No. 613,348.

Patented Nov. 1, 1898.

A. WIRSCHING.

PRINTING TELEGRAPH.

(Application filed May 10, 1897.)

(No Model.)

5 Sheets—Sheet 1.

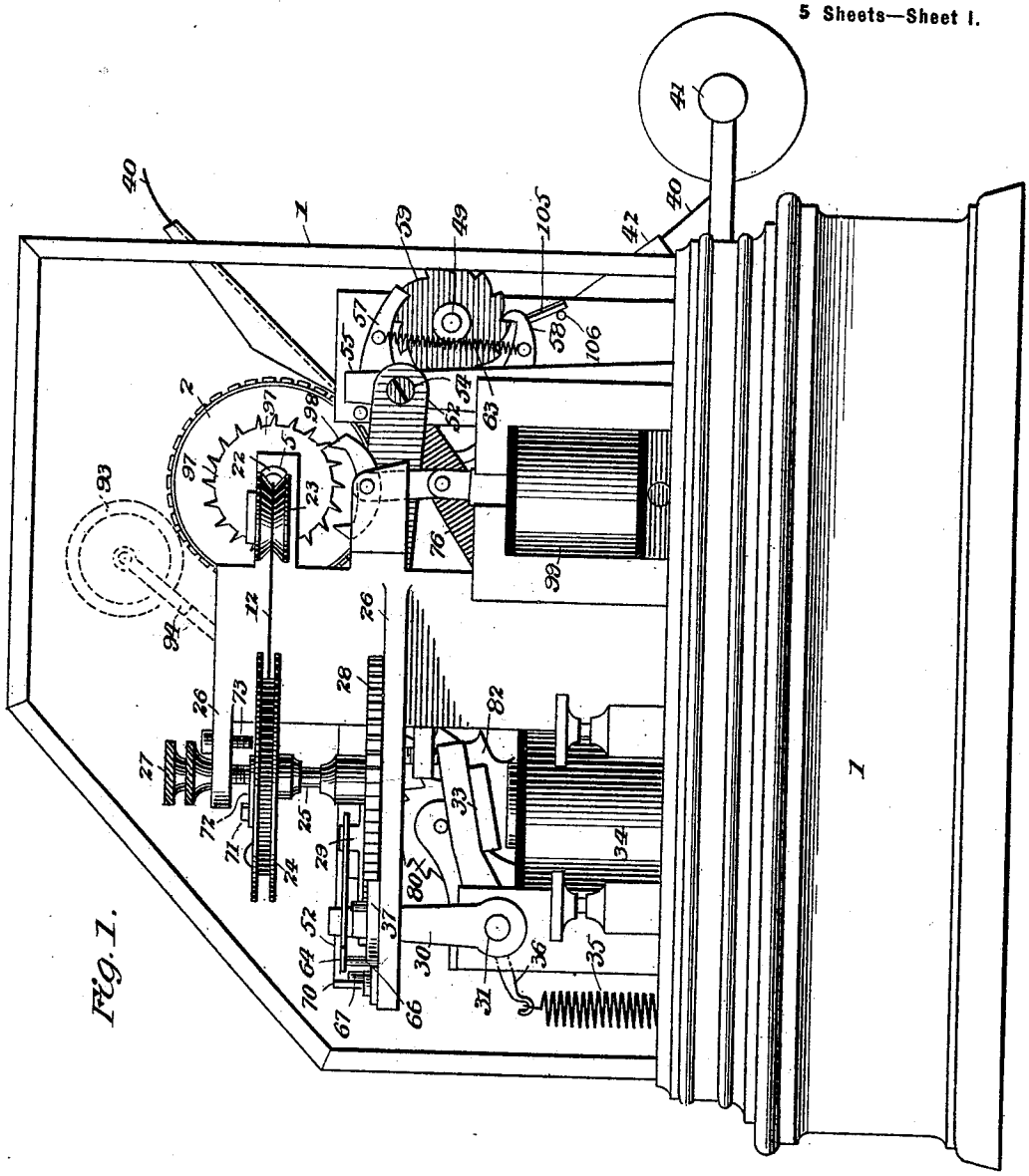

Fig. 1.

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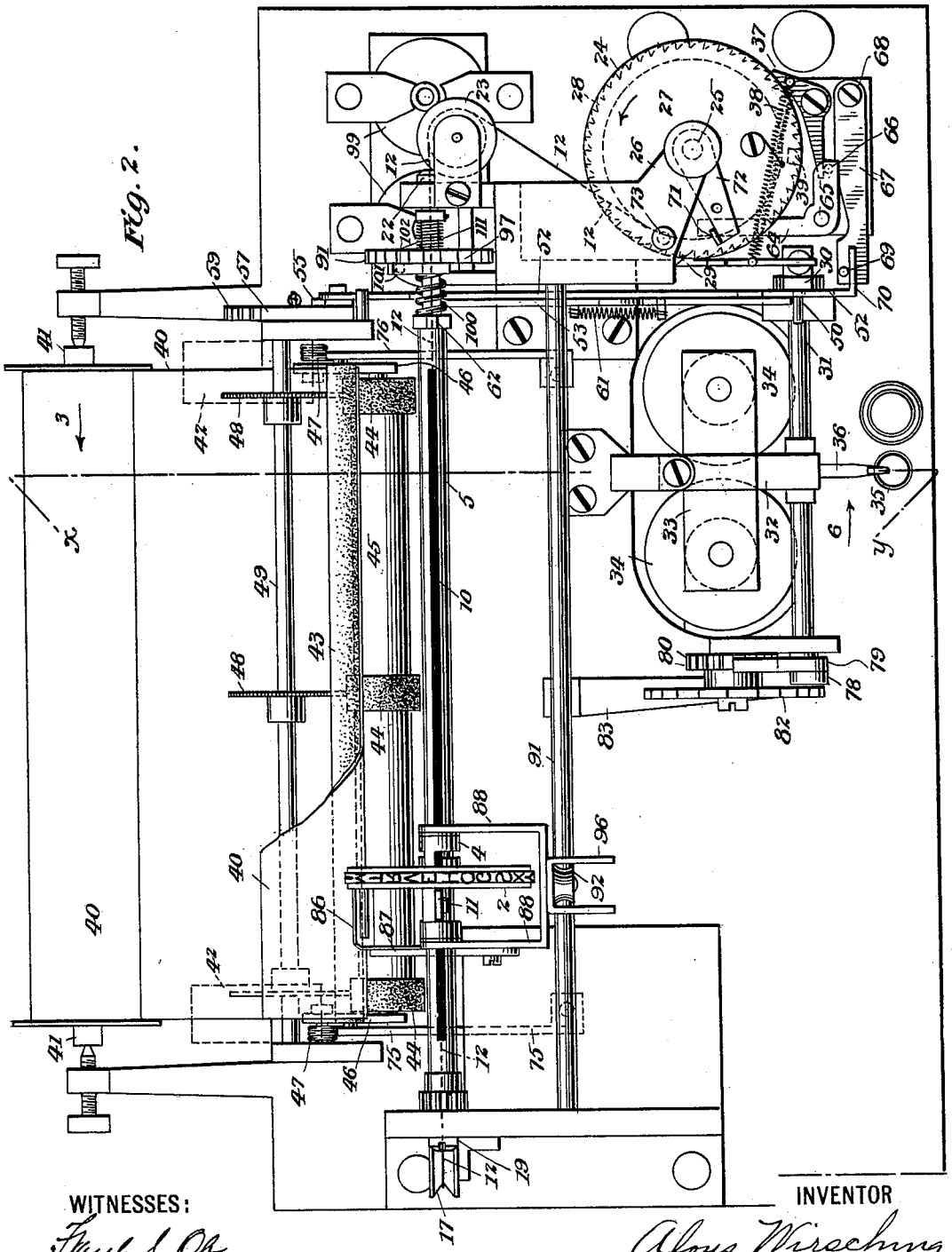
(Application filed May 10, 1897.)

(No Model.) 5 Sheets—Sheet 2.

Fig. 2.



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(No Model.) 5 Sheets—Sheet 3.

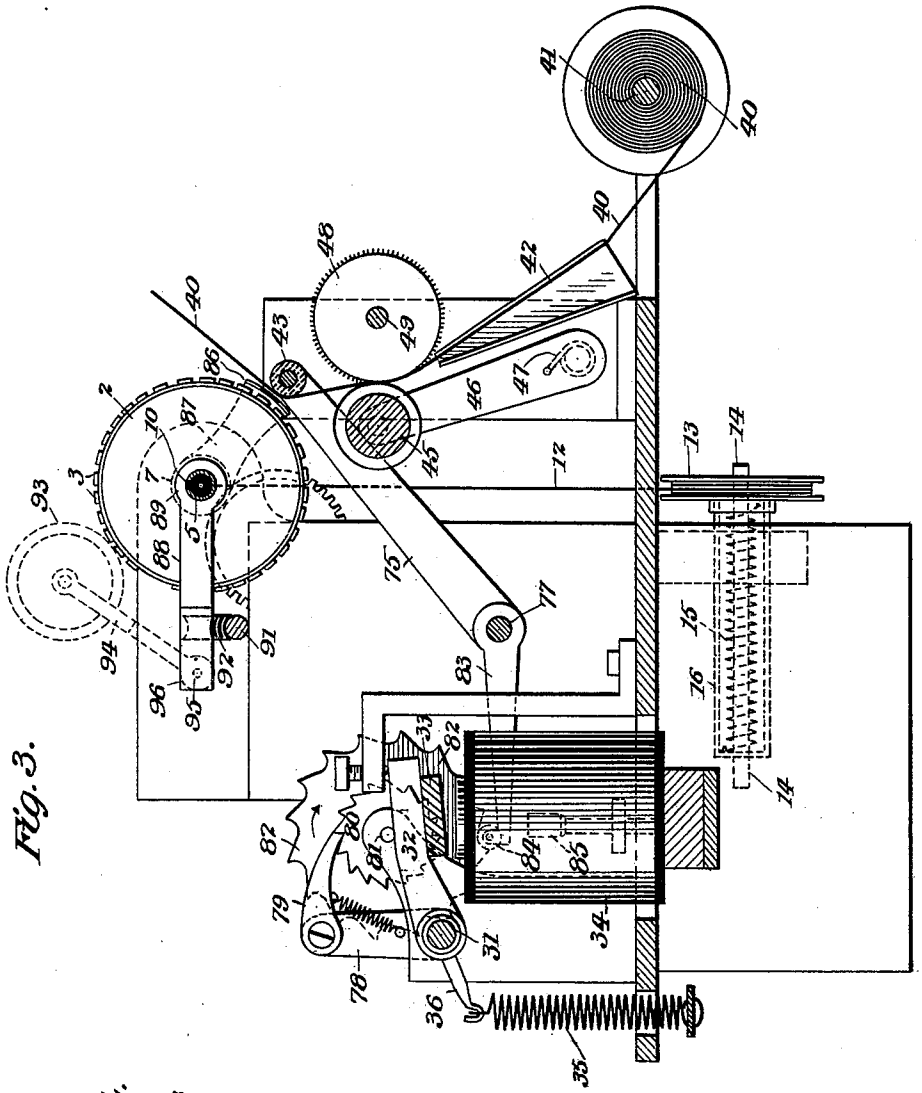

Fig. 3.

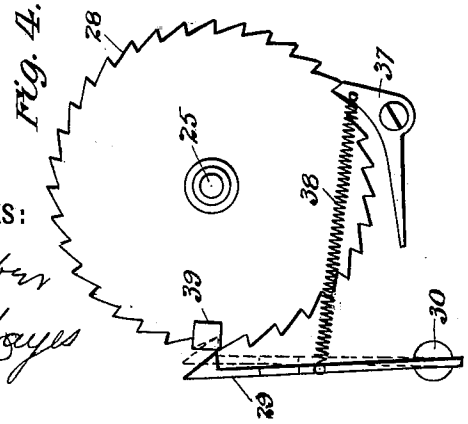

Fig. 4.

Fig. 5.

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(Application filed May 10, 1897.)

(No Model.) 5 Sheets—Sheet 4.

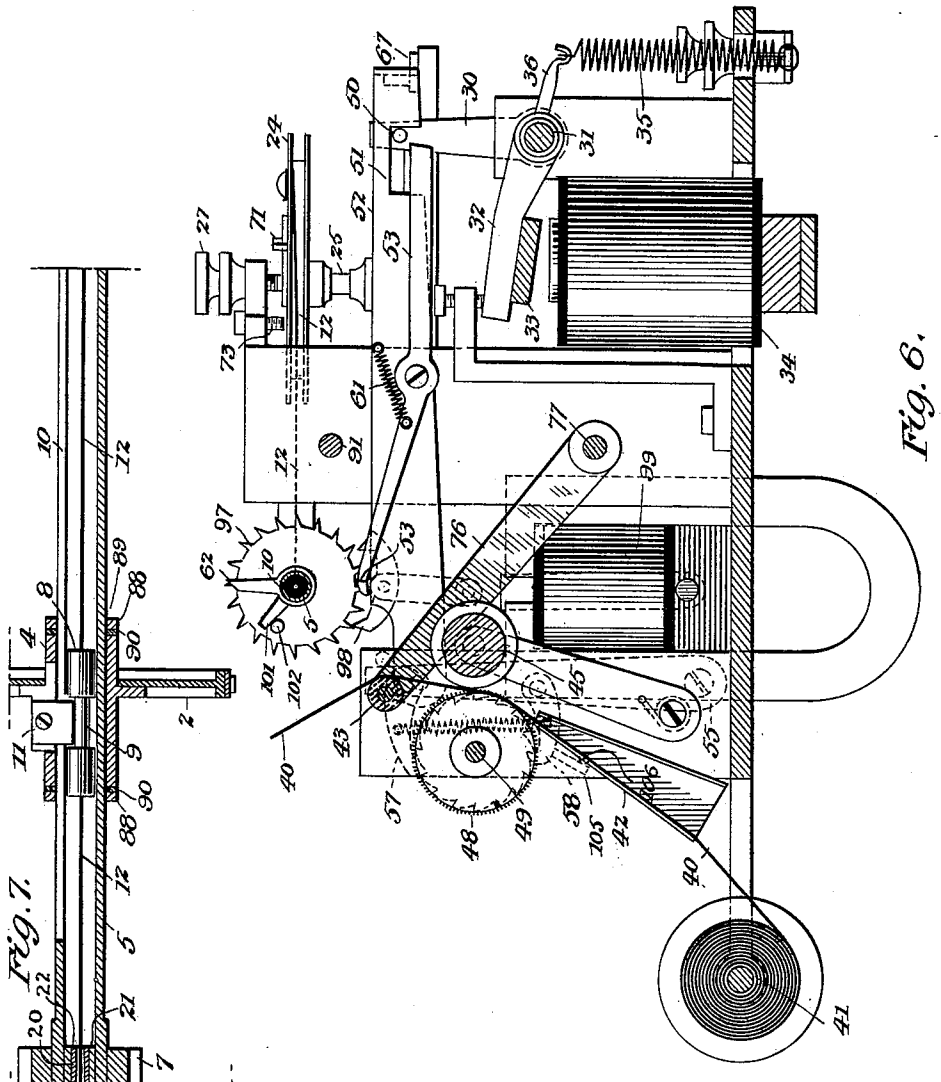

Fig. 6.

Fig. 7.

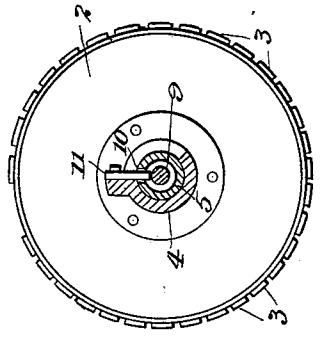

Fig. 8.

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PRINTING TELEGRAPH.

(Application filed May 10, 1897.)

(No Model.)

5 Sheets—Sheet 5.

Fig. 11.

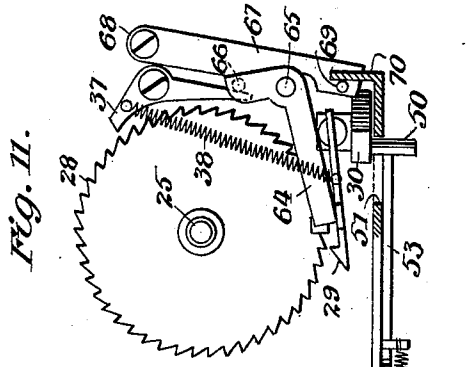


Fig. 9.

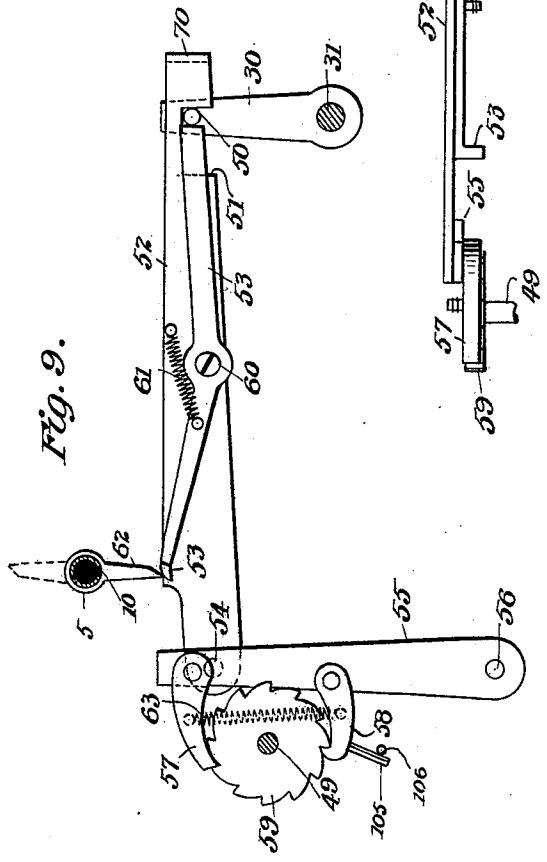
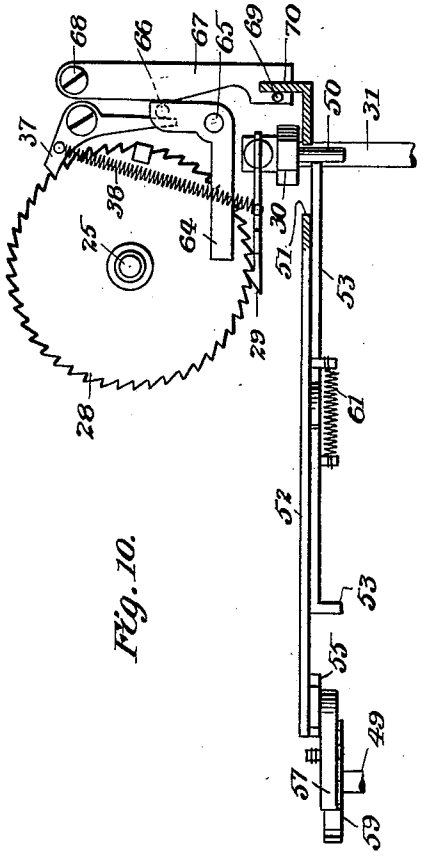


Fig. 10.



WITNESSES:

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UNITED STATES PATENT OFFICE.

ALOYS WIRSCHING, OF NEW YORK, N. Y.

PRINTING-TELEGRAPH.

SPECIFICATION forming part of Letters Patent No. 613,348, dated November 1, 1898.

Application filed May 10, 1897. Serial No. 635,868. (No model.)

To all whom it may concern:

Be it known that I, ALOYS WIRSCHING, a citizen of the United States, residing in the city of New York, (Brooklyn,) county of Kings, and State of New York, have invented certain new and useful Improvements in Printing-Telegraphs, of which the following is such a full, clear, and exact description as will enable any one skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification.

My invention relates to the class of printing-telegraph instruments or receivers in which a rotary type-wheel in addition to its rotary movement about its axis is caused to move across the paper and by means of which what is known as "column" or "page" printing is done.

The principal objects of my invention are to simplify and render more efficient this class of apparatus; and to these ends the invention consists in the various novel and peculiar arrangements and combinations of the several parts of the apparatus, all as hereinafter fully described, and then pointed out in the claims.

I have illustrated a type of my invention in the accompanying drawings, wherein—

Figure 1 is a side elevation of a printing-telegraph instrument embodying my improvements. In this view the instrument is shown as mounted in a casing with a glass top; but in the remaining views the casing is omitted for the sake of clearness. Fig. 2 is a plan view of the instrument with a portion of the sheet of paper on which the printing is done shown as broken away in order to expose the printing-roller and with the inking-wheel omitted. Fig. 3 is a section taken on a vertical transverse plane indicated by line $x\ y$, Fig. 2, and looking in the direction toward the left hand, as indicated by arrow 3 in Fig. 2. Fig. 4 is an enlarged plan view in detail of the feed-pawl and ratchet mechanism of the step-by-step mechanism for moving the type-wheel laterally across the page toward the right as each succeeding character is printed. Fig. 5 is an edge view of a portion of the mechanism shown in Fig. 4, the feed-pawl being in cross-section and a portion of the ratchet-wheel being likewise in section and partly broken away. Fig. 6 is a section of the instrument on a transverse vertical plane indicated by line $x\ y$, Fig. 2, and looking in the direction toward the right hand, as per arrow 6 in said figure. Fig. 7 is an enlarged view of the type-wheel, its hollow shaft, and the carrier traveling therein for moving the type-wheel laterally on the shaft. This view is shown in section taken on a plane longitudinally of the shaft and through the longitudinal slot therein. Fig. 8 is a side view of the type-wheel, together with a transverse section of its hollow shaft and the carrier therein. Fig. 9 is an enlarged side view of the paper-feeding device for moving the sheet of paper to space the lines. Fig. 10 is a plan view of the device shown in Fig. 9, together with the coöperating step-by-step mechanism, which is shown in detail in Figs. 4 and 5. Fig. 11 is a similar view to that shown in Fig. 10 and of the same parts, but in different relative positions, as assumed by the parts when the devices are shifted to feed the sheet of paper in spacing the lines.

Referring to the drawings, in which like numbers of reference indicate like parts throughout, 1 is a case having a glass top for housing the instrument, as shown in Fig. 1.

2 is a type-wheel, which is provided in the usual way upon its periphery with the characters of the alphabet and the numerals, as indicated at 3. The type-wheel is provided with a fixed tubular hub 4, which is mounted to slide upon a hollow cylindrical shaft 5, which is given a rotary motion by means of a fixed cog-wheel 7, located near one end thereof, and which is designed to receive its motion from the motor which is usually employed in telegraphic printing instruments and which may be either actuated by a spring or an electro motor, both types of which motors are well known in the art.

The interior of the shaft 5 is cylindrical in cross-section, and I arrange therein what I term a "carrier" 8, which is designed and adapted to move freely through the shaft in either direction, the movement in one direction, toward the right hand, being by a series of steps to print the successive characters, while the movement in the reverse direction returns the printing-wheel to its left-hand limit of movement, where the printing of the next succeeding line is to begin. (See Fig. 7.)

In the construction shown this carrier consists of a device having a reduced central portion 9 and two enlarged cylindrical ends, which fill the interior of the hollow shaft sufficiently well to steady the carrier in its endwise movements therein. The hollow shaft 5 is formed with a longitudinal slot 10, which extends practically the entire length of the shaft. A fixed piece or arm 11 projects from the hub of the type-wheel inwardly through the slot 10 of the shaft and takes in between the enlarged ends of the carrier 8. This connecting-piece 11, which is shown as consisting in a small plate secured to the hub by a screw, fits loosely in the slot 10, and as the type-wheel is revolved with the shaft the connecting-piece 11 may turn freely around the carrier, so that the type-wheel may turn independently of the carrier, but at the same time is moved laterally by the movement of the carrier along the interior of the shaft.

The carrier 8, controlling the lateral movement of the type-wheel, is suitably connected with a flexible connection or cable 12, which may be made of cord, catgut, fine wire, or other well-known and suitable material. One end of this flexible connection 12 (the left-hand end) winds about a drum 13, turning with a shaft 14, about which is secured a winding-spring 15 and which is mounted within the cylinder 16. The flexible connection 12 passes up from the drum 13 over a guide-pulley 17, thence through a central perforation 18 in the head of a hollow screw 19, which is screwed fast in a perforation in the frame or standard of the machine and is provided with a reduced cylindrical end 20, serving as a bearing for the end of the shaft 5 to turn on, a bushing 21 being placed within the end of the shaft for this purpose, as shown in Fig. 7. The cable 12 passes thence through the screw 19 and the bore or channel of the shaft to the carrier 8, to which it is attached, and from there on through the center of the shaft out at the other end through a hollow screw 22, similar to the screw 19, and upon which the end of the shaft is journaled. After leaving the shaft the connection 12 extends around a guide-pulley 23 to a step-by-step mechanism, which winds it up a little at a time. As the connection is thus taken up and draws the connected carrier to the right through the shaft the spring 15 of the winding mechanism at the other end is gradually wound up and serves to quickly return the carrier to the starting-point whenever the step-by-step mechanism is released and is free to pay out the connection 12. The flexible connection 12 is connected with the carrier in the line of its axis, and a balanced action is thereby obtained and the cable is less liable to whip about. The bearing-screws 19 and 22 being stationary, there is little liability of the connection 12 being cut or worn.

The step-by-step mechanism for taking up the flexible connection 12 comprises a winding-on drum 24, which turns with a vertically-arranged arbor 25, mounted in a suitable part of the machine-framing 26, the upper end of which is provided with a screw 27, in the lower end of which the arbor is journaled to permit of the same being readily removed. (See Figs. 1 and 2.) The arbor 25 is rotated by a ratchet-wheel 28, which is actuated by a feed-pawl 29, carried upon an upright arm 30, which is made fast to a rock-shaft 31, upon which is mounted a fixed member 32, carrying the armature 33 of the printing-magnet 34. A retractile spring 35 is attached to a hooked piece 36, projecting from the rock-shaft 31, and normally holds the armature off of the magnet 34. When the magnet acts to draw down its armature, the rock-shaft 31 is given a partial turn, thereby throwing the upright arm 30 a sufficient distance inwardly to cause the feed-pawl 29 to move into engagement with another tooth, and then upon its return stroke to turn the ratchet-wheel a distance of the length of the tooth. In this way each movement of the armature of the printing-magnet 34 serves to wind up enough of the flexible connection 12 upon the drum 24 to move the type-wheel laterally the distance of the required space between the printed characters. The ratchet-wheel 28 of the step-by-step mechanism is such that about one revolution of the ratchet serves to carry the type-wheel to the right hand over its entire range of lateral movement on the shaft 5. When this limit of movement is reached, the feed-pawl 29 is automatically disengaged from the ratchet by means of a trip 39, which consists in a small plate secured upon the upper face of the ratchet-wheel 28 and covering the space between the points of two adjacent teeth, as shown more particularly in Figs. 4 and 5. The pawl 29 is adjusted so that its hooked end will then be struck by the trip 39 and held out of engagement with the adjacent tooth, as shown in full lines in Fig. 4. By this means if the armature of the printing-magnet should be actuated after the type-wheel has reached its right-hand limit of movement the feed-pawl 29 would be prevented from moving the ratchet, and thereby unnecessarily pulling upon the flexible connection 12. It will be noted that the trip-piece 39 is arranged so as not to come in contact with the dog 37, which locks the ratchet 28 against back rotation, the dog 37 being situated a slight distance below the upper face of the ratchet in order to escape the trip 39, as will be readily understood from Fig. 5.

When another line is to be printed, the sheet of paper 40, which is wound upon a roller 41 and passes thence up through the guides 42, through the paper-feeding device, and over the printing-roller 43, between the same and the type-wheel, must be fed upwardly a suitable distance to space the line. This paper-feeding mechanism for spacing the lines comprises a series of rollers 44, preferably made of a soft yielding material—such, for example, as rubber—and which are mounted upon

a horizontal shaft 45, turning loosely in bearings in the upright arms 46, which are provided with springs 47, acting in such way as to hold the rollers with slight pressure against a corresponding set of toothed feed-wheels 48, which are secured upon a shaft 49, which is caused to be rotated at will by the movement of the printing-magnet armature 33 in the following manner: Upon the upright arm 30 of the rock-shaft 31, which carries the armature of the printing-magnet, is a laterally-projecting pin 50, which at each vibration of said arm moves idly through a slot or notch 51, formed in the bar or link 52, unless said pin be not engaged by the end of locking-lever 53. This bar or link 52 is pivoted at 54 to the upper end of a pawl-carrier 55, which is pivoted to its lower end at 56 and carries an upper pawl 57 and a lower pawl 58, the former of which acts upon a ratchet 59 on the shaft 49 when the pawl-carrier is moved in toward the shaft, while the lower pawl 58 acts upon the ratchet in the reverse movement of the pawl-carrier as it moves outwardly. During the printing operation the pin 50 of the upright arm 30 is ineffective upon the bar 52. When it is desired to feed the sheet of paper in order to space the line, said pin is caused to thrust the bar 52 inwardly toward the shaft 49 and immediately to draw it back again by means of the locking-lever 53, which is pivoted at its center at 60 and is provided with a spring 61 for normally holding the end thereof adjacent the pin 50 down below the same to permit the pin to clear it, as shown in Figs. 6 and 10. The end of the locking-lever 53 remote from the end coöperating with the pin 50 is engaged when desired by a finger 62 projecting from the type-wheel shaft 5 and is thus depressed in order to raise the other end of the lever in the position to be met by the pin 50 of the upright arm, as shown in Figs. 9 and 11. This trip-finger 62 is controlled by a special key of the transmitter, with which the printing instrument here shown may be connected, and the depression of such key serves to bring the finger in place and hold down the end of the locking-lever 53, whereupon the next movement of the armature of the printing-magnet throws the arm 30 inwardly, so that the pin 50, pushing upon the end of the lever 53 thus held in its path, will cause the bar 52 to be thrown forward on its length. This endwise movement of the bar 52 moves the pawl-carrier and causes the upper pawl 57 to advance the ratchet 59 almost the length of a tooth. (See Fig. 11.) When the pin 50 is moved back by the outward movement of the arm 30, it is brought in engagement with the outer end of the notch 51, and thereby carries back the bar 52, and in this backward movement the lower pawl 58 is caused to give the ratchet 59 another partial rotation about the length of a tooth, the pawl 58, as well as the upper one 57, being held in engagement with the ratchet 59 by means of spring 63, which is connected between the two. The action of the two pawls 57 and 58 upon the ratchet 59 serves to turn the shaft 49, and likewise the toothed wheels 48 carried thereby, so that the sheet of paper 40, which is interposed between the soft rollers 44 and the toothed wheels 48, is drawn upwardly between the same a sufficient distance to space the line. The parts are so adjusted that each stroke of the bar or link 52 will feed the paper the required distance, and in this connection it will be noted that the action of the two pawls 57 and 58, one feeding the ratchet about the distance of a length of a tooth as the bar moves inwardly and the other feeding the ratchet a corresponding distance as the bar moves outwardly, affords a long feeding movement compared with the distance through which the printing-magnet armature vibrates the upright arm 30, as will be understood from Fig. 9.

In order to give a positive feeding action to the paper and to cause it to move the same distance at each feeding operation, so that the lines may be equally spaced from each other in printing a column or page, I fix a pin 105 upon the lower feed-pawl 58 and cause it to strike against a pin 106, fixed upon the machine-frame. The pin and stop are so adjusted that after the return movement of the feed-pawl carrier 55 has caused the pawl 58 to turn the ratchet the two come together and further movement of the pawl is prevented, thereby locking the pawl with the tooth then engaged by it and in this way preventing the momentum of the ratchet and its shaft and connected parts from turning the ratchet any farther. By thus preventing the overrotation of the parts beyond that caused by the actual movement of the feed-pawl the spacing of the lines is kept uniform.

It will be noted that the loose fit of the carrier traveling within the guide or type wheel shaft prevents it from being positively rotated thereby, and in case it should be rotated any consequent twisting of the flexible connection 12 would in no wise affect the operation of the apparatus.

An important feature of the invention resides in the fact that the traveling device or carrier which controls the lateral movements of the type-wheel is drawn upon by the flexible connection along the line of the axis of said carrier. This results in the smoother operation of the type-wheel, as it is in fact acted upon centrally and not eccentrically, as is the case in some of the prior devices.

Simultaneously with the feeding of the paper to space the line the feed-pawl 29 and the locking-dog 37 are each disengaged from the ratchet-wheel 28 of the step-by-step mechanism, whereupon the spring-actuated winding-drum 13 automatically winds up the flexible connection 12 and draws back the carrier 8, together with the type-wheel, to the left-hand limit of movement and brings the type-wheel in position for starting a new line. I effect the release of the feed-pawl 29 and the dog

37 simultaneously by means of an L-shaped trip-piece 64, which is pivoted at its angle at 65 and is provided at one end with a pin 66 for pressing against one end of the dog 37. When the L-shaped piece 64 is moved on its pivot, the pin 66 bears upon the free end of the dog 37 and raises it out of engagement with the ratchet. At the same time the other end of the piece 64 pushes the feed-pawl 29 out of engagement with the teeth. The L-shaped piece 64 is thrown into operation by an arm 67, which is pivoted at 68 and is provided at the opposite end with a pin 69, adapted to be engaged by a projection 70 upon the bar or link 52. When the upright arm 30 is thrown inwardly and its pin 50 brought into engagement with the end of the locking-bar 53, so as to move inwardly the bar 52, the extension 70 of the latter, striking the pin 69, will swing the arm 67 inwardly, and, forcing the L-shaped piece 64 into the position shown in Fig. 11, will thereby effect the simultaneous disengagement of the feed-pawl and dog from the ratchet.

The different positions assumed by the several parts just described in reference to the paper-feeding device and the devices for releasing the step-by-step mechanism to permit the return of the type-wheel to the starting-point will be readily understood from Figs. 6 and 10, wherein such parts are shown in the positions assumed by them when the printing is being done, at which time the vibration of the upright arm 30 does not actuate the bar 52, and Figs. 9 and 11, wherein the locking-lever 53 is shifted into locking position by the trip 62 and the step-by-step mechanism has been released by the inward movement of bar 52 and the paper-feeding pawl 57 has moved the ratchet 59 one tooth.

In order to prevent the type-wheel 7 at the end of its range of movement in either direction from being forcibly brought against a fixed part of the apparatus, I provide the following means for checking the lateral movement of the type-wheel before it can be so brought in contact with any part of the apparatus: Upon the arbor 25, carrying the drum 24, I mount an arm 72, which projects radially therefrom over the drum. This arm 72 carries near its end a projection 71, which engages a stop 73, consisting of a screw mounted through a horizontal portion of the machine-frame 26. (See Figs. 1, 2, and 6.) The projection on the arm 72 engages one side or the other of the stop 73, according as to whether the drum has been given a complete forward revolution or a backward one. As the step-by-step mechanism gradually turns the drum 24 in the direction of the arrow shown thereon in Fig. 2 the flexible connection is wound upon the drum and the stop-piece 71 is gradually moved around in the direction of the arrow until the drum has made a complete revolution and thereby drawn the type-wheel to its right-hand limit of movement. Upon the reverse movement of the drum 24 to unwind the connection 12 for returning the type-wheel the stop-piece 71 is carried back until it collides with the fixed pin 73, whereupon the drum and its connected ratchet 28 are brought sharply to rest.

An impression is made on the sheet of paper by the type presented thereto by the type-wheel by forcing the paper against the type by means of a horizontal printing-roller or platen 43, over which the sheet of paper 40 passes. The printing-roller 43 has its surface covered with soft material, such as rubber, and its ends are loosely journaled in the inclined arms 75 76, which at their lower ends are made fast to a rock-shaft 77, which is given a rocking motion at each vibration of the armature 33 of the printing-magnet 34 through means of the following mechanism: Upon one end of the rock-shaft 31, which carries the armature of the printing-magnet, is fixed a pawl-carrier 78, carrying at its upper end a spring-actuated pawl 79, which acts upon a small ratchet-wheel 80, loosely journaled on the arbor 81, mounted upon a fixed part of the frame. (See Figs. 2 and 3.) A toothed trip-wheel 82 is also mounted upon the arbor 81 and moves in fixed relation with the ratchet 80. The teeth of the wheel 82 act upon an arm 83 projecting from and made fast to the rock-shaft 77. At the point where the teeth of the trip-wheel engage the arm 83 there is arranged an antifriction-roller 84 to cause the parts to work smoother. An adjustable stop 85 is placed beneath the trip-arm 83 in order to regulate the throw of the arm when tripped by the wheel 82, and thereby regulate the pressure of the printing-roller 43 against the type-wheel. When the armature of the printing-magnet is drawn down, the pawl-carrier 78 moves inwardly and causes its pawl 79 to turn the ratchet 80 the distance of one tooth, and this in turn moves the trip-wheel 82 the distance of one tooth in the direction of the arrow placed thereon in Fig. 3. The movement of the wheel 82 depresses the arm 83, and this elevates the upper ends of the arms 75 76, carrying the printing-roller, so that the same is thrown against the type-wheel with a sharp blow, after which it immediately gravitates back as the tripping end of the arm 83 drops into the space between the teeth of the wheel 82.

In order to prevent the sheet of paper from receiving accidentally an impression from the type adjacent to the one from which an impression is to be taken, I provide the type-wheel with a guard-plate 86, formed with an opening the width of which is approximately the height of the type or characters on the type-wheel. This guard-plate is carried upon an arm 87, fixed to a forked frame 88, the arms of the fork of which are formed with circular openings 89 (see Figs. 2, 3, and 7) for receiving the type-wheel shaft 5, on which they are adapted to slide. The arms of the

forked frame 88 are arranged one at each end of the hub 4 of the type-wheel, and washers 90 are interposed between the arms and the ends of the hub, respectively. By virtue of this construction the frame 88 is carried along with the type-wheel in its lateral movements. The outer end of the frame 88, which travels with the type-wheel, is supported upon a rod or track 91, the frame being provided with a roller 92, which runs upon the rod and has its periphery made concave in order to fit the cylindrical surface of the rod. (See Figs. 2 and 3.)

The type-wheel is inked by an ink-roller 93, which is journaled in a swinging forked piece 94, pivoted at its lower end at 95 to a forked extension 96 of the frame 88. The swinging arm 94, standing in inclined position, causes the ink-wheel 93 to rest with sufficient weight upon the periphery of the type-wheel to be revolved thereby and in this way ink the type.

As already stated, the driving of the pinion 7 (see Figs. 2 and 7) by the motor used for actuating the printer causes the revolution of the type-wheel shaft and the type-wheel. The rotation of the type-wheel, however, is governed by a well-known form of escapement, comprising a toothed wheel 97, to which is secured one end of a spiral spring 111, which encircles the shaft and has its other end made fast to a point thereon. An arm 101, fixed upon the shaft 5, bears upon a pin 102, projecting from the face of the escapement-wheel 97, and serves to push the wheel around at each vibration of the pallet or escapement-anchor 98, which is vibrated in a well-known manner by the escapement-magnet 99. (See Figs. 2 and 7.) For a fuller description of this particular form of escapement reference may be had to my United States Patent No. 166,911, granted August 17, 1875, for printing-telegraphs.

I have not deemed it necessary to show a complete form of unison device, as such illustration is unnecessary to the understanding of my invention. I have, however, shown a portion of a common form of unison device, such portion comprising a worm 100 on the type-wheel shaft 5, which worm is designed to feed laterally a unison lever, which by being carried to the right of the worm a certain distance acts upon the escapement-wheel in a manner well known. The printing-magnet 34 and escapement-magnet 99 are included in the same circuit and are each controlled in the usual way by the transmitter.

From the foregoing description of the apparatus shown in the drawings the operation of the same will be readily understood. The revolution of the type-wheel shaft 5 and its type-wheel by an ordinary driving mechanism, through means of the pinion 7, is controlled by a transmitter, through means of the magnet 99, which governs the action of the escapement 97 98 in a manner well known, and the printing-magnet 34 is likewise controlled and actuated through means of the transmitter in the usual way. The type-wheel being brought to its starting-point at the left hand to begin a line or near to such point to begin a paragraph and the escapement-magnet 99 having, through the intermediary of the escapement, caused the type-wheel to be brought to rest at a certain point in its revolution to present the desired character at the printing-point, the closing of the armature on the printing-magnet 34 serves to rock the shaft 31 and ultimately (through means of the connections described) throw the printing-roller 43 in toward the type-wheel, and thereby carry the interposed sheet of paper 40 against the same and take an impression on the paper of the character then presented by the type-wheel at the printing-point. As the armature moves away from the printing-magnet it rocks the shaft 31 in the reverse direction and, through means of the connections described, causes the flexible connection 12 to be taken up and wound upon the drum 24 a sufficient distance to move the type-wheel to the right far enough to print the next character on the line. When a word has been printed on the line in this way, the spacing-key of the connected transmitter is operated to shift the type-wheel laterally a sufficient distance to space the next word, and so on until the line is printed. At the completion of a line the transmitter causes the finger 62 to be presented to the adjacent end of the locking-lever 53, as shown in Fig. 9, and thereby lock the pin 50 of the upright arm 30 to the bar or link 52, so that when the armature of the printing-magnet is next drawn down the bar 52 is thrust inwardly and, through the connections described, serves to feed the paper upwardly for another line to be printed and at the same time releases the ratchet 28 of the step-by-step mechanism and permits the type-wheel to be returned to its position at the left to begin a new line.

I do not wish to be understood as limiting my invention to the construction herein shown, as it is evident that various modifications may be made in the same without departing from the spirit of the invention. For example, instead of employing a tubular form of shaft for the type-wheel any character of guide or support may be employed whereby the type-wheel may be supported and permitted to rotate and at the same time be drawn laterally along the same by the flexible connection. The particular form of the carrier 8 for the type-wheel may likewise be varied so long as it serves to carry the wheel laterally along the shaft by acting centrally upon it and at the same time permitting independent rotation of the wheel.

My improved form of carrier, which is drawn to and fro along the shaft by mechanism in which the line of draft is coincident with the axial line or center of said carrier, may obviously be used with type-wheels which are not concentric with the shaft, but which

travel parallel therewith, either with the axis of the type-wheel normal to that of the shaft or parallel with it.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a printing-telegraph instrument, the combination of a guide or shaft held against endwise movement, a carrier adapted to travel to and fro lengthwise of said guide or shaft, a type-wheel and connections between the same and said carrier, whereby the type-wheel moves in response thereto, and means for moving the carrier along the guide or support, said means having its line of draft coincident with the axial line or center of said carrier.

2. In a printing-telegraph instrument, the combination of a rotary and laterally-movable type-wheel, a guide or support for said type-wheel and upon which it is adapted to travel laterally, an endwise-traveling flexible connection for drawing the type-wheel laterally, the line of draft of said flexible connection being along the center line or axis of said type-wheel, and mechanism for periodically moving said flexible connection to shift the type-wheel laterally.

3. In a printing-telegraph instrument, the combination of a hollow shaft, a type-wheel, a carrier adapted to travel through the interior of said shaft and connected with and controlling the movement of said type-wheel lengthwise the shaft, means for moving the carrier through the shaft step by step.

4. In a printing-telegraph instrument, the combination of a hollow shaft provided with a longitudinal slot, a type-wheel, a carrier located within said shaft and adapted to travel through the same, a device connecting said carrier and type-wheel and extending through said slot and adapted to travel along the same, and means for moving the carrier step by step to translate the type-wheel relative to the length of the shaft.

5. In a printing-telegraph instrument, the combination of a hollow shaft, a type-wheel, a carrier located within said shaft and adapted to travel through the same, connections between said type-wheel and carrier, a flexible connection attached to each end of said carrier, and means for drawing the flexible connection in one direction with a step-by-step movement.

6. In a printing-telegraph instrument, the combination of a hollow shaft provided with a longitudinal slot, a type-wheel, a carrier located within said shaft and traveling through the same, said carrier being provided with enlarged ends, an arm mounted upon said type-wheel and projecting through the slot in said shaft and lying between the enlarged ends of said carrier, whereby said type-wheel and carrier are adapted to move together relatively to the length of the shaft but may rotate independently of each other, and means for moving the carrier step by step through the shaft.

7. In a printing-telegraph instrument, the combination of a hollow shaft, a type-wheel, a carrier adapted to travel through the interior of said shaft and provided with means for moving it step by step in one direction, and means for connecting said type-wheel and carrier to cause them to move together relatively to the length of the shaft but to permit independent relative rotation.

8. In a printing-telegraph instrument, the combination of a hollow shaft, a type-wheel, a carrier traveling through said shaft and connections between said carrier and type-wheel whereby they are caused to move together relatively to the length of the shaft but may have independent relative rotation, a flexible connection connected to said carrier, and means for drawing said connection step by step, in one direction and a device for drawing the said connection in the other direction to return the type-wheel to the starting-point.

9. In a printing-telegraph instrument, the combination of a hollow shaft, a type-wheel, a carrier traveling through said shaft and connections between said carrier and type-wheel whereby they are caused to move together relatively to the length of the shaft but may have independent relative rotation, a flexible connection connected to said carrier, and means for drawing said connection step by step, in one direction and a spring-actuated winding device for drawing said flexible connection in the other direction to return the type-wheel to the starting-point.

10. In a printing-telegraph instrument, the combination of a guide or shaft and a type-wheel, a flexible connection for drawing the type-wheel in either direction relatively to the length of the shaft, a step-by-step mechanism for drawing said flexible connection step by step in one direction, said step-by-step mechanism comprising a drum for winding on said flexible connection, and a ratchet-wheel moving in fixed relation therewith, a device for holding said ratchet against backward rotation, a feed-pawl for turning said ratchet, a printing-magnet and connections between the armature of the same and said feed-pawl for actuating the latter, means for simultaneously releasing said feed-pawl and the device for preventing backward rotation of the ratchet, said releasing means being at will controlled by the armature of said printing-magnet, and a finger fixed upon said type-wheel shaft and adapted at will to be brought into position to render operative said releasing means of the step-by-step mechanism.

11. In a printing-telegraph instrument, the combination of a type-wheel and a shaft for actuating the same, a paper-feeding mechanism, a pawl and ratchet for actuating said paper-feeding mechanism, a printing-magnet and connections between the armature there-

of and said paper-feed pawl, said connections being normally disengaged and not acted upon by the movement of the printing-magnet armature in printing, a locking device for effecting the engagement of said connections and a finger or trip device mounted upon said type-wheel shaft and adapted to be brought into position by the rotation of the type-wheel shaft to actuate said locking device thereby causing said connections to be operated by the next movement of the printing-magnet armature to effect the feeding of the paper.

12. In a printing-telegraph instrument, the combination of a type-wheel and a shaft for actuating the same, a paper-feeding mechanism comprising a shaft having a pawl and ratchet for actuating it, a pawl-carrier for said pawl, a printing-magnet and a rock-shaft actuated by the armature thereof, a fixed arm mounted on said rock-shaft, a bar or link connected with said pawl-carrier and loosely engaging said fixed arm, a locking device for locking said fixed arm to the bar or link, and a finger or trip device mounted upon said type-wheel shaft and adapted when brought to rest at a certain point of rotation of the shaft to actuate the said locking device and thereby lock together the fixed arm and the bar or link to actuate the feed-pawl.

13. In a printing-telegraph instrument, the combination of a shaft and a type-wheel, a magnet, a step-by-step mechanism actuated by said magnet and connected with and moving said type-wheel relatively to the length of the shaft, means for returning said type-wheel to the starting-point when said step-by-step mechanism is released and devices for releasing said mechanism, a printing roller or platen having a swinging frame connected with and actuated by the armature of said magnet, a paper-feeding device also connected with and actuated by the armature of said magnet but normally disengaged therefrom, a locking device for effecting the engagement of the connections between said paper-feeding mechanism and the magnet, said connections also controlling said releasing devices of said step-by-step mechanism, a finger or trip device mounted upon said type-wheel shaft and adapted when brought to rest at a certain point of rotation of said shaft to actuate said locking device and thereby effect the feeding of the paper and simultaneously the release of said step-by-step mechanism to permit the type-wheel to be returned to the starting-point.

14. In a printing-telegraph instrument, the combination of a shaft and a type-wheel, a step-by-step mechanism connected with and moving said type-wheel relatively to the length of the shaft, said mechanism comprising a ratchet-wheel, a feed-pawl for turning the same and a dog for locking the ratchet against backward rotation, one tooth of said ratchet being provided with means for preventing the engagement of the feed-pawl therewith but permitting the engagement of the locking-dog therewith, substantially as and for the purpose set forth.

15. In a printing-telegraph instrument, the combination of a guide or shaft and a type-wheel adapted to travel to and fro relatively to the length of said guide or shaft, tubular screws provided with bearings at their ends for receiving the respective ends of said shaft to journal the same, a connection for drawing said type-wheel along the shaft and extending through the bores of said tubular screws, substantially as and for the purpose set forth.

16. In a printing-telegraph instrument, the combination of a shaft and a rotary type-wheel, a flexible connection 12, controlling the movements of said type-wheel relatively to the length of the shaft, and acting along the axial line thereof, a step-by-step mechanism for drawing said flexible connection in one direction and means also connected therewith for drawing it in the reverse direction when released by said step-by-step mechanism, substantially as and for the purpose set forth.

17. In a printing-telegraph instrument, the combination of a shaft 5, a type-wheel 2 mounted thereon and turning therewith, a carrier 8 traveling in said shaft and connected with and controlling the lateral movements of said type-wheel, a flexible connection 12 connected with said carrier in the line of its axis and a step-by-step mechanism for drawing the carrier through the shaft, and means for drawing the flexible connection in the reverse direction to return the type-wheel, substantially as and for the purpose set forth.

18. In a printing-telegraph instrument, the combination of a hollow shaft 5 provided with a longitudinal slot 10, a carrier 8 traveling through said shaft, a type-wheel 2 mounted on said shaft and sliding laterally thereon, a member 11 fixed to said type-wheel and extending through said slot and loosely engaging said carrier, a step-by-step mechanism for drawing said flexible connection in one direction and means for drawing it in the reverse direction to return the type-wheel, substantially as and for the purpose set forth.

19. In a printing-telegraph instrument, the combination of a paper-feeding device, a reciprocating bar or link 52 for periodically actuating the same and provided with a notch 51, a vibrating arm 30 provided with a pin 50 taking in said notch 51 of the bar, a magnet controlling the movement of said arm 30, a locking-lever 53 mounted upon said bar 52 and adapted to engage with one end said pin 50 when said lever is moved into locking position, a rotary-type-wheel shaft provided with a trip-finger 62 for engaging and depressing said lever 53 into locking position, substantially as and for the purpose set forth.

20. In a printing-telegraph instrument, the combination of a rotary type-wheel mounted so as to move laterally and mechanism for moving it laterally step by step, said step-by-

step mechanism comprising a ratchet-wheel 28 provided with a locking-dog 37 and a reciprocating feed-pawl 29, a magnet and connections between the same and said feed-pawl for actuating the latter, a paper-feeding device and connections between the same and said magnet for operating said device, a pivoted lever 64 adapted to be moved into position to simultaneously engage said dog 37 and the feed-pawl 29 and thereby disengage said ratchet-wheel, a swinging arm 67 for throwing said lever into engagement with said dog and pawl, said swinging arm being actuated by said connections between the magnet and the paper-feeding device, substantially as and for the purpose set forth.

21. In a printing-telegraph instrument, the combination of a guide or shaft held against endwise movement, a carrier adapted to travel to and fro lengthwise of said guide or shaft, a type-wheel and connections between the same and said carrier whereby the type-wheel moves in response thereto, and flexible means connected with said carrier for moving it relatively to the length of the guide or shaft and having its line of draft coincident with the axial line or center of said carrier.

22. In a printing-telegraph instrument, the combination of a rotary and laterally-movable type-wheel, a guide or shaft upon which said type-wheel is mounted and adapted to move laterally and means for rotating said type-wheel, said guide or shaft having a longitudinal opening extending along its axial line, a carrier adapted to travel through said axial opening of said guide or shaft, connections between the said carrier and type-wheel, and means for moving said carrier to shift the type-wheel laterally.

In testimony whereof I have hereunto set my hand, this 8th day of May, 1897, in the presence of the two subscribing witnesses.

ALOYS WIRSCHING.

Witnesses:
JAS. E. WIRSCHING,
JOS. BARR.