft and detent and permit said detent and finger on said rock shaft to return to their respective wheels at the point of commencement.

12. A telegraphic instrument of the character described, in combination with a revoluble shaft, a type wheel and a series of selecting disks: each disk provided with one or more radial projections, collectively arranged with respect to each other, as that said radial projections shall differ in circumferential position; suitable means for rotating said shaft, type wheel and disks; a toothed wheel and detent for controlling same; a rock shaft and a backwardly projecting arm; and an angular lever adapted to draw the detent from the toothed wheel and the finger on said rock shaft from the selecting disks.

13. A telegraphic instrument of the character described in combination with a revoluble shaft, a type wheel and a series of selecting disks: each disk provided with one or more radial projections arranged with respect to each other as that said radial projections shall differ in circumferential positions, transverse depressions in three of said disks which depressions are also arranged to differ in circumferential positions, a toothed wheel and detent for controlling the same; a rock shaft provided with an extending finger adapted to engage said disks separately, a forwardly projecting arm on said rock shaft; a thin flat spring provided with a hook to lightly catch over said arm, an armature bar attached to the lower end of said flat spring, and an electro-magnet for operating same.

14. A telegraphic instrument constructed and adapted to transmit and receive Morse signals and translate the same into alphabetical letters and numeral characters and separately print them, in combination with a suitable electrical generator, a main line of transmission, a polarized relay consisting of a permanently magnetized pivoted bar arranged between the poles of two electro-magnets forming part of the main line, a non-magnetic bar connected to the permanently magnetized bar; an armature attached to the non-magnetic bar; an electro-magnet for actuating said iron armature; a local circuit and battery having no electrical communication with the main line, but in such relative position to the non-magnetic bar of the polarized relay as that a change of polarity

in the magnets of said relay will operate to open and close said local circuit.

15. A telegraphic instrument constructed and adapted to transmit and receive Morse signals and translate the same into alphabetical letters and numeral characters, and separately print them, in combination with a suitable electric generator, a polarized relay consisting of electro-magnets of different polarities arranged in and forming part of said main line, a permanently magnetized bar pivoted so as to swing between said electro-magnets, a non-magnetic bar pivoted to the magnetic bar, an iron armature affixed to the non-magnetic bar, two adjustable points one of which is insulated and between which the non-magnetic bar is adapted to swing; a spring to draw said non-magnetic bar toward and against said insulated point, an electro-magnet forming part of the main line and in such proximity to the armature on the non-magnetic bar as to produce in the same a vibratory movement corresponding to an electrical impulse sent over the line communication without affecting the position of the magnetized bar forming part of said polarized relay.

16. A telegraphic instrument constructed and adapted to transmit and receive Morse telegraphic signals and translate the same into alphabetical letters and numeral characters—said instrument consisting of an organized mechanism comprising a revoluble shaft which has rigidly affixed thereon, to revolve in unison with a type bearing wheel—suitable selecting disks provided with radial projections and depressions, also a toothed wheel, in combination with a detent adapted to engage the teeth of said wheel; an electro-magnet which, when energized, will operate to withdraw said detent from said toothed wheel and permit it, by the passage of a short electrical impulse, to rotate to the extent of one tooth, and a proportionately greater extent, to escape several teeth, by prolonged or continued electrical action; a finger in peripheral contact with one or other of the selecting disks, and adapted to engage them separately, which finger, by suitable intermediate connections with the parts operated by said electro-magnet, is momentarily withdrawn by said electrical impulse and immediately released to resume its primary position on the disk which will continue to rotate during said prolonged electrical impulse until a projection on said disk comes in contact with said finger, whereby further rotation is suddenly arrested.

17. A telegraphic instrument constructed and adapted to transmit and receive Morse signals and translate same into alphabetical letters and numeral characters, and separately print them in combination with a main line of communication, a polarized relay of the character described, a local electrical circuit constructed and adapted to operate sub-



stantially as described; an electrical battery  
for working the main line, a wire that con-  
nects the copper or positive pole of said bat-  
tery to a contact point under a suitable key  
5 66; a wire that connects the zinc or negative  
pole of said battery to a point at the top of said  
key; a wire which permanently connects said  
key to the main line, a wire which connects a  
contact point under the opposite end of key 66  
10 to a similar point back of and under closed key  
lever 70; a wire from the same point connect-  
ing it to the zinc or negative pole of the bat-  
tery; a wire which connects a point under the  
forward end of said key lever 70 to the copper

or positive pole of the battery; and a wire one 15  
end of which terminates in the earth and its  
other end in said key lever 70, which system-  
ized arrangement of wires and keys enables  
an operator to suddenly change the polarity  
of the polarized relay and thereby bring into 20  
action such portions of the local circuit as may  
be required to operate separately the select-  
ing apparatus and the printing device.

OSCAR L. KLEBER.

Witnesses:

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