J. C. BARCLAY.

PRINTING TELEGRAPH.

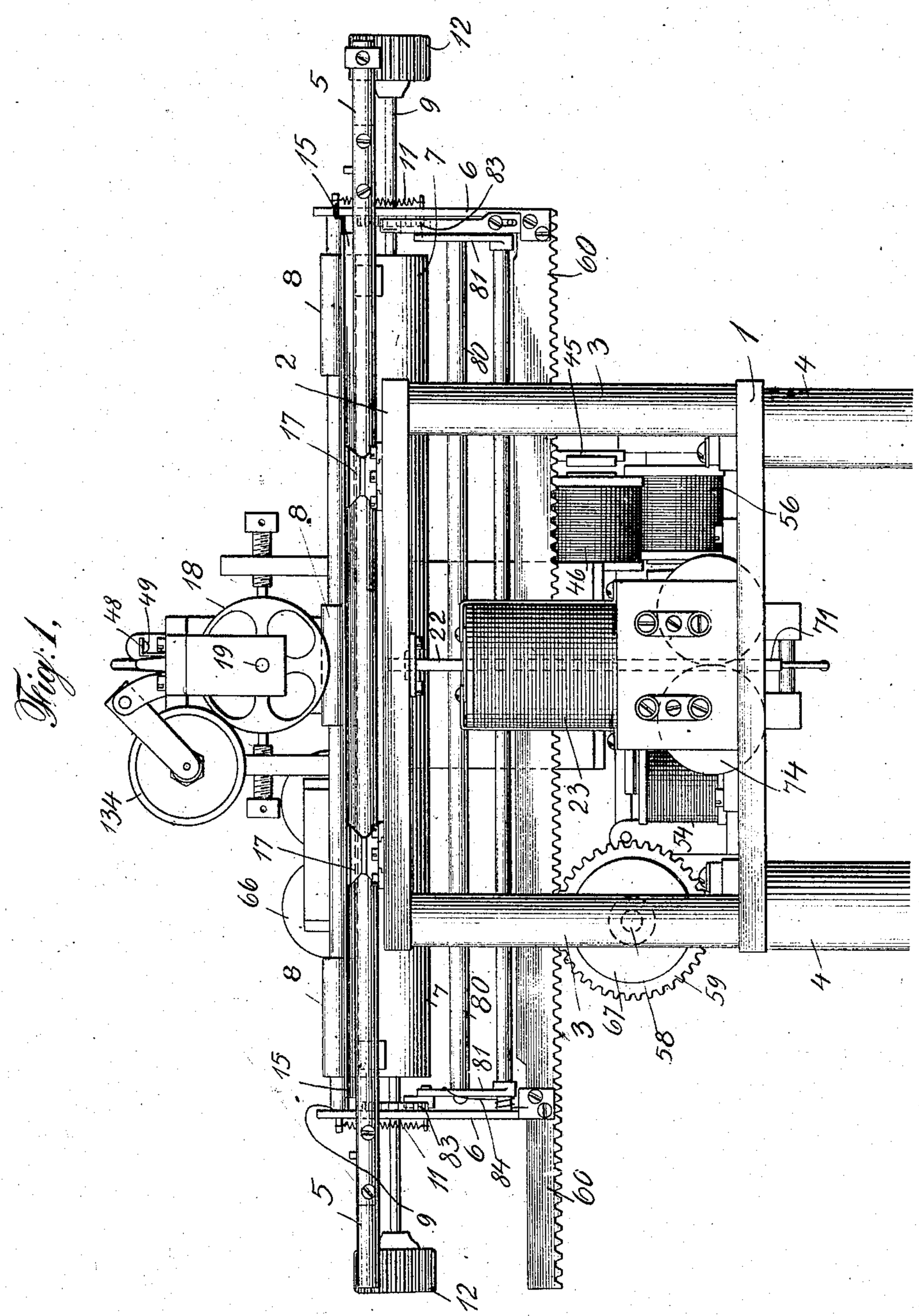
APPLICATION FILED SEPT. 21, 1908.

937,032.

Patented Oct. 12, 1909.

10 SHEETS--SHEET 1.

Fig. 1.



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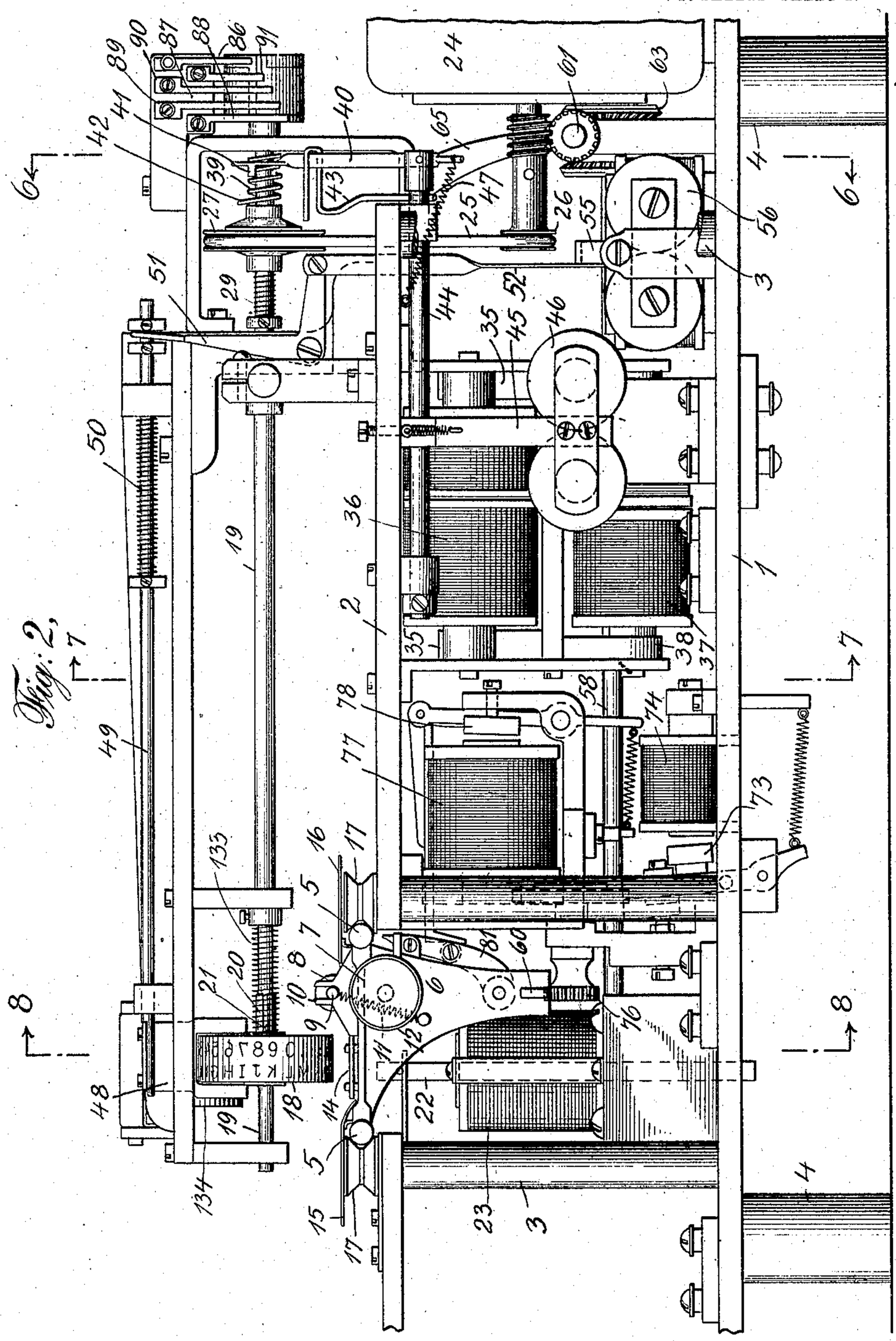
10 SHEETS—SHEET 2.



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10 SHEETS—SHEET 3.

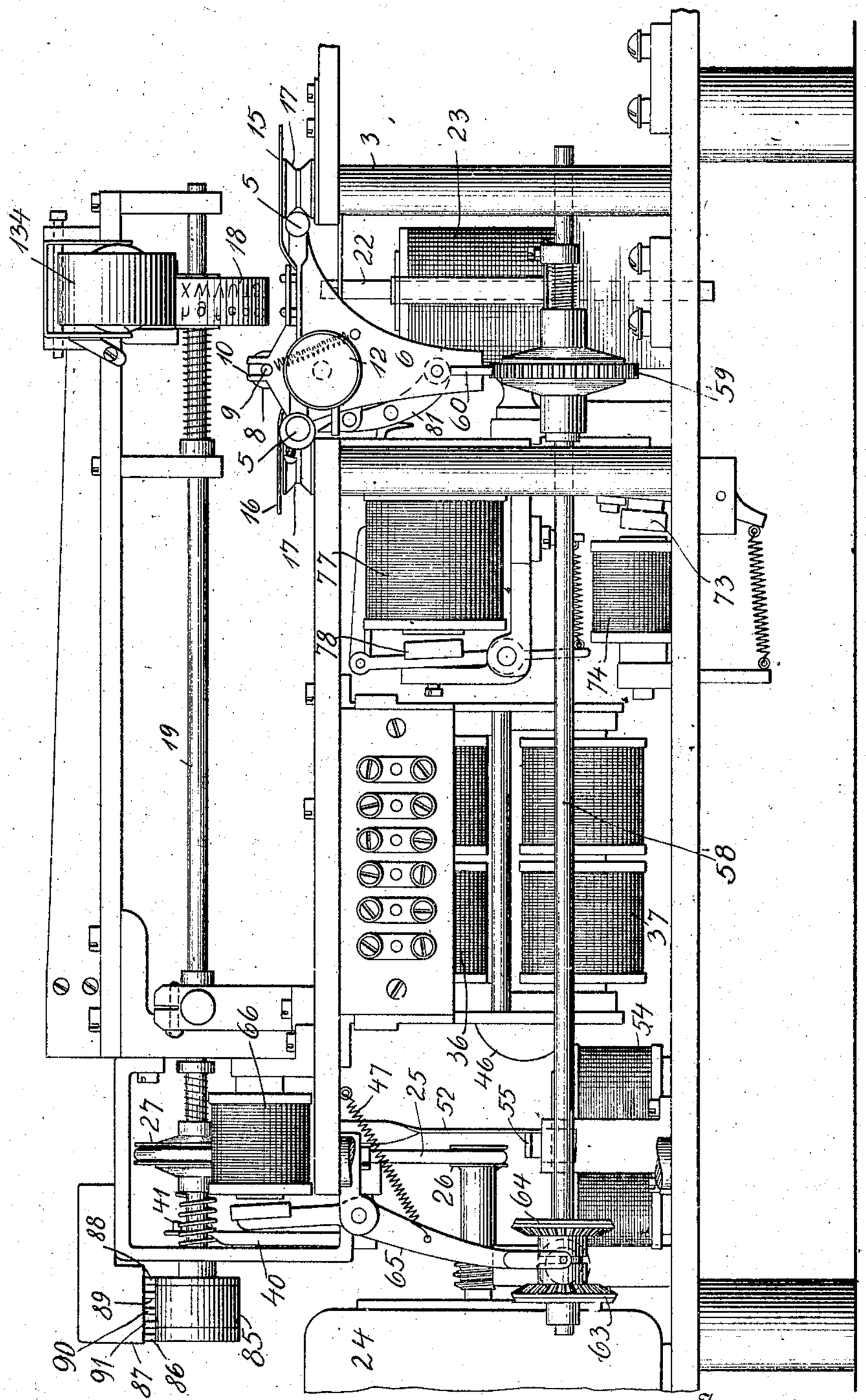

Fig. 3.

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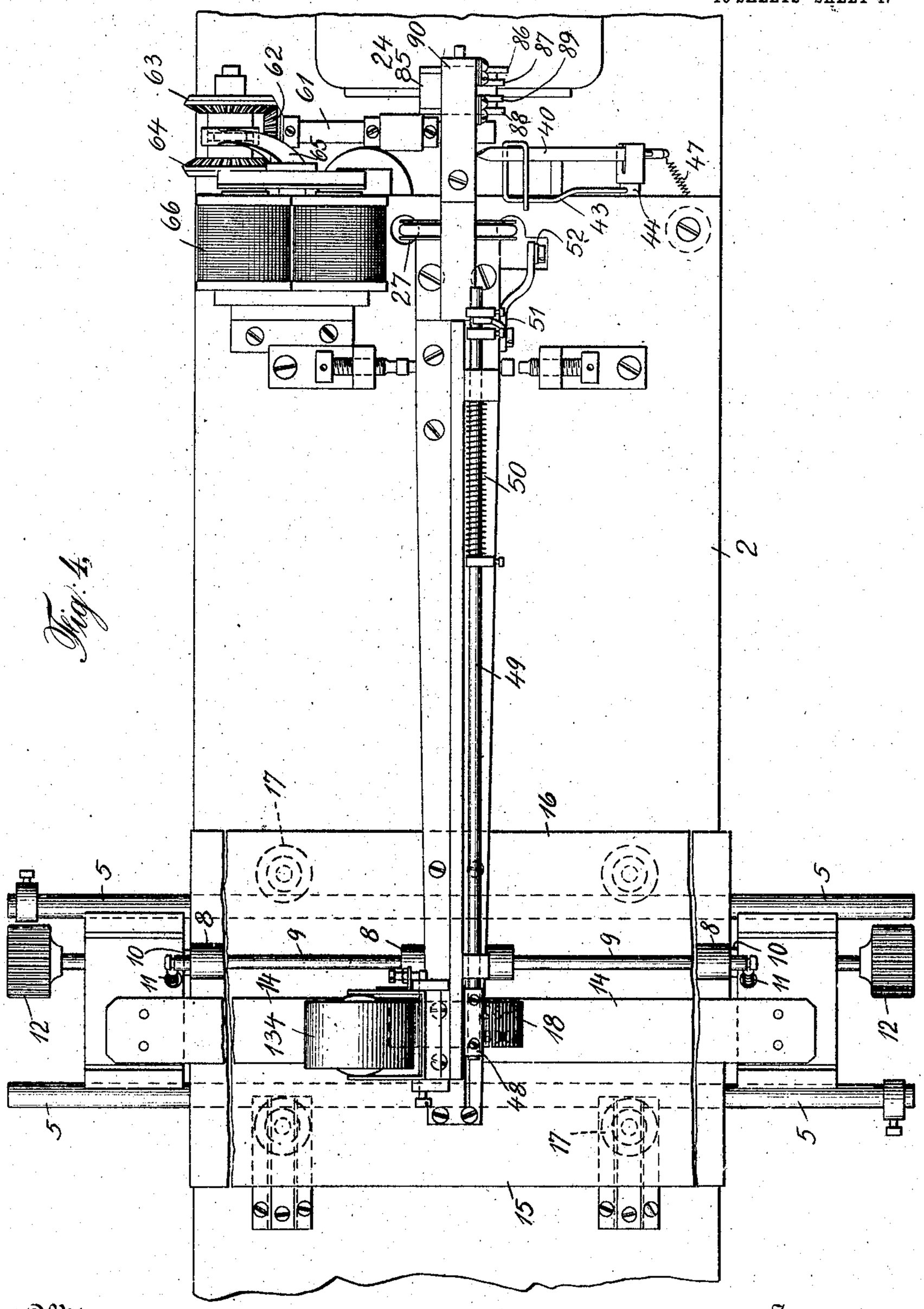
10 SHEETS—SHEET 4.

Fig. 4.



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10 SHEETS—SHEET 5.

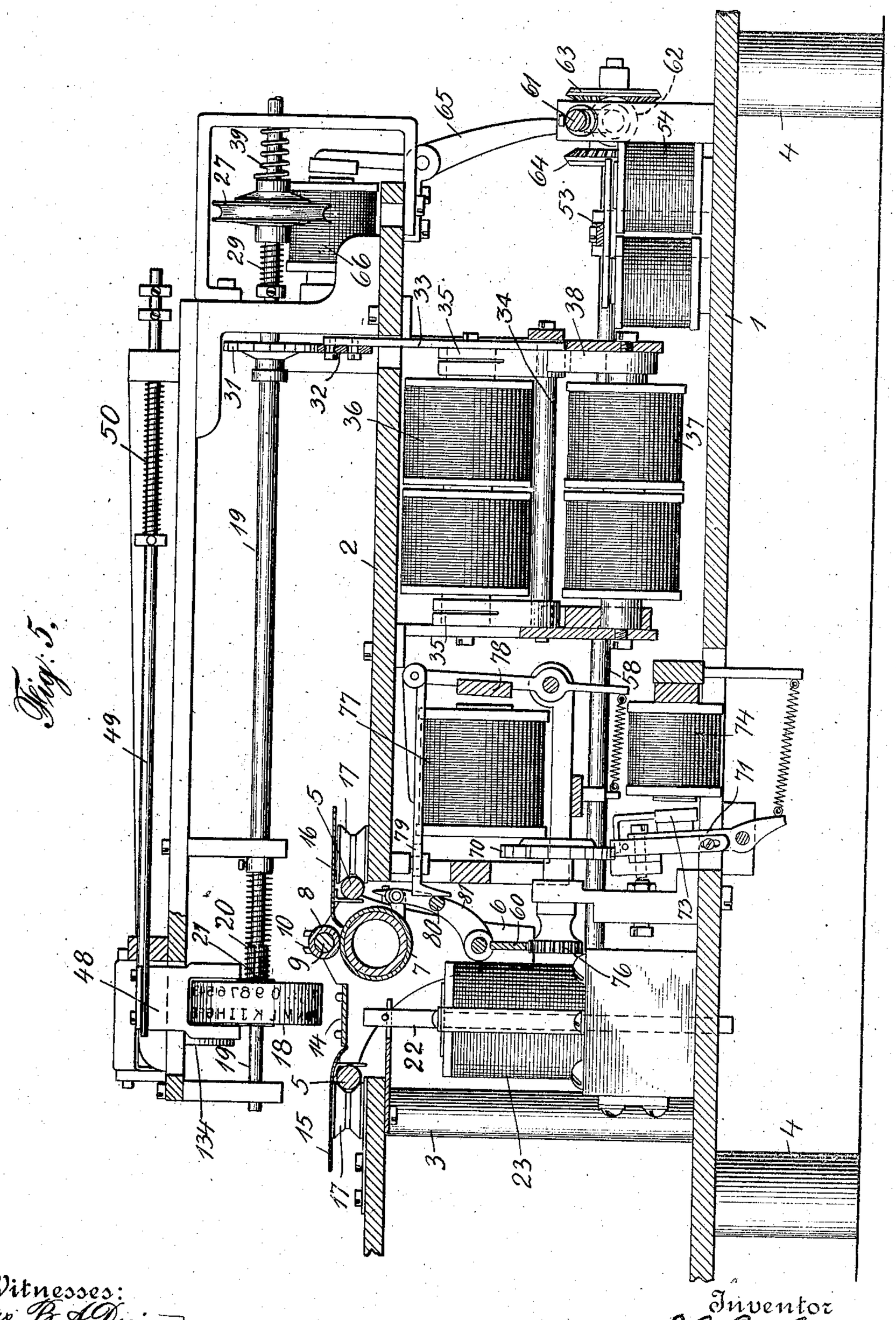

Fig. 5.

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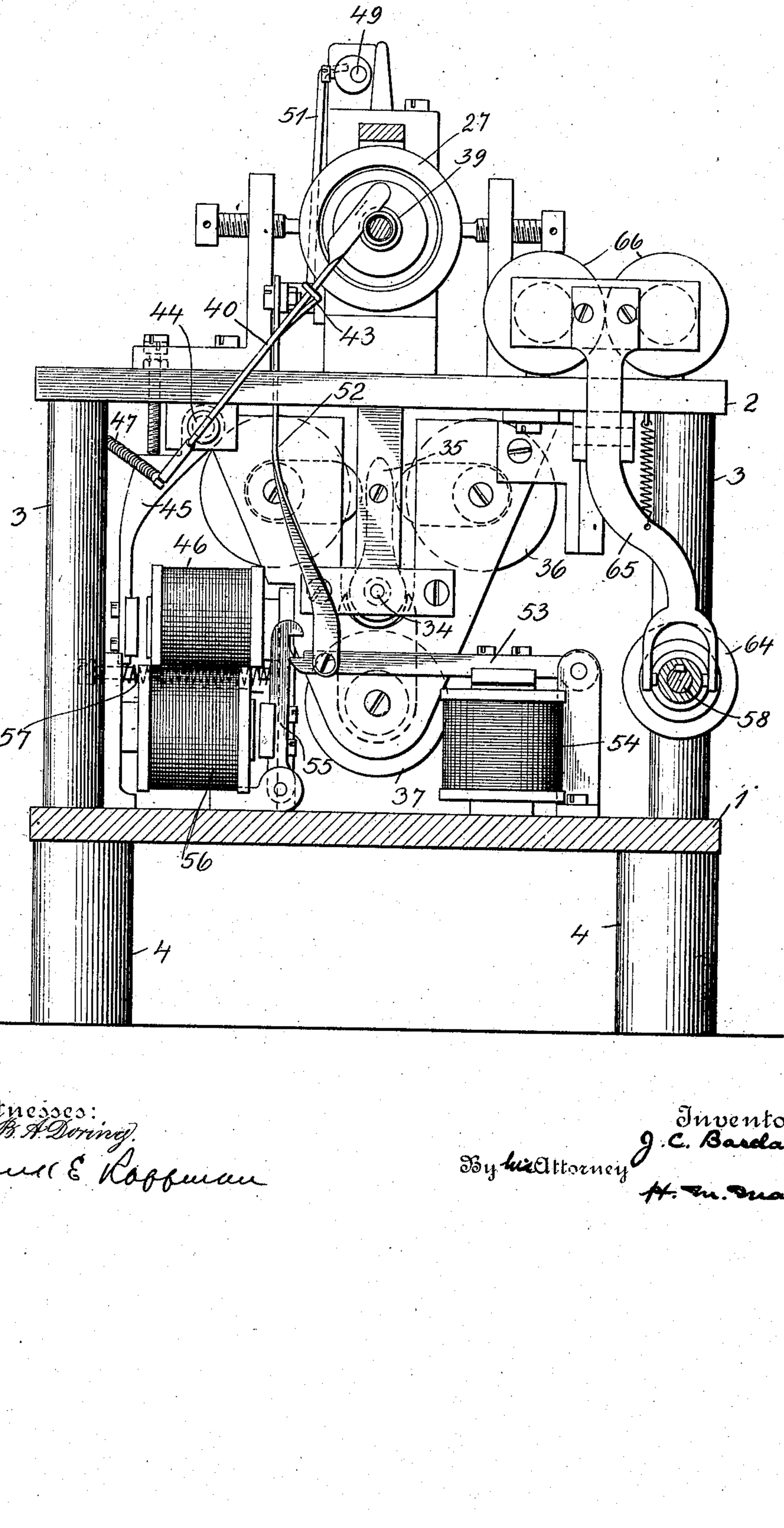
10 SHEETS—SHEET 6.

Fig. 6,



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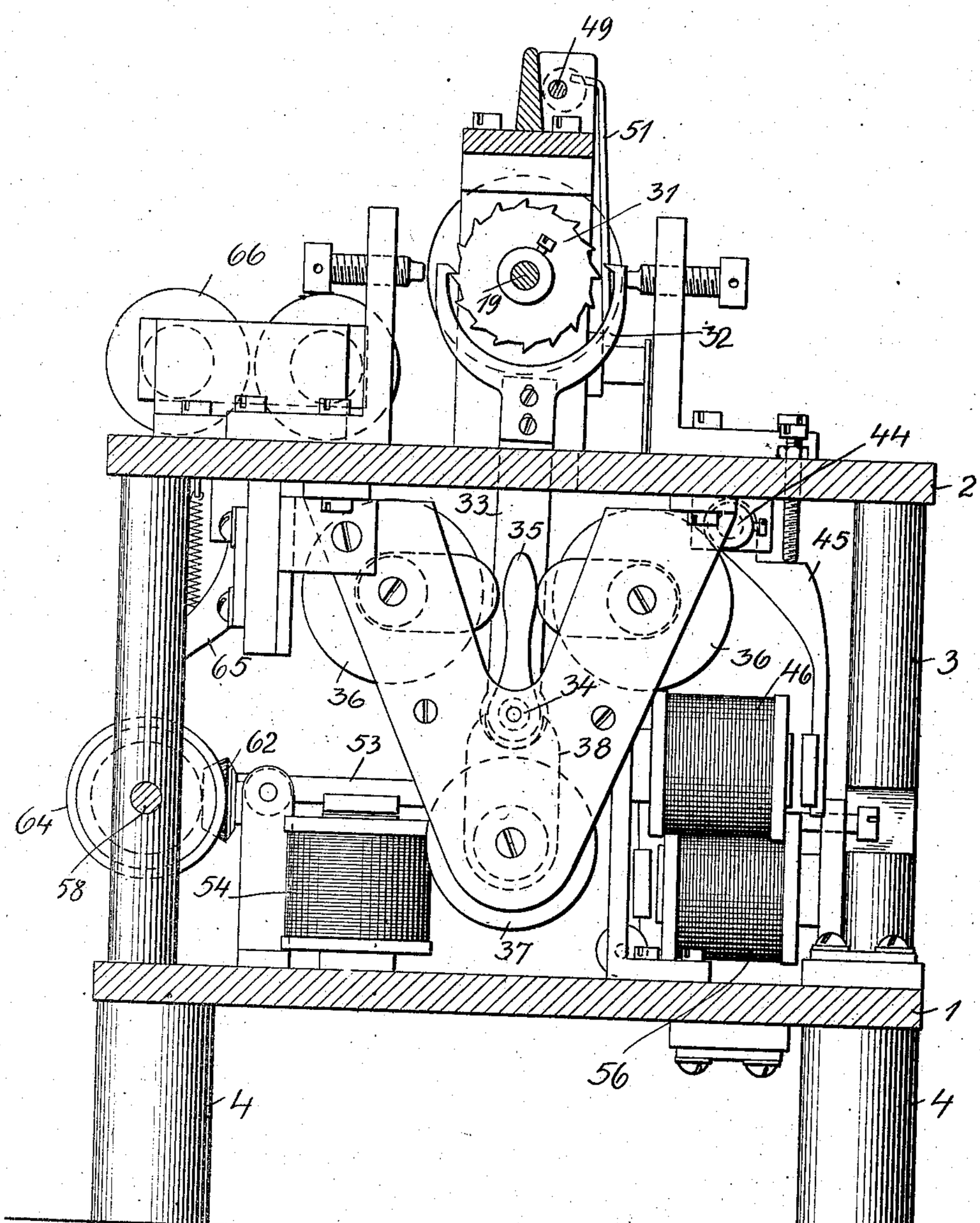
10 SHEETS—SHEET 7.

Fig. 7.



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PRINTING TELEGRAPH.

APPLICATION FILED SEPT. 21, 1908.

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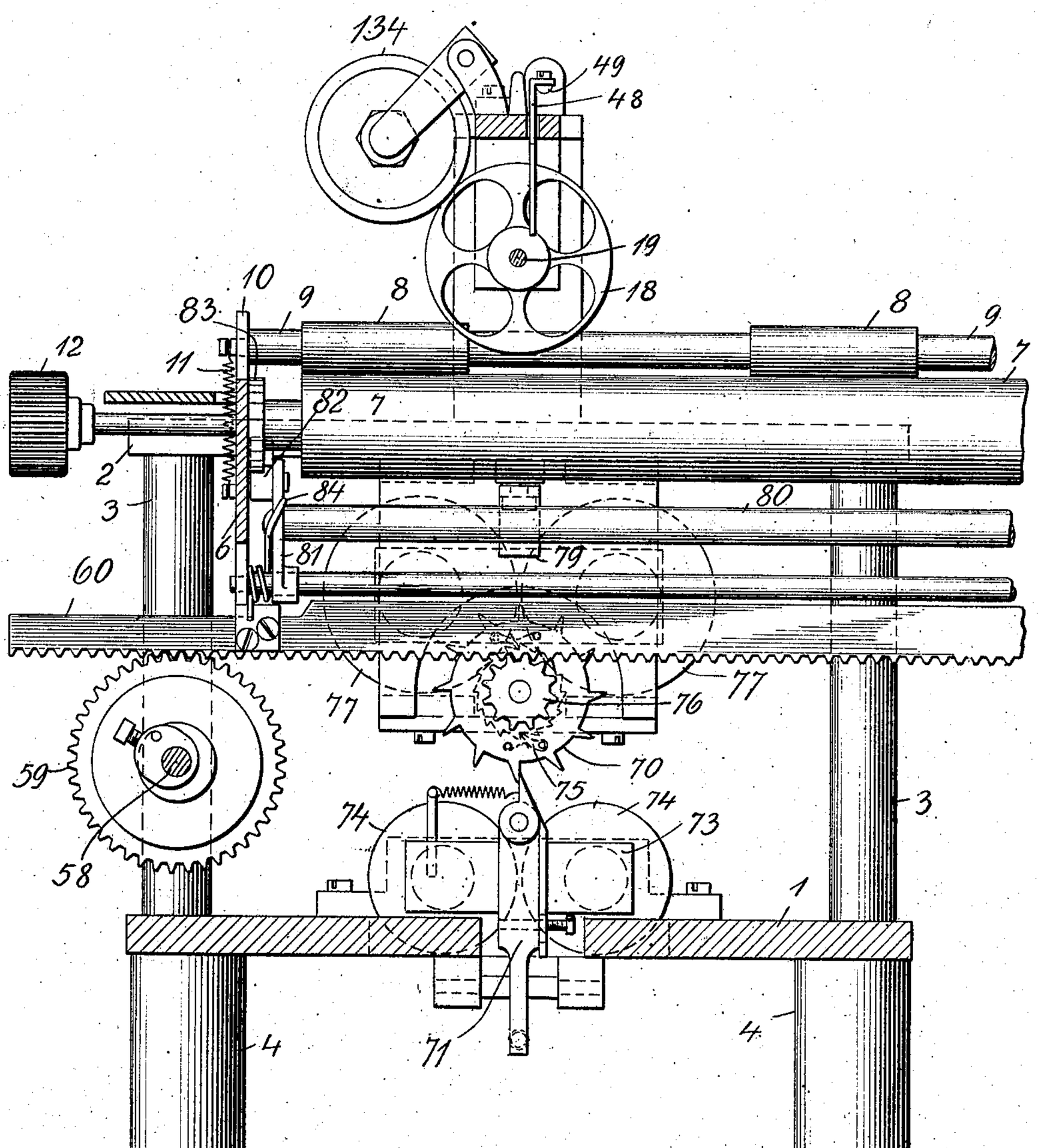
10 SHEETS—SHEET 8.

Fig: 8.



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10 SHEETS—SHEET 9.

Fig: 9.

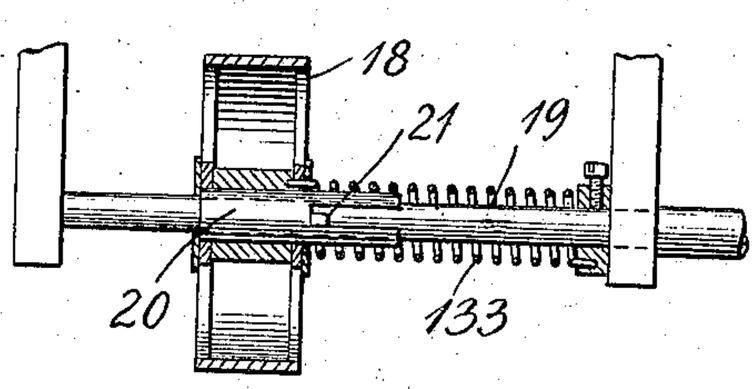


Fig: 10.

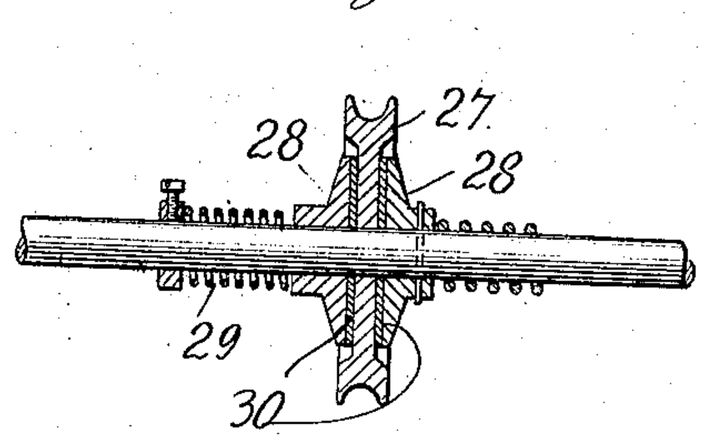


Fig: 11.

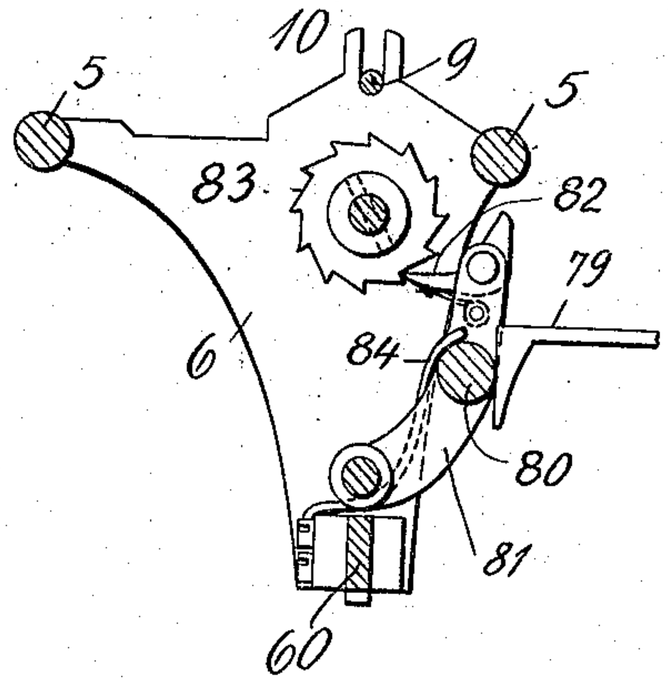
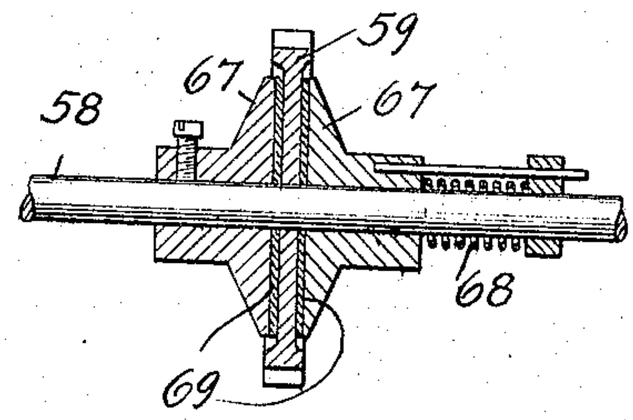


Fig: 12.



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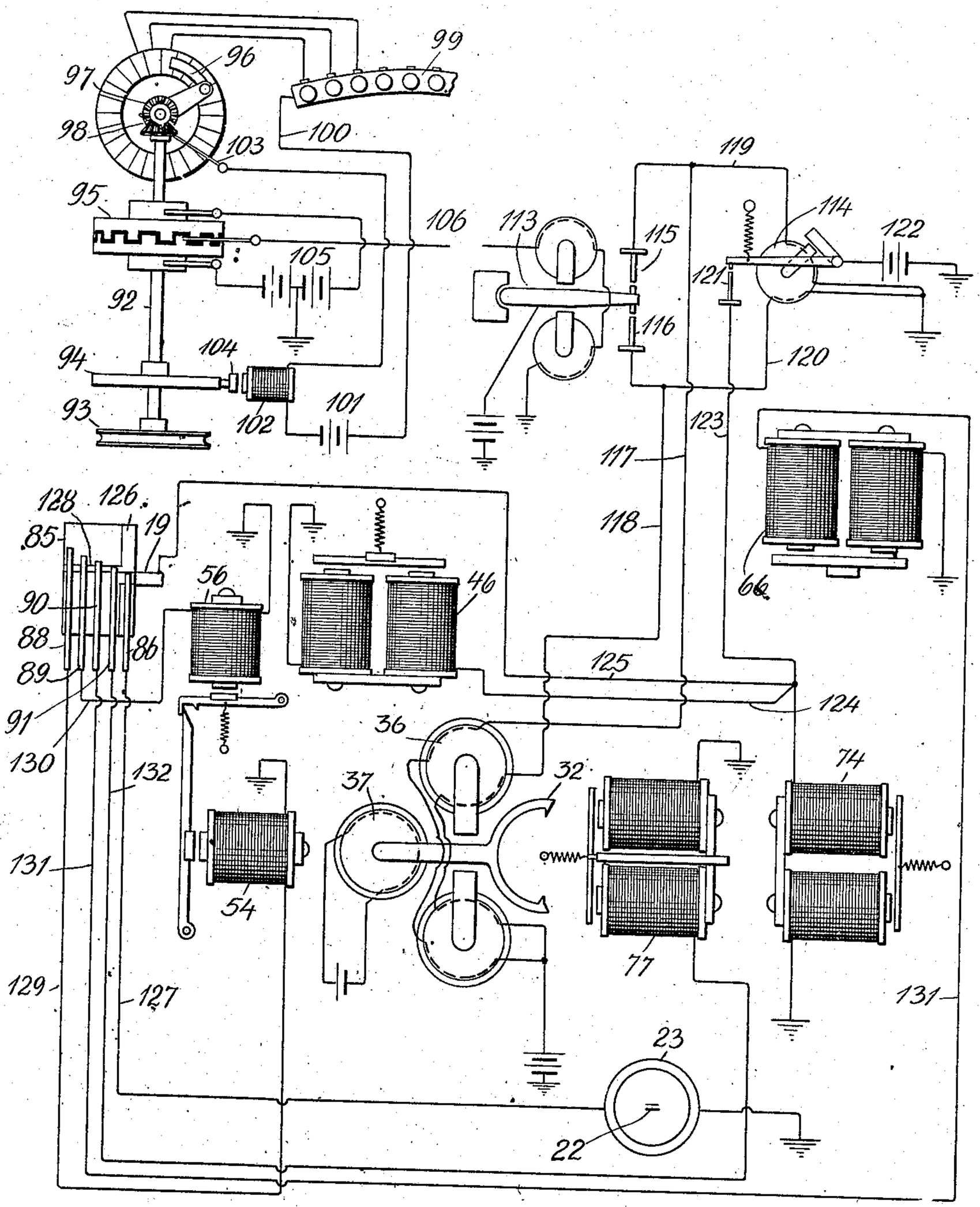
10 SHEETS—SHEET 10.

Fig. 13.



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UNITED STATES PATENT OFFICE.

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PRINTING-TELEGRAPH.

937,032. Specification of Letters Patent. Patented Oct. 12, 1909.

Application filed September 21, 1908. Serial No. 453,919.

To all whom it may concern:

Be it known that I, JOHN C. BARCLAY, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Printing-Telegraphs, of which the following is a specification.

My invention relates to improvements in the printing machines of printing telegraph systems.

The printing machine herein illustrated and described is of that class, of which the ordinary stock ticker is an example, comprising a type wheel adapted to be rotated synchronously with a sun-flower arm of a corresponding transmitter, pause of such arm on any one of the segments of the sun-flower causing operation of the printing or other suitable mechanism of the printing machine. But whereas the ordinary stock ticker is adapted only for printing on a paper tape or ribbon, the machine herein described is adapted for printing in regular lines on a sheet, the same as an ordinary typewriter.

The machine comprises a movable paper carriage with automatic mechanism for feeding the same forward and backward and for feeding the paper line by line.

The machine illustrated is particularly adapted for receiving ordinary telegraph message blanks and for recording telegraph messages on such blanks. The blank lies flat horizontally in the machine in the direct view of the operator, the letters printed being upright, as viewed by the operator from the front of the machine, the paper being fed toward the rear of the machine during line-spacing; the operator therefore finds it easy to insert and remove blanks and to check the message while it is being printed.

Heretofore in telegraph printers of the stock ticker type, where the performance of numerous functions besides that of rotating a type wheel synchronously with the operation of the transmitter and of operating a press-arm or the like, have been attempted, for example, where mechanism for shifting from one line of type to another, for rewinding a driving spring, and for other added functions, have been provided, it has been customary either to operate the ticker by a plurality of circuits or to effect the performance of the added functions by increasing or decreasing the strength of the line current. In the present printer I have avoided the necessity of varying the strength of the line current to effect performance of these added functions, and have instead, provided a commutator which rotates with the type wheel and controls, in conjunction with a relay, termed a separator relay, with which the instrument is provided, a plurality of local circuits by means of which magnets controlling the performance of functions such as shifting of the type wheel, return of the carriage, feeding of the paper, etc., are energized at proper times. The separator relay not only acts in this connection, but also in controlling the printing of the characters.

Heretofore in telegraph printers of the ticker type, the magnet operating the press arm or equivalent part, has usually been in the line circuit or in the same circuit as the escapement magnet controlling the rotation of the type wheel, and printing has been effected by using for the press magnet a magnet which is somewhat sluggish and hence operates its press arm only when a pulse in the line is prolonged, due to momentary arrest of operation of the transmitter contact mechanism. In this present printer, however, the magnet or solenoid which effects the operation of a hammer, corresponding to the press arm of an ordinary ticker, is in a local circuit controlled by the separator relay. Since this relay has very little mechanical work to do it may be very sensitive and easily operated, and for this reason permits the operation of the printer on much longer lines than the ordinary stock ticker can be operated on successfully, also a number of such separator relays, corresponding to separate printers, may be included in the same circuit without building up the resistance and retardation in such circuit to the same extent as would be the case were a corresponding number of press magnets of the ordinary telegraph tickers included in such circuit. For greater sensitiveness and rapidity of operation, and in order that the effective length of the line over which the printer may be operated may be increased, I commonly place this separator relay, or the separator relay of a plurality of printers when a number of printers are to be worked from the same circuit, in a local circuit controlled by a line relay; and for the same reason I com-

monly place the magnet of the escapement mechanism controlling the rotation of the type wheel, in a local circuit also, both of these local circuits being controlled by the same line relay. By reason of the use of this line relay, separator relay, and the local circuits and commutator mentioned, I require only one strength of current in the line circuit and only one class of signals therein, namely, current alternations; and these alternations may be of quite high frequency, comparable to the alternations produced by a Wheatstone transmitter operating at high speed. In fact, since the line conditions controlling the operation of my printer are much the same as those which obtain in Wheatstone operation, the printer is susceptible of being operated over lines of very great length.

My invention consists in means whereby the complete control of the various mechanisms of the printer is effected with only one class of line signals; in the separator relay controlling the hammer magnet and the magnets of various other mechanisms of the printer; in the general arrangement of the mechanisms of the machine, whereby the machine is particularly adapted for receiving flat sheets of considerable length and width and for printing in successive lines, *i. e.*, for "page printing", all in full view of the operator, and in various other features of construction and arrangement of the parts, as hereinafter described and particularly pointed out in the claims.

The objects of my invention are to improve and simplify the printers of printing telegraph systems, to avoid the use of more than one line conductor and more than one class of signals in that line, to adapt the printer for high speed operation over relatively long lines, to make the printer sensitive and accurate, simple, compact, durable, relatively inexpensive, and easily kept in repair, and to particularly adapt the printer for use for receiving ordinary telegraph messages on ordinary telegraph message blanks, and for operation under the charge of ordinary receiving oporators

I will now proceed to describe my invention with reference to the accompanying drawings, in which one form of printer embodying the said invention is illustrated, and will then point out the novel features in claims.

In said drawings:—Figure 1 shows a front elevation of the machine; Fig. 2 an elevation of the right hand side of the machine; Fig. 3 an elevation of the left hand side of the machine; Fig. 4 a top view of the machine; Fig. 5 a longitudinal vertical section of the machine looking from the right hand side; Fig. 6 a transverse sectional elevation taken on the line 6—6 of Fig. 2, this view showing particularly the escapement magnets, the shift and latch magnets, the carriage return magnet and mechanism operated thereby, and the synchronizing mechanism; Fig. 7 shows a transverse vertical section on the line 7—7 of Fig. 2, this view showing particularly the escapement mechanism controlling the rotation of the type wheel; Fig. 8 shows a transverse vertical section on the line 8—8 of Fig. 2, and shows particularly the carriage-feed and carriage-escapement mechanism; Fig. 9 shows a detail longitudinal section of the type wheel and associated parts; Fig. 10 shows a detail longitudinal section of the friction driving device by which the type wheel is driven; Fig. 11 shows a detail elevated partial section of the paper feed mechanism; Fig. 12 shows a detail longitudinal section of the friction driving device of the carriage-feed mechanism; Fig. 13 is a diagram illustrating the electrical connections.

In the drawings numerals 1 and 2 designate respectively a base plate and a top plate, 3—3 designate pillars between these plates 1 and 2, and 4—4 designate legs, usually of rubber or like material, on which the machine stands.

5—5 designate side guide rods of a paper carriage, 6—6 designate end plates of such carriage connecting said rods, 7 designates a feed roll mounted in said carriage and 8—8 designate idler rollers mounted upon a shaft 9 and adapted to hold paper against the feed roll 7, said shaft being mounted to slide up and down somewhat in guides 10 of the end plates 6 of the carriage, and being normally held downward by springs 11.

12—12 are handles by which the feed roll may be rotated.

This machine has no real platen, but the carriage has a flexible strip 14, (usually of rubber); and the paper to be printed on is held in the carriage above said strip. A hammer hereinafter mentioned, located below the flexible strip, is arranged to drive the paper so held against the type faces on the type wheel hereinafter mentioned. Paper guide plates 15 and 16 are provided in front of this strip 14 and in rear of the feed roll 7, as shown particularly in Fig. 5. In feeding paper into the machine, the paper sheet is laid upon the guide plate 15 and thence passed between the strip 14 and the type-wheel, and between feed roll 7 and idler rolls 8, and thence over the guide plate 16.

Numeral 17 designates grooved guide rolls mounted upon the top plate of the machine, which serve as guides for the guide rods 5 of the carriage.

Above the strip 14 there is a type wheel 18 mounted upon a shaft 19; said type wheel having a hub-bushing 20 slotted as shown particularly in Figs. 2 and 5, a key 21 mounted on shaft 19 working in this slot; the construction being such that while the

type wheel is caused to rotate with said shaft 19 it may be moved axially on said shaft to bring one or another of its rows of characters into printing position.

Printing is effected by a hammer 22 forming the plunger of a solenoid 23, said hammer being located directly beneath the type wheel 18 and the strip 14 and being arranged to be driven upward, when the solenoid is energized.

24, Figs. 2, 3 and 4, designates a motor by means of which the type wheel shaft 19 and the carriage-feeding shaft are driven. Shaft 19 is driven from this motor by means of a belt 25 passing about a suitable pulley 26 on the shaft of the motor, and about a suitable pulley 27 on the shaft 19, this latter pulley not being keyed directly to shaft 19 but driving said shaft through the friction driving device shown in detail in Fig. 10, and comprising friction disks 28 pressed against the web of said pulley 27 by a spring 29, there being rubbing pieces of felt, leather, or other suitable material, 30, between the disks 28 and the web of said pulley 27. This friction driving device permits continuous operation of the motor 24 and pulley 27, while shaft 19 will be driven by said pulley or will be held stationary, according as the escapement mechanism for said shaft permits. This escapement mechanism, shown particularly in Figs. 5 and 7, comprises an escapement wheel 31, secured to shaft 19, and an escapement anchor 32 mounted on an arm 33, secured to a pivot shaft 34, to which is also secured the armature 35 of field magnets 36. The armature 35 is polarized by a magnet 37, the pole pieces 38 of which are extended to embrace the hub of the armature 35, as clearly shown in Figs. 6 and 7. It will be clear that current reversals such as are commonly employed to operate synchronous printers, occurring in the circuit of the field magnets 36, will cause the escapement anchor 32 to be vibrated back and forth, permitting shaft 19 to be rotated step by step by motor 24.

In synchronous printers of the step by step type, synchronizing means are commonly provided to bring the transmitter and printer into synchronism; and such synchronizing means are provided in this machine, comprising a spiral thread 39 on shaft 19, and a pivoted stop arm 40 adapted to ride in this thread and to be moved thereby toward the left of Fig. 2 and provided with a lug 41 adapted to engage a projection 42 when said arm 40 has been carried as far to the left as it can go, engagement of the lug 41 and stop projection 42 arresting rotation of shaft 19. The synchronizing device further comprises a lifter 43 for arm 40, mounted upon a shaft 44 arranged to be oscillated by the armature 45 of a magnet 46, each time the solenoid 23 or one of the other magnets hereinafter mentioned operates, and when said lifter 43 is operated it raises the arm 40 out of the spiral thread on shaft 19, permitting said arm to be pulled back to the right of Fig. 2 by a spring 47; the construction being such that so long as characters are being steadily printed the stop arm 40 will not be permitted to move far enough to the left of Fig. 2 to arrest the rotation of the shaft; but when the type wheel of the printer is caused to rotate a number of times without the printing of a character, the lug 41 of stop arm 40 is brought into engagement with the stop projection 42, so arresting rotation of the type wheel. It will be observed that the type wheel will always be arrested at the same position, (which is a blank space on the typewheel) and, therefore, when arm 40 is raised, as it will be upon the depression of a special space key of the transmitter, stop arm 40 will fly back to the right, permitting the type wheel to go on rotating. This synchronizing device is in principle the same as the synchronizing device commonly used on stock tickers and the like, and, therefore, more detailed description of its operation is not required.

As shown, the type wheel 18 has two rows of type faces; and one row or the other is brought over the hammer 22 by moving said type wheel along the shaft 19. For this purpose said type wheel is embraced by a sliding yoke 48 (Fig. 2) mounted upon a sliding rod 49, itself arranged to be operated by a spring 50 and by a bell crank 51 connected by a link 52 to the armature 53 of a shift magnet 54. To hold the type wheel in its shifted position against the action of the spring 50, a latch 55 (Fig. 6) is provided, said latch being the armature of a latch magnet 56. The spring 57 of this latch 55 is a compression spring tending to move the latch away from the magnet and into engagement with the armature 53.

Upon the left hand side of the machine, as viewed from the front, there is a shaft 58 carrying a gear 59 (Fig. 3) meshing with the rack bar 60 of the paper carriage of the machine. This gear 59 is driven from shaft 58 by means of a counter shaft 61 (Figs. 2 and 4) driven by gearing from the shaft of the motor and provided with a beveled pinion 62 (Fig. 4) adapted to engage one or the other of two beveled gears 63 and 64 keyed to the shaft 58, but arranged to be moved axially thereon, to bring one or the other of said gears into engagement with the pinion 62, by the armature lever 65 of a carriage return magnet 66. It is clear that the effect of shifting gears 63 and 64 is to change the direction of rotation of shaft 58. Gear 59 is driven from shaft 58 through a friction driving device, illustrated in detail in Fig. 12, and comprising disks 67 pressed against the

sides of said gear 59 by a spring 68, there being suitable rubbing pieces 69 between these disks 67 and the faces of the gear. Normally shaft 58 rotates in such direction as to cause gear 59 to tend to feed the carriage toward the left (looking from the front of the machine); but such motion of the carriage is controlled by an ordinary typewriter escapement mechanism comprising an escapement wheel 70, an escapement anchor 71 of well-known type, pivoted to be oscillated by the armature 73 of an escapement magnet 74, which magnet is energized, as hereinafter shown, each time a character key or space key of the transmitter is depressed. Escapement wheel 70 is connected to the rack bar 60 of the carriage by means of a pinion 76 mounted on the same shaft as said escapement wheel 70 and intermeshing with said rack bar.

To permit return of the carriage notwithstanding engagement of the escapement wheel 70 by the escapement anchor, said escapement wheel is driven from pinion 76 through pawls 75 on said escapement wheel, engaging teeth of a ratchet wheel driven by said pinion, as indicated in dotted lines in Fig. 8. This is a well known construction.

For feeding the paper line by line in the carriage, I provide a feed magnet 77, the armature 78 of which actuates a pusher 79 in such manner that when the said magnet 77 is energized the front end of this pusher pushes against a rod 80 extending lengthwise of the carriage and mounted upon two levers 81 at opposite sides of the carriage, one of these levers carrying a pawl 82 which is adapted to engage teeth of a ratchet wheel 83, mounted on the shaft of the paper feed roll 7. It will be clear that each time feed magnet 77 is energized pusher 79 will move rod 80 to the left of Fig. 11, causing the ratchet wheel 83 to be moved forward one tooth; and that as soon as the magnet is de-energized the pusher 79 will retire, permitting springs 84 to move back arms 81 and the pawl 82, so that said pawl may engage another tooth of the ratchet.

The circuits of the shift magnet 54, the latch magnet 56, the carriage return magnet 66 and the paper feed magnet 77, are controlled by a commutator 85, mounted upon the type wheel shaft 19 to rotate in synchronism with the type wheel, and by a series of brushes 86, 88, 89, 90 and 91, mounted upon a block of insulation 87 and adapted to engage suitable conductive strips of this commutator.

Fig. 13 shows diagrammatically circuits of the apparatus, also diagrammatically a transmitter such as is commonly used in synchronous printing telegraph systems. In said figure the transmitter there diagrammatically illustrated comprises a shaft 92 arranged to be driven by some suitable friction driving device, in this case illustrated as a belt wheel 93 and carrying a stop wheel 94, and a current reversing commutator 95 of well known type, and driving the trailer 96 of a sunflower 97. In practice this trailer is mounted directly on shaft 92 but for convenience in illustration I have in this figure, shown it arranged to rotate about an axis at right angles to that of shaft 92 and driven from said shaft by beveled gears 98. It will be clear that the operative effect is the same. 99 designates a suitable keyboard, each of the keys of which is arranged when depressed to connect a corresponding segment of the sunflower 97 to a return conductor 100, so that depressing any key of the keyboard places said return conductor in electric connection with the segment of the sunflower corresponding to that key. Such keyboard contacts are well known and I do not deem it necessary to illustrate the same in detail. Return conductor 100 leads through battery 101 to stop magnet 102 and thence to brush 103 electrically connected to the trailer 96. It will be seen that upon the depression of any key of the keyboard the circuit of this stop magnet 112 remains open until the trailer 96 is upon corresponding sunflower segment, whereupon the circuit is completed, the stop magnet energized, and its armature 104 engages stop wheel 94 and arrests further rotation of the trailer, holding said trailer stationary until the finger key which has been depressed is released.

The effect of the operation of the current reversing commutator 95 is to place opposed sides of the divided battery 105 alternately to line 106, leading to the receiving printer. This printer comprises, besides the parts hereinbefore described and illustrated in Figs. 1–12 inclusive, a polar relay 113 and a so-called separator relay 114, which are instruments of well known construction, being in effect ordinary relays. The armature of relay 113 vibrates with each reversal of current by commutator 95, such reversals corresponding to the passage of the trailer 96 from one segment of the commutator to another segment thereof. This armature is connected to a source of electric energy, and makes contact alternately with two contact stops 115 and 116 which are connected by conductors 117 and 118 respectively, to opposed coils of escapement magnet 36 of the printer, and thence to ground. It will be clear that the effect of the operation of the armature of relay 113, is to cause corresponding vibrations of the escapement anchor 32, and that in principle the effect is the same as if this escapement anchor were on the armature of relay 113. In practice it is better to have the escapement operated by a local circuit, as shown, as the instrument operated directly by the line will ordinarily be sensitive, particularly if the line over

which the printer is to be worked is of any considerable length. The contact screws 115 and 116 of relay 113 are also connected by conductors 119 and 120 respectively, to coils of separator relay 114. This separator relay is somewhat sluggish, and though its armature is affected more or less by the ordinary alternations produced by the operation of relay 113, said armature is not affected sufficiently to cause it to close contact with contact screw 121 until the armature of relay 113 remains in contact with one of its stops, 115 or 116, for a relatively long interval of time, due to the stopping of the trailer 96 of the sunflower on a segment of that sunflower corresponding to a key of the key-board which has been depressed and is being held down. The armature of separator relay 114 then makes contact with screw 121, closing circuit from a source of electric energy 122 through conductor 123 to the escapement magnet 74; also through the branch conductor 124, to the magnet 46 of the synchronizing device; also through branch conductor 125 to the shaft 19 and distributing conductive strip 126 of the commutator 85. A brush 86 of this commutator is connected by conductor 127 to the hammer solenoid 23; and this brush makes contact with the strip 126 of the commutator during the greater portion of the rotation of said commutator, so that whenever said commutator is arrested during contact of brush 86 with this strip 126, and separator relay 114 closes circuit through conductor 123, the hammer 22 is operated. The other brushes of the commutator are arranged to make contact successively with an extension 128 of conductor strip 126 of the commutator, and are connected to different magnets of the apparatus as follows: brush 88 by conductor 129 to the type shift magnet 54; brush 89 by conductor 130 to shift release magnet 56; brush 90 by conductor 131 to carriage return magnet 66; and brush 91 by conductor 132 to the paper feed magnet 77. It will be clear that whenever the commutator is arrested with its strip 128 in contact with one of these brushes 88–91 inclusive, and the separator relay 114 closes its circuit simultaneously, the corresponding magnet of the apparatus is energized and caused to operate. For each of these magnets 46, 54, 56, 66, 74 and 77, there will be a corresponding key on the keyboard and a corresponding segment on the sunflower, so that arresting of the sunflower trailer on one of these segments will cause the operation of the corresponding magnet of the printer.

In machines of this sort difficulty has sometimes been experienced owing to missing of pulses, the type-wheel and its driving shaft, owing to its inertia, failing to rotate a full space with the first vibration of the escapement anchor following arrest of the type-wheel. This missing of pulses I have overcome by means of the spring 133 (Figs. 2 and 9) one end of which is secured to the shaft 19 and the other end secured to the hub of said typewheel, and by providing a certain amount of play between the key 21 on shaft 19 and the sides of the slot in the hub of the type wheel in which said key works; with this construction, when the shaft 19 first commences to rotate, the type-wheel may lag slightly behind the shaft, increasing the tension of spring 133, and then, as the inertia of the typewheel is overcome, said wheel springs forward again into proper position with relation to the shaft 19. In connection with the typewheel I provide an ordinary inking roller 134.

In the operation of the machine, a paper blank is inserted in the carriage from the front, so that it is held beneath the type-wheel 18. During the operation of printing a line, the several characters are printed, right side up, as viewed from the front, the carriage being fed space by space to the left, and then returned at the end of the line or sooner, according to when the transmitter is operated to energize the carriage return magnet of the printer. When the paper feed magnet 77 is energized, it causes the paper to be fed backward or toward the rear of the machine, a line-space. The motion of the paper being toward the rear of the machine, space is provided above the top plate 2, and between the rear carriage guide rolls 17 and the escapement mechanism, so that the paper may be fed backward until free of the carriage, and then removed laterally. This arrangement of the parts is particularly convenient in the case of a printer doing commercial telegraph work, as it permits the use of standard telegraph blanks, and permits the receiving operator to read the message as printed and to check any possible errors in the printing, and at the conclusion of the message to remove the blank from the machine and by the same motion of the paper feed roll 7 to introduce a new blank to prepare the machine for the receipt of another message; the required interval between messages being thereby rendered very brief indeed.

I do not in this application claim the structure of the printing machine itself, as this forms the subject matter of a divisional application for Letters Patent Serial Number 489,861, filed April 14, 1909.

What I claim is:—

1. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor, and a magnet for operating the same, a movable carriage, a carriage escapement controlling

motion thereof and comprising a controlling magnet, and control means for said magnets adapted for complete operation by a single class of line signals.

2. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor, and a magnet for operating the same, a hammer and an operating magnet therefor, a commutator rotating with said type wheel and controlling the circuit of said hammer-operating magnet, and other control means for said magnets adapted for complete operation by a single class of line signals.

3. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor, and a magnet for operating the same, a movable carriage, a carriage escapement controlling motion thereof and comprising a controlling magnet, and control means for said magnets adapted for complete operation by current alternations of one strength.

4. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor, and a magnet for operating the same, a hammer and an operating magnet therefor, a commutator rotating with said type wheel and controlling the circuit of said hammer-operating magnet, and other control means for said magnets adapted for complete operation by current alternations of one strength.

5. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor and a magnet for operating the same, a movable carriage, a carriage escapement controlling motion thereof and comprising a controlling magnet, and control means for said magnets comprising a line relay and a local circuit controlled thereby for operating said escapement magnet, and a separator relay controlled by said line relay and controlling the operation of said carriage escapement magnet.

6. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor and a magnet for operating the same, a hammer and an operating magnet therefor, and control means for said magnets comprising a line relay and a local circuit controlled thereby for operating said escapement magnet, and a separator relay controlled by said line relay and controlling the operation of said hammer-operating magnet.

7. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor and a magnet for operating the same, synchronizing mechanism including a release magnet, and control means for said magnet comprising a line relay and a local circuit controlled thereby for operating said escapement magnet, and a separator relay controlled by said line relay and controlling the operation of said release magnet.

8. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor and a high speed magnet for operating the same, other mechanism comprising an operating magnet, and control means for said magnets comprising a high speed line relay and a local circuit controlled thereby for operating said escapement magnet, and a sluggish separator relay controlled by said line relay and controlling the operation of the magnet of such other mechanism.

9. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor and a high speed magnet for operating the same, shift mechanism including an operating magnet, a commutator rotating with said type wheel controlling said shift magnet, other mechanism including an operating magnet, and control means comprising a high speed line relay and a local circuit controlled thereby for operating said escapement magnet, and a sluggish separator relay likewise controlled by said line relay and controlling the operation of the magnet of such other mechanism.

10. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor and a high speed magnet for operating the same, other mechanisms comprising controlling magnets, a commutator rotating with said type wheel, and control means comprising a line relay and a local circuit controlled there-

by for operating said escapement magnet, and a sluggish separator relay likewise controlled by said line relay and controlling the operation of one or more of said controlling magnets, others of said magnets in circuits controlled by said commutator.

11. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor and a high speed magnet for operating the same, a carriage, carriage escapement mechanism, paper feed mechanism, type wheel shift mechanism and carriage return mechanism, such mechanisms each comprising a controlling magnet, a commutator rotating with said type wheel controlling certain of such magnets, and control means comprising a line relay and a local circuit controlled thereby for operating said escapement magnet, and a sluggish separator relay likewise controlled by said line relay and controlling certain of said magnets.

12. A telegraph printer comprising in combination a rotary type wheel, means for rotating and controlling the rotation of said type wheel comprising an escapement wheel in mechanical driving connection with said type wheel, an escapement anchor and a high speed magnet for operating the same, a sluggish separator relay arranged to be controlled by curent changes such as operate the escapement anchor magnet, and to be operated effectively only by relative long current changes, and other mechanism comprising a controlling magnet or magnets, said controlling magnets controlled by said separator relay.

In testimony whereof I affix my signature in the presence of two witnesses.

JOHN C. BARCLAY.

Witnesses:

C. A. VAN BRUNT,

H. M. MARBLE.