

(No Model.)

2 Sheets—Sheet 1.

O. L. KLEBER.
PRINTING TELEGRAPH.

No. 537,464.

Patented Apr. 16, 1895.

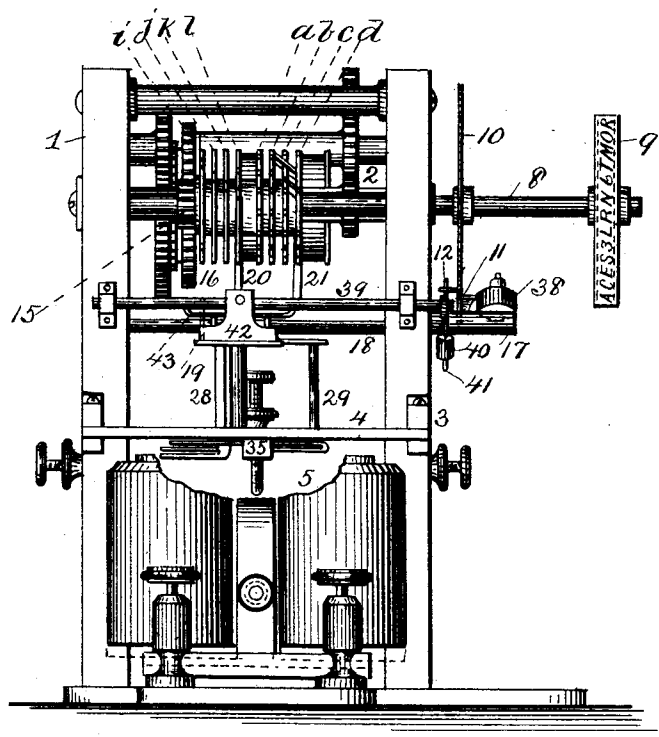


Fig. 1.

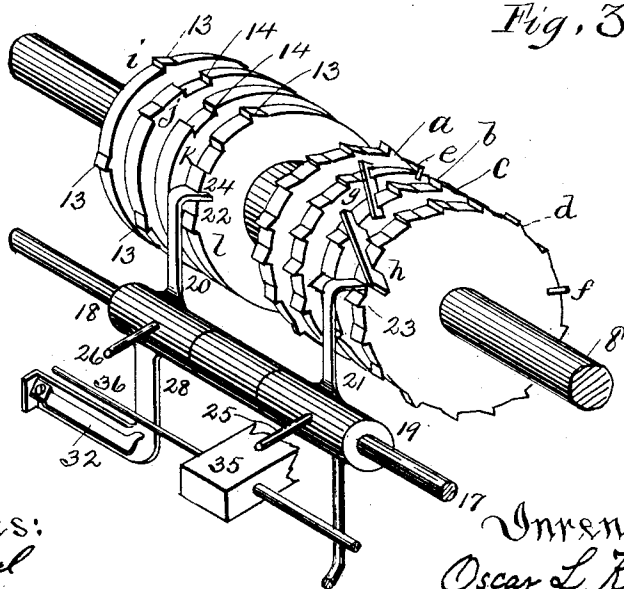


Fig. 3.

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per Josiah W. Ellis
attorney

(No Model.)

2 Sheets—Sheet 2.

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Fig. 2.

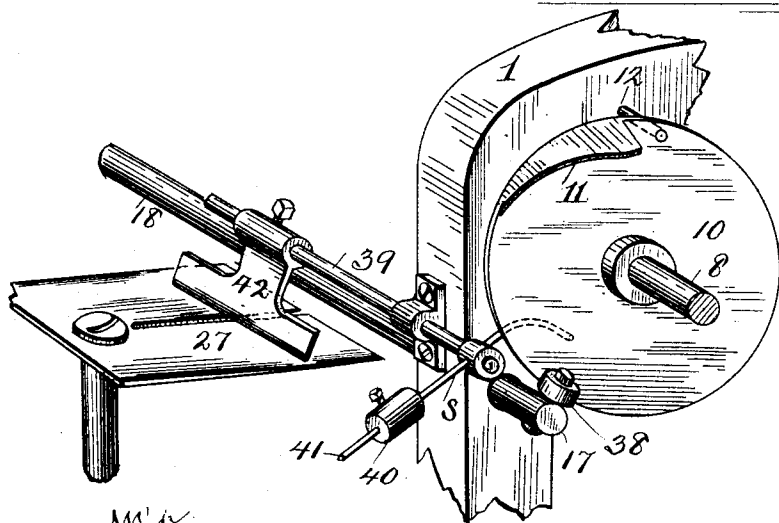
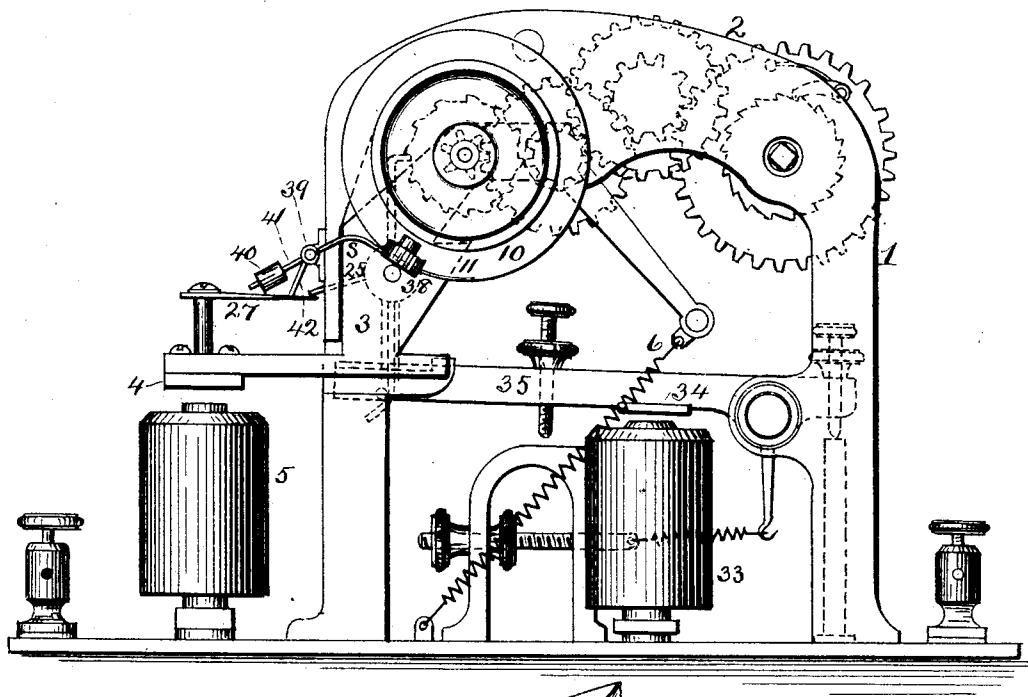


Fig. 4.

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UNITED STATES PATENT OFFICE.

OSCAR L. KLEBER, OF PITTSBURG, PENNSYLVANIA.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 537,464, dated April 16, 1895.

Application filed June 5, 1894. Serial No. 513,587. (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 that character devised by me and described in my former application, Serial No. 470,237, of which the following is a specification.

To enable others to understand my present invention and construct an apparatus embodying the principles thereof, I will proceed to describe the mechanism, its construction, and mode of operation by reference to the accompanying drawings, wherein—

Figure 1 represents a front elevation of the mechanism designed to translate and print alphabetical letters and numeral characters on the reception of Morse or other telegraphic signals; Fig. 2, a side elevation of the same mechanism; Fig. 3, a perspective view of an enlarged detached portion of said mechanism. Fig. 4, represents a detached portion of the front end of the apparatus.

To give my invention bodily form and put the same to practical use, I construct a suitable rigid frame 1 and erect in proper bearings therein a train of cog wheels 2 which may be actuated and driven by a spring, weight, or any suitable force or power. To this frame 1 is hinged or pivoted a secondary and smaller frame 3 the forward part of which is provided with a soft iron plate 4 forming the armature of an electro magnet 5 secured to the base of the main frame and arranged directly underneath said armature or soft iron plate. This pivoted portion 3 of the frame is adapted to move upwardly by means of a spring 6 and downwardly by the action of the energized electro magnets 5. Arranged horizontally in bearings in the upper part of this movable portion of the frame is a suitable shaft 8 having rigidly secured to the same, and so as to revolve therewith, a type wheel 9 having around its periphery projecting alphabetical letters and numeral characters. Next in order on said shaft and affixed likewise is a circular plate 10 or plain wheel which has a cam 11 or incline projecting from its outer face, and a pin 12 on its opposite side. Within the movable portion of the

frame 3 and a little distance from said circular plain wheel, and also affixed to the same shaft 8 so as to revolve with it, is a requisite number of toothed wheels *a, b, c, d*, each having an equal number of radially projecting teeth which are arranged side by side a little distance apart, and relatively so affixed to said shaft 8 and with such respect to each other, as that the teeth in any one wheel shall be opposite to the blank spaces between the teeth of all the adjoining wheels. These wheels are also provided in addition to their teeth, with a number of short inclined projecting planes or slides *e, f, g, h*, which connect each pair of adjacent wheels, and are arranged obliquely to the axis and plane of said wheels. A suitable distance from the toothed wheels just described and rigidly affixed to the same shaft 8, so as to revolve therewith is a requisite number of circular selecting disks *i, j, k, l*, of uniform size, each provided with radially projecting teeth or short cogs 13, occurring at irregular intervals around the periphery of said wheels; and between some of these teeth portions of the metal are removed to form deep, radial depressions 14, so located and arranged as to coincide in point of number and circumferential position to the several inclines *e, f, g, h*, or oblique slides on the other toothed wheels, hereinbefore described. This shaft 8 carrying said circular disks and toothed wheels is also provided with a small cog wheel or pinion 15 in gear with a larger toothed wheel 16, forming one of a number or train of cog wheels actuated by a weight to give quick and rapid rotary movement to said shaft, and the various wheels affixed thereon so that their upper surface shall revolve toward the front of the apparatus.

Near the front of the movable portion of the frame 3 a little lower down and parallel with the shaft 8 and wheels just described is arranged another shaft 17 having around and about its middle portion two collars 18, 19, one of which 18 is adapted to turn on said shaft 17. Each of these collars is fitted with an upwardly projecting finger 20, 21, the tops of which terminate in a horizontal plane radial with the axis of the selecting disks and spacing wheels. The terminal ends of these

fingers are bent inwardly in the form of a short hook 22, 23 designed and adapted to come in contact with, and operate against, the respective faces of the circular selecting disks 5 and toothed wheels opposite thereto. The hook 23 on that finger 21 controlling the spacing wheels is plain, whereas the hook of the finger 20 controlling the selecting wheels is provided with a thin continuation or projecting point 24, which overlaps the periphery and extends down the side of such selecting disk as the finger may be temporarily in contact with.

Each collar 18, 19 in addition to its finger 20, 21 is provided with a short pin 25, 26 extending horizontally outward toward the front of the apparatus; and underneath these two pins and a little lower down, and parallel with them, is a thin flexible, bifurcated spring 20 or plate 27 one end of which is attached to the soft iron armature 4 fastened to the front movable portion of the frame 3, so as to move with it. The other ends of these thin, flexible springs press against the projecting pins 25, 26 so as to force them upwardly, and thereby press the hooks of the fingers against the peripheries of their respective wheels. These collars are also provided each with a downwardly extending arm 28, 29; the one on the collar of the plain hook 23 being bent near its lower portion to form an incline 30 toward the front. The other arm 28, or that on the collar 18 supporting the finger 20 having its hooked end furnished with the thin continuation or projecting point, is bent horizontally at its lower portion 31 in a line parallel with the shaft 17 supporting said collars. To the extreme end of this bent portion is attached a thin, flat spring 32 which lies nearly parallel and also along the same. This thin flat spring is arranged so that its upper plane surface shall present a downward incline its entire length and width.

At or near the rear end of the apparatus, and rigidly attached to the base plate thereof is an electro-magnet 33. This electro magnet 33 is provided with the usual, ordinarily constructed armature 34 affixed to a bar 35 having its rear portion pivoted to the main frame, its opposite end extending between, and a little distance in front of the aforesaid downwardly projecting arms 28, 29 attached to the collars supporting the hooked fingers; and from one side of this forward end of the pivoted armature bar 35, and just above and along the inclined surface of the flat spring 32 attached to the longitudinal portion of the arm is a thin projecting rod 36 that in a downward descent of the armature bar is carried with it, and by its action on the inclined surface of said spring forces it backward, thereby throwing that finger 20 in connection therewith, free from the selecting disks, and passing beyond the flat surface of the spring 32 said arm and finger will recover their former position by the action of the thin flat spring 27 operating upwardly against the projecting pin 26 at-

tached to the collar 18. On an upward movement of this end 35 of the armature bar the thin rod 36 is carried with it in its upward ascent. Without changing the position of the finger 20 it pushes the spring outward, and passes between it and the horizontal portion of the arm and regains its position on top of the inclined surface of said spring 32 ready for repeated action. In a line with said thin rod 36, but on the opposite side of the armature bar is a similar rod 37, that extends to and a little beyond the other downwardly extending arm 29; which rod 37 in its descent operates on the bent inclined portion 30 of said arm, pushing it backward, and thereby lifting the finger hook 23 off the toothed wheels provided with inclined or oblique short slides, holding said hooked finger free from the same until the armature bar 35 is released and returns to its normal position. The horizontal shaft 17 supporting these hooked fingers, is carried in suitable bearings by the pivoted portion of the frame 3 and is adapted to move longitudinally in one direction by means of the inclined or oblique planes *e, f, g, h*, operating in connection with the plain hook 23 therewith to push said shaft in one direction, and in the opposite direction said shaft 17 is drawn by means of the revolving cam 11 on the large plain wheel 10 coming in contact with an anti-frictional roller 38 on that end of said shaft; and this rectilinear reciprocating movement of said shaft carries the hooked fingers simultaneously back and forth at the proper times across the faces of their respective wheels.

In front of and parallel with the shaft 17 is another shaft 39 having its bearings in the immovable portion of the frame. This shaft 39 is given a partial rotation in one direction by means of a weight 40 on the end of a projecting short arm 41; and in the other direction by means of the pin or stud 12 on the cam wheel 10 coming in contact with a similar arm *s* extending from said shaft so as to be operated on by said pin. Attached to the middle portion of said rock-shaft 39 is a downwardly extending plate 42, the lower edge of which is directly above the thin flat spring 27 attached to the armature 4 of the electro-magnet 5 beneath; and in the descent of the said armature said flat plate 42 will assume a vertical position so that upon a return or upward movement of the said armature the free ends of said flat springs 27 are met by the plate 42 and held down. A spline or rib 43 which extends along the under side of this shaft 39 when the plate is in a vertical position, is brought directly over the ends of the projecting pins 25, 26 extending outwardly from the collars 18, 19 so that on an upward movement of the armature 4 the hooked fingers are drawn free from their respective wheels. The cam wheel 10 on its revolution brings around the pin 12 thereon which presses against the lever *s* on said rock-shaft, throws the plate 42 attached thereto outward, freeing said flat springs 27, enabling them to

operate on the projecting pins 25, 26 of the collars, and thereby return the hooked fingers 20, 21 to the peripheries of their respective wheels. At the same time the cam 11 by its operation on the little anti-friction roller 38 forces the finger-shaft 17 in the direction of the cam, and draws the fingers across the faces of the wheels to the original position or starting point. Said cam 11 and pin 12 are so arranged and located as to bring about these results at the desired and proper times.

On the extreme front of the apparatus, and extending up from the base thereof, are two binding posts to which wires are attached for sending electrical impulses into the forward electro-magnets 5 which draws down the movable portion of the frame 3, carrying with it the selecting disks, spacing wheels, and type wheel to make an imprint. To operate these several electro-magnets separately by a current of electricity to be transmitted along a single main line I use the electrical system and polarized relay as shown and described in my said former application, Serial No. 470,237.

By electrically energizing electro magnet 33 it will draw down its armature bar 35. This action will carry with it the thin rod 36 projecting from that side of the forward end of said armature bar and slide down the inclined surface of the flat spring 32 on the lower horizontal portion of the finger arm 28 and force it backward thereby throwing the finger 20 free from the selecting disks; and as the rod 36 passes said inclined spring the finger is immediately thrown forward against the wheels by the action of the flat spring 27 acting on the projecting pin 26 attached to the collar of said finger. At the same instant the rod 37 on the opposite side of this end of the armature bar 35 by sliding farther down the inclined portion of the rod 29 attached to the collar of that finger 21 adapted to control the action of the toothed spacing wheels, leaves them free to rotate. If the impulse be one of short duration, such as is required to make a dot only, the armature 35 will immediately return to its original position, and that finger 21 controlling the spacing disks will also have resumed its position thereon, and as the disks and wheels revolve the hooked end 23 of this finger will be acted upon by the oblique slide *h* extending from the first *d* to the second *c* toothed wheel or spacing disk, which action will thrust the finger 21 of said spacing disk, as well as the finger 20 controlling the selecting disk over on to those next adjoining, and further rotation of said wheels and disks is checked by said finger 21 coming in contact with the nearest projecting tooth on said spacing disk *c*. As before remarked when a dot is made and the finger 21 on the spacing wheels *a, b, c, d*, comes in contact with one of the oblique slides, the effect will be to shift said finger 21 as well as the other finger 20 over on to the adjoining disk and wheel; and when a dot is made when the finger acting on

the spacing wheels is in such relative position or point where no slide appears, then such dot is made without the fingers being forced to leave the particular wheels they happen to be on, the wheels simply escaping to the extent of one cog. On the reception of a longer electrical impulse, to make a dash, the armature 35 operating the fingers will necessarily remain down during that period; the finger 20 controlling these selecting disks having dropped back thereon. Just before the armature 35 arrives at its lowest point the other finger 21 by means of the continued pressure on its inclined arm 29 will remain out of contact with the spacing wheels sufficiently long and far as to enable the oblique slides and teeth to pass said finger without check, which wheels will continue to rotate until a radial projection 13 on one of the selecting disks *i, j, k, l*, opposite the finger 20 controlling the same comes in contact with said finger and thereby checks further rotation. The peculiar positions of the oblique slides *e, f, g, h*, depressions 14, and radial projections 13 on all of these wheels are arranged and predetermined so as to meet the requirements of the alphabetical signals.

When the disks comprising the spacing and selecting mechanism are at a position designated as zero, or starting point, and a short electrical impulse is sent to make a dot which represents the letter "E," that letter on the periphery of the type wheel 9 will be carried around and opposite to any predetermined point required for the printing of said letter. To make an impression of that letter, a moving strip of paper or message blank is arranged in proper position to receive it, and which strip of paper or message blank may be given a suitable intermittent motion to space off the several letters and words as they are received, by any suitable mechanism adapted to the purpose. By sending a current of electricity into the electro magnet 5 it pulls down the armature 4 attached to the forward part of the hinged and movable portion of the frame 3, carrying the selecting disks, spacing wheels, and finger shaft together with the fingers thereon, causing the type wheel 9, which is also attached to said shaft to make an impression on the underlying sheet of paper properly arranged to receive it. By this downward movement of the armature 4 the bifurcated spring 27 attached thereto is also drawn down enabling the plate 42 on the rock-shaft 39 just above said spring to assume a vertical position, and the spline 43, underneath said rock-shaft 39, to obtain a place directly above the projecting pins 26, 25 on the finger collars 18, 19. Such is now the relative position of the connected parts with said armature 4 as that on a liberation and upward movement thereof these said separate parts will be so affected and brought into such position enabling the fingers, selecting disks, and spacing wheels to return to the original starting point ready for a repeated operation.

To make this invention perfectly plain and well understood I will proceed to describe the action of the mechanism in receiving and printing the word "hat" in Morse characters, translating and printing the same into alphabetical characters, consisting of four dots, one dot and a dash, and one dash; to wit:

On the first short electrical impulse or dot entering the apparatus the effect is to cause the armature 35 to make a quick downward and upward motion. This downward action of the armature bar so operates the fingers 20, 21 as to lift the finger-hooks free from their respective wheels in the manner hereinbefore described, enabling said wheels (which are in gear with the clockwork) to start with a rapid rotary movement which is suddenly checked by the return of the armature bar 35 and consequent liberation of the finger 21 opposite the spacing wheel *d*, which immediately returns thereto, and comes in contact with the first inclined slide *h* whereby said finger 21 is shifted from its position on the first wheel *d* to another position against the cog on the next adjoining wheel *c* thus arresting the rotary movement of the several wheels. This shifting movement of the fingers 20, 21 and the finger-shaft 17 carries with it to a like extent that finger 20 operating on the selecting disks *i, j, k, l*. The second short electrical impulse produces a similar result, with the difference that the fingers are carried from the second to the third wheels, and in a like manner the third short electrical impulse shifts the fingers from the third wheels onto the fourth wheels; and the fourth short electrical impulse enables the wheels to escape to the extent of one cog without further shifting of the fingers, and thus the letter "H" has been produced, and that part of the type wheel 9 containing the letter "H" has been brought around to a position ready to print therefrom. At that instant an electric impulse is sent through the electro magnet 5 which operates the armature 4 attached to the projecting front portion of the movable frame 3 carrying all the selecting and spacing mechanism together with the type wheel downward to make an imprint of that letter upon a paper suitably arranged to receive it. On the descent of the aforesaid mechanism the shaft 39 to which is affixed the horizontal spline 43 and small plate 42 turns sufficiently to prepare the mechanism to free the fingers from their respective wheels on an upward movement of that armature bar 4, which then remain in that position until the cam 11 on its revolution forces the finger-shaft 17 longitudinally outward to zero or its starting point. At the same instant the stud 12 on the opposite side of the cam-wheel 10 will have pressed down the small lever *s* attached to the rock-shaft 39 thereby liberating the fingers and enabling them to return to the perimeters of their respective wheels, at the place of beginning. To make the letter "A" the operation of the mech-

anism in making the first dot is substantially the same as that of the first dot of the letter "H." To make the succeeding dash, a longer electrical impulse is sent, which draws the finger 21 away from the spacing disk *d* sufficiently long and holds it away enabling said disks to rotate without check; but as the finger 20 operating and controlling the selecting disk *l* has by this time fallen back upon its second disk *k* the first radial projection thereof comes in contact with the hook 22 of said finger; thereby stopping further action of the wheels, which have rotated to a distance greater than that required for a single dot, and thus a dash is made, the type wheel 9 being at the same time turned so as to bring the letter "A" to the proper position ready to be printed by the action of the mechanism, as in the case of the letter "H," which printing operation again returns the fingers and wheels to their primary position ready for the production of the next letter. As the final letter "T" is now to be produced a dash is made which is effected by presenting a long electrical impulse that withdraws the finger 21 of the spacing wheels sufficiently long therefrom to enable the said wheels to rotate until the finger 20 on the selecting disks comes in contact with the first radial projection 13 on the first wheel *l* of selecting disks which checks their further rotation, the type wheel 9 having by the same action moved around to bring the letter "T" in a position ready to print therefrom, and thus the word "hat" is transmitted in Morse characters, received by the apparatus, translated into alphabetical letters, and printed upon a tape or message blank properly arranged, moved, and spaced to receive it, which movement and spacing may be accomplished by any suitable means known to the art.

Having thus described my present invention, I claim—

1. In a printing telegraph a shaft which has affixed thereon a wheel with alphabetical letters and numeral characters arranged around its periphery, suitable means for revolving the same, in combination with a series of wheels each of which has an equal number of teeth and intermediate spaces, the teeth of the series relatively arranged in oblique lines across the faces of the wheels and advancing beyond each other, like a flight of stairs.

2. In a printing telegraph, a shaft which has thereon a wheel with alphabetical letters and numeral characters arranged around its periphery in combination with a series of wheels each of which has an equal number of radial teeth, and in addition thereto a number of prominent inclined slides arranged obliquely to the axis and plane of said wheels.

3. In a printing telegraph, a revoluble shaft provided with a series of wheels each of which has an equal number of radial teeth, and in addition thereto a number of prominent inclined slides arranged obliquely to the axis and plane of said wheels, in combination with

a finger adapted to move across said wheels and engage them separately, for the purpose of checking and controlling their rotation.

4. In a printing telegraph, a movable shaft
5 provided with a series of spacing wheels, each of which has an equal number of radial teeth arranged at equidistant points around the peripheries of said wheels, and in addition thereto a number of prominent inclined slides that
10 occupy parallel positions to each other obliquely to the axis and plane of said wheels, in combination with a series of circular selecting disks, provided with radial teeth arranged in different predetermined positions, a series
15 of transverse depressions that coincide in point of relative position to the several inclined projecting slides on the spacing wheels, and a pivoted finger adapted to move across said selecting disks and engage them separately and return to its first and original position.
20

5. In a printing telegraph, a series of spacing wheels and a series of selecting disks of the construction shown and described, in combination with a separate finger for each series
25 of wheels, and said fingers having an independent movement to and from their respective wheels and selecting disks, but so supported on and by a shaft as that a transverse movement of one finger will effect a like result of both in the same direction.
30

6. In a printing telegraph, a series of spacing wheels, each of which has an equal number of teeth, and a number of inclined slides
35 arranged as shown and described, in combination with a hook ended finger for controlling the rotary movement of said spacing wheels, a downwardly extending arm which is bent to form a forward incline at its lower portion,
40 an armature bar from the side of which projects a rod that will act upon said inclined arm and force it backward on a descent of said armature and thereby draw the finger free from the spacing wheels and prevent its
45 return until released by an upward movement of said armature.

7. In a printing telegraph, a revoluble shaft provided with a series of spacing wheels which have radial teeth arranged at equidistant points around their peripheries, and
50 in addition thereto a number of prominent inclined slides that occupy parallel positions to each other obliquely to the axis and plane of said wheels, in combination with a pivoted
55 finger adapted to have a movement to and from said wheels and engage them separately, and a lateral or side movement in one direction by the action of the inclined slides upon said finger, a series of circular selecting disks
60 provided with radial teeth arranged in different predetermined positions, a series of transverse depressions that coincide in point of relative location to the several inclined projecting slides on the spacing wheels, a
65 finger adapted to engage said selecting disks and pass transversely through the depressions

therein, and across the same by a slide on the spacing wheels coming in contact with its finger to force both fingers in the same direction, a downwardly extending arm attached to
70 the finger of said selecting disks, a spring secured to the lower portion of said arm, a pin projecting sidewise from an armature bar that will on its downward movement press upon said spring and force the finger of the
75 selecting disks out of contact therewith, and on passing said spring permit said finger to return to its former position on the selectors before the upward movement of said armature bar.
80

8. In a printing telegraph, a type wheel secured on a revoluble shaft in combination with a number of toothed spacing wheels—prominent inclined slides arranged at different points around and on the peripheries of
85 said spacing wheels, a number of toothed selecting disks arranged and secured in a series of parallel planes around the same shaft, a pivoted finger, or detent, adapted to operate against and across the edges of said spacing
90 wheels and engage them separately, a pivoted finger adapted to operate in like manner on said selecting disks, and an electro magnet and armature for actuating said fingers.

9. In a printing telegraph, a type wheel secured on a revoluble shaft in combination
95 with a number of toothed spacing wheels—prominent inclined slides arranged around and on the peripheries of said spacing wheels, a number of toothed selecting disks secured
100 on the same shaft, a pivoted finger, or detent, adapted to operate against and move from one spacing wheel to another, thereby engaging them separately, an electro magnet, that, on being electrically energized, will draw said
105 finger from the spacing wheels, a pivoted finger adapted to separately engage the selecting disks and withdraw therefrom on each short electrical impulse of the electro magnet, and reengage the same before completion of a
110 longer electrical impulse.

10. A printing telegraph consisting of an organized mechanism comprising a type wheel, a toothed spacing wheel, a number of toothed
115 selecting disks, together with suitable means for simultaneously rotating said wheels and disks in the same direction, in combination with an electro magnet and armature bar, a pivoted finger, or detent, for controlling rotation of said spacing wheel, and adapted to
120 be drawn out of contact therewith by and during electrical excitation of said electro magnet—a pivoted finger, or detent, that will release the selecting disks by a downward pull of the armature bar, and resume its former
125 position before return of the armature bar for repeated action.

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