

(No Model.)

3 Sheets—Sheet 1.

J. F. McLAUGHLIN.
ELECTRICAL TYPE WRITER.

No 388,143.

Patented Aug. 21, 1888.

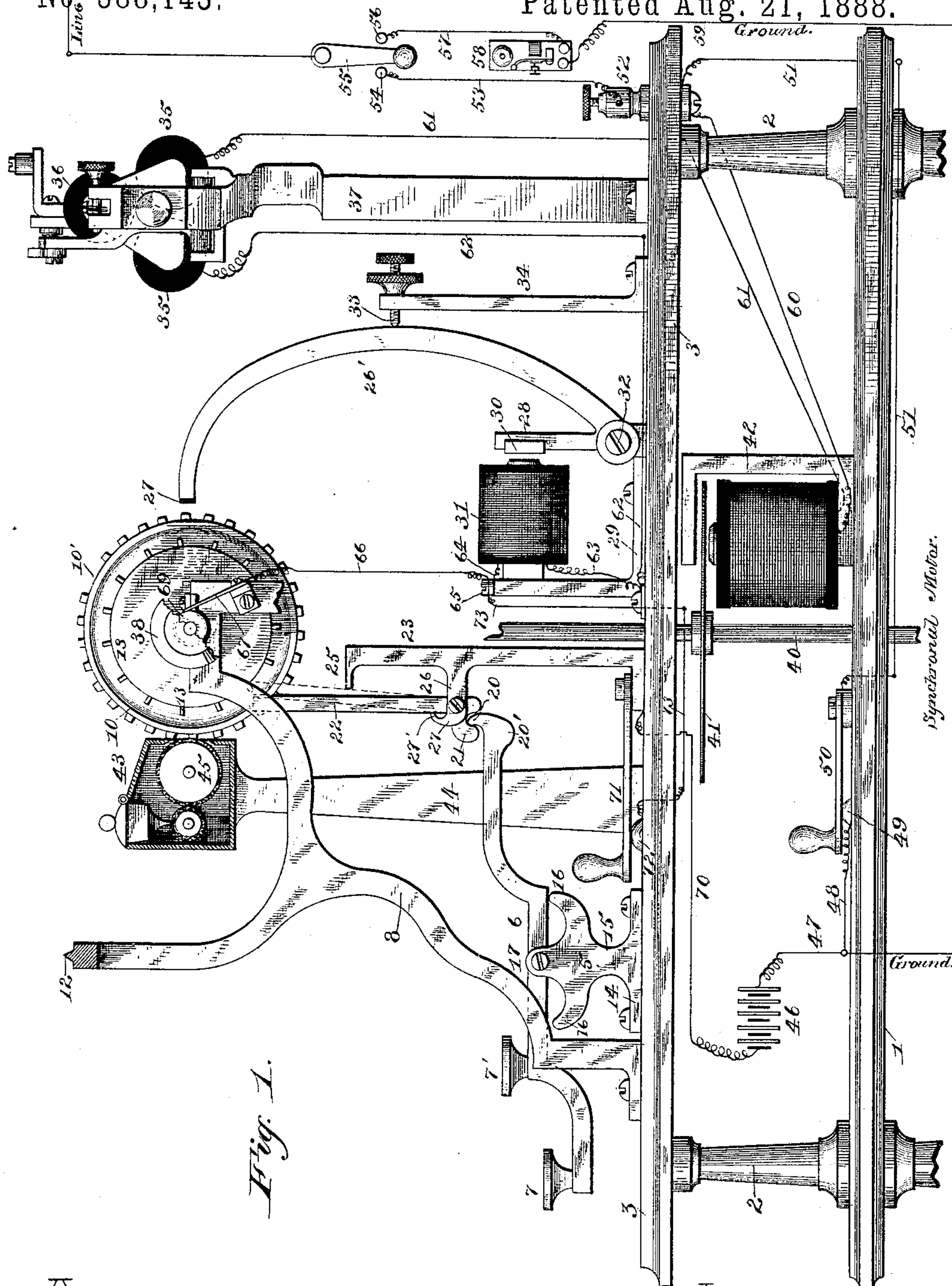


Fig. 1.

ATTEST:

Rey C. Bowen,
Car B. Waller

INVENTOR:

James F. McLaughlin,
By Harding & Tichenor,
his Attorneys.

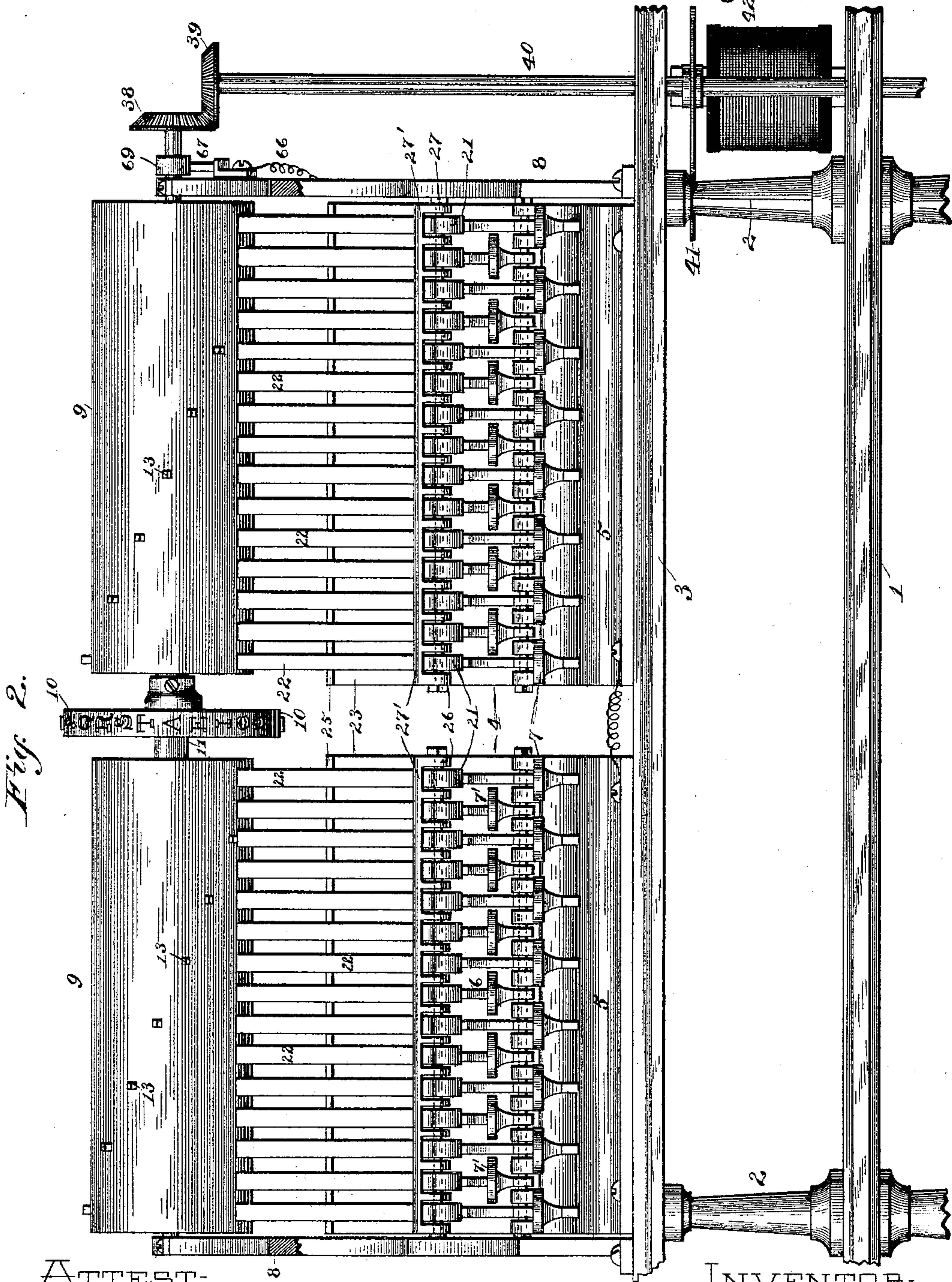
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3 Sheets—Sheet 2.

J. F. McLAUGHLIN.
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(No Model.)

3 Sheets—Sheet 3.

J. F. McLAUGHLIN.
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Fig. 5.

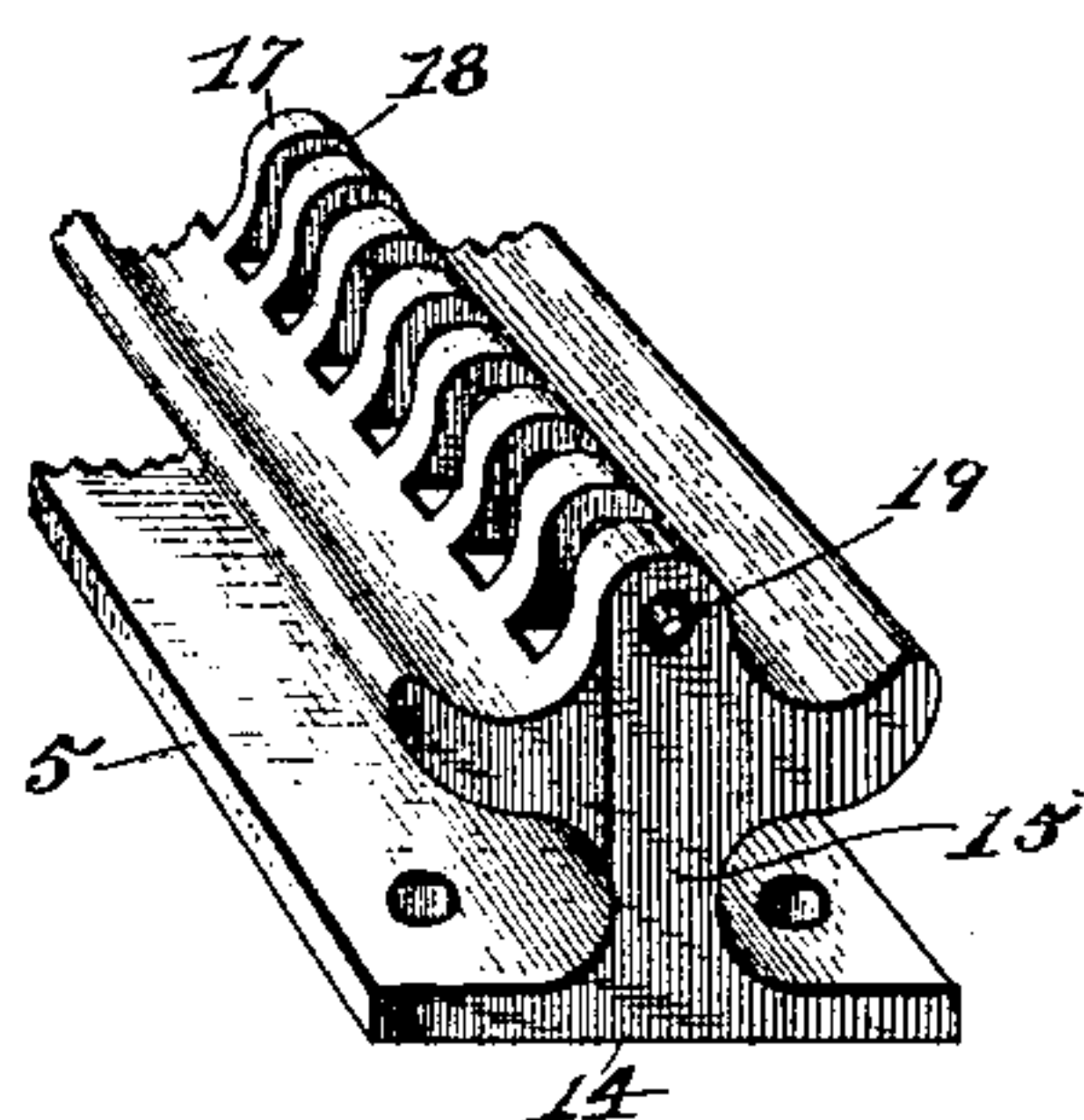


Fig. 6.

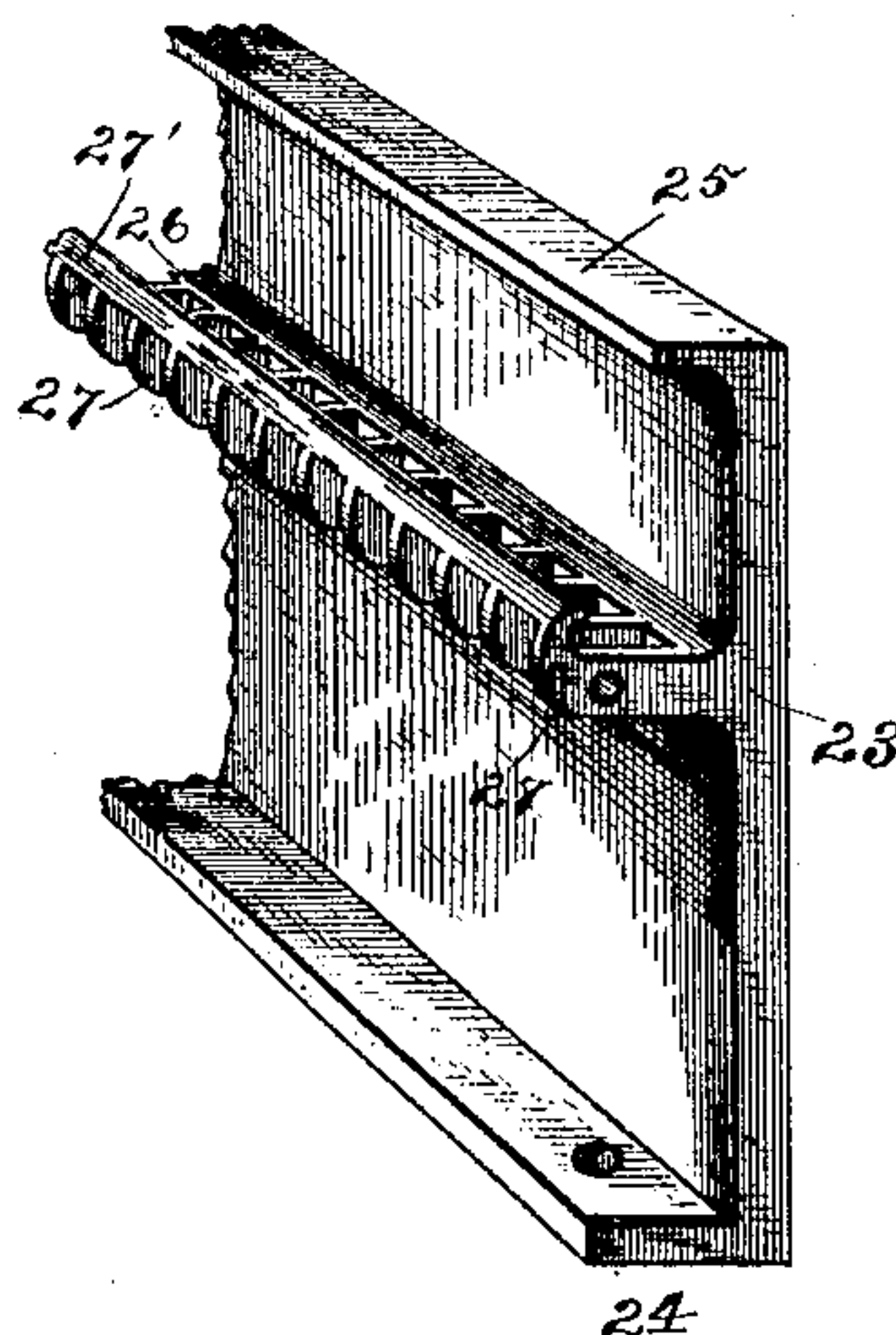


Fig. 4.

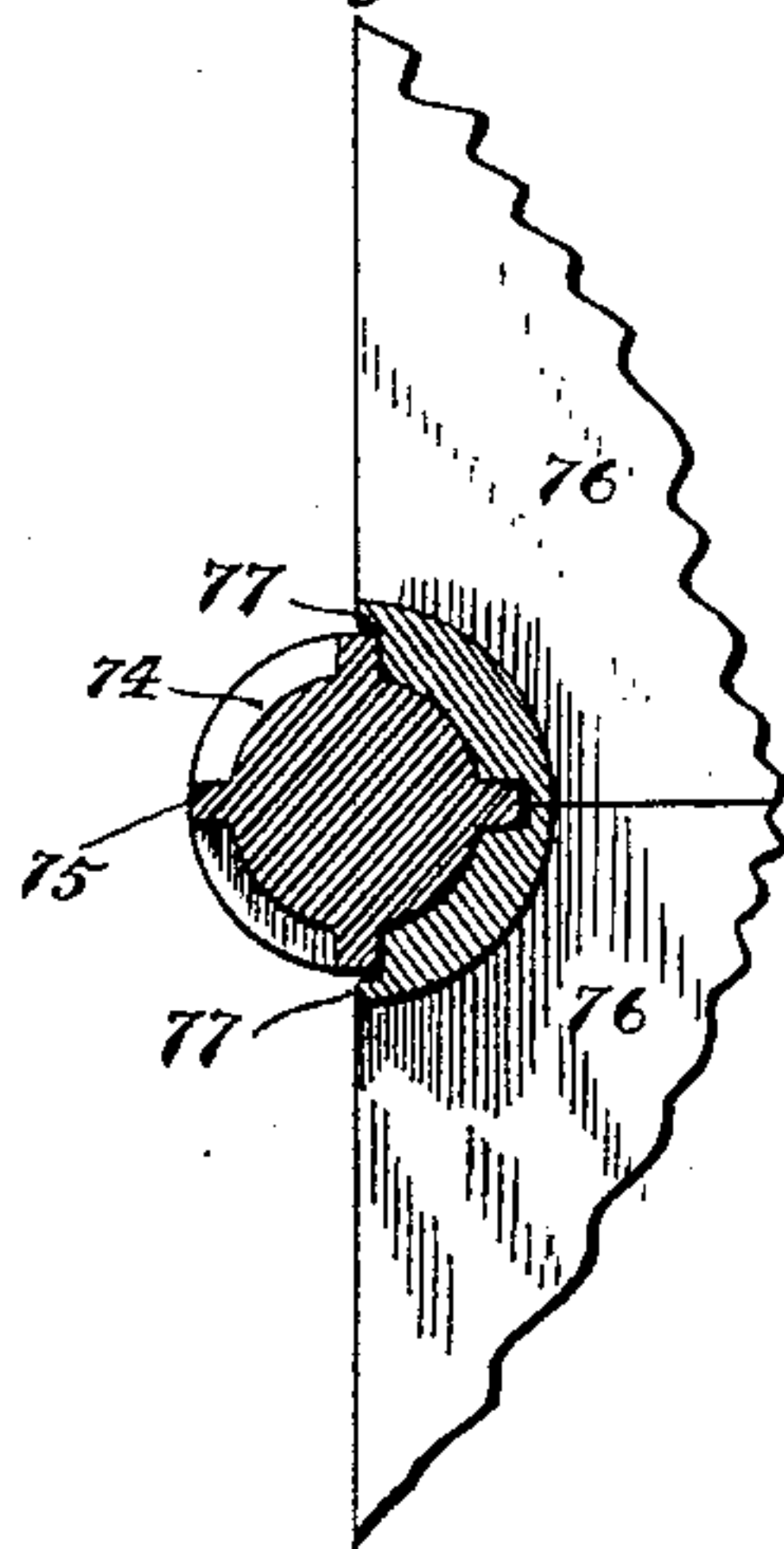
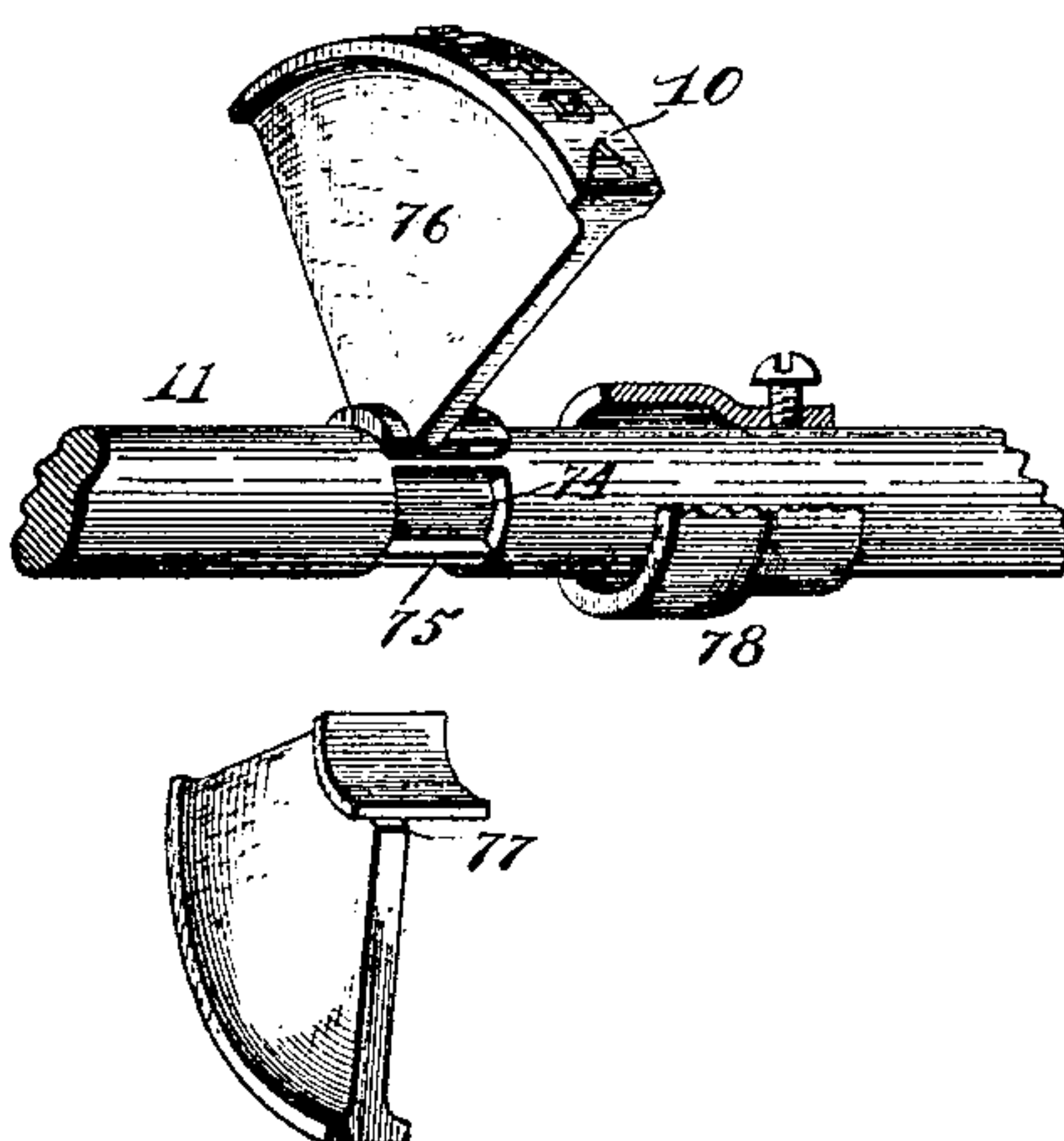


Fig. 3.



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UNITED STATES PATENT OFFICE.

JAMES F. McLAUGHLIN, OF PHILADELPHIA, PENNSYLVANIA.

ELECTRICAL TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 388,143, dated August 21, 1888.

Application filed October 18, 1887. Serial No. 252,728. (No model.)

To all whom it may concern:

Be it known that I, JAMES F. McLAUGHLIN, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Electrical Type-Writers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention has reference to improvements in electrical type-writers which are adapted for use both as transmitters and receivers if connected with similar instruments located at a different station and as independent local instruments when not connected with a line.

As a line-instrument my type-writer operates, when used as a transmitter, to print at the home-station a message which is spelled out by the manipulation of keys, and at the same time to send over the line electrical impulses which are designed to cause the printing of the same message at a similar instrument used as a receiver located at the distant station. When used as a receiver, my type-writer operates to record an incoming electrical message sent from a distant station by a transmitter constructed in accordance with my invention by printing the same in the same manner in which it is printed at a transmitting-station. As a local instrument, my improved type-writer serves the purpose of an ordinary mechanical type-writer, with this difference, however, that the printing is effected by electro-magnets, as in transmitting and receiving.

In other pending applications previously filed by me—Serial Nos. 247,764, 249,784, and 252,727, filed, respectively, August 24, 1887, September 15, 1887, and October 18, 1887—I have shown and described apparatus embodying the fundamental features thus briefly defined, and my present invention has reference to improvements in the construction of the more essential parts of the apparatus, whereby the functions of the same are performed with greater ease and certainty, the mechanical

difficulties of construction inherent in the original form are obviated, and the cost of the type-writer is reduced.

In the accompanying drawings, which form a part of this specification, I have illustrated my improvements with special regard to clearness, and have omitted or indicated in the diagram only such parts of the apparatus as are not necessarily parts of my present invention, and the co-operation of which with the parts fully shown will be understood without specific illustration or description.

Figure 1 represents a side elevation, partly in section, of my improved type-writer; Fig. 2, a front elevation of the same. Fig. 3 is a perspective view of my improved sectional type-wheels; Fig. 4, a cross-section of the same, and Figs. 5 and 6 are perspective views of castings employed in the construction of my apparatus.

The general arrangement of the apparatus will more clearly appear from Figs. 1 and 2.

Upon the base-plate 1 is fixed a number of posts, 2, of suitable height, and these in turn support a platform, 3, upon which the apparatus proper is mounted. It consists in the main of a key-board, a rotary type-wheel controlled thereby, a printing lever or mallet, type and line spacing mechanism, and electro-magnets actuating the several parts. The key-board is arranged in two sections, 4 4, each of which consists of a casting, 5, with key-levers 6 6 pivoted therein. Each key-lever corresponds to a letter, numeral, or punctuation-mark used in writing, and is provided with a button, 7, having such letter, &c., marked upon its face, as in ordinary mechanical type-writers. The two sections of the key-board are separated from each other by a space, the width of which is adapted to the construction of the other parts of the apparatus, which are hereinafter described.

At the outer ends of the castings 5 are standards 8 8, which form the frame of the apparatus and contain the bearings for the shafts of drums 9 9. Each drum extends from one standard to about the inner end of its corresponding casting, 5, and in the space between the inner ends of these drums is located the type-wheel 10, which may be of any ordinary or improved construction, but which is pref-

erably constructed as hereinafter more fully described.

As will be seen in Fig. 2, the type-wheel is mounted upon a short shaft, 11, which is in line with the main shafts of both drums, and is secured to the inner ends of the latter. Thus when the drums are rotated the type-wheel will move with the same.

The standards 8 are of such height as to support the drums a suitable distance above the platform, as shown, and they are also provided with V-shaped guide-bars 12, for supporting and guiding the carriage of the type-writer, which carriage, however, has been omitted from the drawings for the sake of clearness of illustration. The drums 9 9 are preferably made of metal, and they are provided with a series of lugs, 13, arranged helically upon their surface, the position of each lug corresponding to the position of one of the levers of the two sections of the key-board, and also corresponding each to one of the types upon the type-wheel.

The castings 5 have the general shape of an I-rail. They are constructed with a base, 14, by which they are secured to the platform, a central stem, 15, two lateral branches, 16 16, and a central bearing branch, 17. The central bearing branch is divided by slots 18 into a number of lugs, and perforations 19, passing in a single line through the lugs, serve for the reception of a pivotal rod passing through all of them, and upon this rod are pivotally hung the levers 6, which are received in the slots 18. Each alternate key-lever is curved upwardly from its outer end. It then extends upon a straight line through and beyond one of the slots in the casting 5, and is then again curved upwardly and terminates in an upwardly-curved nose, 20, which engages with a downwardly-curved nose, 21, formed at the end of a corresponding stop-lever, 22, pivoted in a bracket, 23. Between these key-levers are others, the front arms of which terminate with the straight portions of said levers, to which the type-buttons are secured. Thus while there is only a single row of key-levers in each section of the key-board there are two parallel rows of type-buttons, as is clearly shown in the drawings.

From the construction thus far described it follows that if a key-lever is depressed by hand one of the lateral branches 16 of casting 5 will form its front stop, and if the lever is rocked in the opposite direction the other lateral branch, 16, of casting 5 will form its back stop. Each lever is held normally in contact with its back-stop by a counterbalancing weight or swelling, 20', formed under the nose 20. Thus if any one of the key-levers is first depressed in front and is then released the overbalancing weight 20' will return such lever automatically to its normal position in contact with its back stop.

There are two castings, 23, each corresponding to one of the castings 5 5, and parallel with the latter. Each casting 23 is fastened by screws passing through a flange, 24, formed

at its lower edge to the platform, and it terminates on top in a projecting flange, 25, which is parallel to flange 24. Between these two flanges there is a rib, 26, parallel with the two flanges and projecting from the main body of the casting. In general outline this rib 26 has the shape of an upwardly-curved hook, and is divided into lugs 27, which correspond each to one of the lugs on the central bearing branch 17 of casting 5. These lugs, however, are joined at their upper edges by a web, 27', which is cast in one piece with the lugs, as is clearly shown in Fig. 6.

The stop-levers 22 are pivoted upon a rod passing through all the lugs of rib 26, and the parts are so proportioned and arranged that in its normal position the vertical arm of each lever 22 leans forward and is arrested by web 27' of casting 23. When one of the key-levers is depressed in front, its nose 20, engaging nose 21 of its corresponding stop-lever, will tip the vertically-extending arm of lever 22 rearwardly until the same is arrested by the projecting flange 25, and if the type-lever is released, its nose 20 disengaging nose 21 of the stop-lever, the latter will be brought into its original position by the overbalancing weight of nose 21, which for this purpose is made thicker and heavier than the vertical arm of lever 22.

The normal position of lever 22 (shown in solid lines in Fig. 1) is insured by so distributing the weight of said lever that its center of gravity is at all times to the left-hand side of its fulcrum, as shown in Fig. 1, and this may be effected either by making the nose 21 sufficiently heavy, as before stated, or in any other suitable manner.

Web 27' in each casting 23 constitutes the front stop for each lever 22 mounted in that casting, and flange 25 constitutes the corresponding back stop, and it will now be seen that when a key-lever, 6, is upon its front stop the corresponding stop-lever will be upon its back stop, and, on the other hand, when a key-lever is upon its back stop its corresponding stop-lever will be upon its front stop. The latter is the normal position, and in this position the vertical arms of the stop-levers are all in one plane, which slightly inclines from the vertical, and their upper ends are all in one straight line. The back stop, 25, of the levers is so located and the levers themselves are of such length that when a key-lever is depressed and its corresponding stop-lever is forced against its back stop, the upper edge of such stop-lever will be fairly out of contact with, but close to, the surface of one of the drums or cylinders 9 9.

The metallic lugs 13 upon each cylinder are arranged upon a helical line, and are so spaced longitudinally that whenever a key-lever is depressed the corresponding stop-lever will intercept one of these lugs and will stop the cylinders and the type-wheel rotating with the same. There are therefore as many lugs upon each cylinder as there are key-levers to the

corresponding section of the key-board, and the number of types upon the type-wheel is equal to the total number of key-levers. In addition to this, there is a word spacing lever 5 which occupies the place of a key-lever. This spacing-lever is constructed exactly like a key-lever, and has its corresponding stop-lever pivoted in one of the castings 23 and a corresponding lug, 13, upon one of the drums or 10 cylinders 9. There is, however, no type upon the type-wheel corresponding to the spacing-key, but an empty space, 10', the function of which will be explained hereinafter.

A printing lever or mallet, 26', with its 15 striking-head 27, of soft rubber or other elastic material, facing the edge of the type-wheel, is pivoted to the base of a frame, 29. One arm, 28, of this lever carries the armature 30 of an electro-magnet, 31, so that when the latter is 20 energized the armature will be attracted and the head of the mallet will strike upon the rim of the type-wheel, and if a paper is interposed between the type-wheel and the head of the printing-lever the letter, numeral, or 25 other character formed upon that part of the type-wheel which happens to face the printing-lever will be printed upon such paper. The types on the type-wheel are so spaced and are in such sequence that if a key or key-lever 30 marked with a certain letter or character is depressed, and the rotating cylinders are stopped by the interception of one of the lugs upon a cylinder by the stop-lever corresponding to the depressed key, the same letter or 35 character upon the type-wheel will face the head of the printing-lever. This same letter or character will therefore be printed upon the paper if the magnet 31 be energized at the proper time, and if a word or sentence be 40 spelled out by the successive depression of the proper keys this word or sentence will be printed upon the paper, as in ordinary mechanical type-writers.

The arm 26' of the printing-lever is curved, 45 as shown, to bring its center of gravity to one side of the fulcrum 32, and an adjustable stop-screw, 33, in a standard, 34, limits the outward movement of the printing-lever and armature. It constitutes the back stop of the 50 printing-lever.

The carriage and its letter and line spacing mechanism are not shown in the drawings for the sake of clearness of illustration; but the electro-magnets 35 36 and their adjuncts which 55 actuate that mechanism are shown conventionally supported upon a standard, 37. It is not necessary here to describe these magnets and their adjuncts any further than to say that they are designed to move the carriage 60 after each imprint and to shift the paper after the completion of a line in position to receive another line of writing.

To one end of the common shaft of the cylinders 9 9 is secured a bevel-gear, 38, meshing 65 with another bevel-gear, 39, keyed to a vertical shaft, 40, which is driven by a suitable mo-

tor (not shown) in unison with a similar shaft in an apparatus constructed substantially like the one here described located at a distant station. The synchronal motor is not here 70 shown; but it will be understood that I may use any ordinary or improved motor of that kind, although I prefer to use the synchronal motor patented to me August 16, 1887, and numbered 368,411.

Upon a shaft, 40, is secured a disk, 41, of 75 soft iron, below the platform 3, and this disk, rotating with the shaft 40, extends between the two poles of electro-magnet 42. When this electro-magnet is energized by the passage of 80 a current through its coils, and one side of the disk 41 is in a dense magnetic field, when said magnet is energized, and its motion will be ordinarily retarded by the resistance of said field, and if the electro-magnet is powerful 85 enough the passage of the disk through the magnetic field of the same will be arrested. In pursuance of the objects of my invention, electro-magnet 42 is made strong enough to 90 arrest the motion of disk 41 through its field of force whenever a suitable current is passed through the magnetizing-coil, and the construction herein described is specially adapted to aid this operation.

In other pending applications, heretofore 95 mentioned, I have shown electrical type-writers serving the same purpose as that herein shown, and among other features, similar to those found in the present invention, it has also a rotary shaft with a magnetic disk mov- 100 ing through a magnetic field; but in those other pending applications there is, in addition, a disk of large diameter secured to the shaft and provided with lugs corresponding to the lugs 13 upon cylinders 9, (shown in this 105 case,) and the momentum of a disk of such size as is necessary to provide room for the lugs would carry the same and the magnetic disk beyond the point where it is necessary to stop it, unless the magnet were very powerful 110 and the energizing-current very strong.

In the construction herein shown a cylinder or cylinders are employed in place of a disk, and this enables me to reduce the mass set in 115 motion by the shaft to which the magnetic disk is secured, and to bring that mass closer to the mathematical axis of rotation. For both reasons the momentum is greatly reduced, and the electro-magnet may be comparatively 120 weak, and will promptly arrest the motion of disk 41 and the parts connected therewith. The reduction of the momentum of the rotating parts has also another beneficial effect, in that the shock received by the stop-levers is thereby lessened. In addition to this, the use 125 of cylinders in place of a disk enables me to place the stop-levers in such position that the direction of the blow of the stop-lugs upon the same will pass through the fulcrums of these levers. The latter may therefore be 130 made comparatively light without danger of bending, whereas in the construction with the

disk the stop levers must be arranged to receive the blow of the lugs on their sides, tending to bend these levers.

An inking apparatus, 43, is mounted upon a post or pillar, 44, close to the type-wheel, and, with the inking-roller 45 in light contact with the types, any suitable form of inking apparatus may be used.

The electrical connections are as follows:
 10 One pole of a battery, 46, is grounded by a conductor, 47, and a branch, 48, from the ground-conductor is connected with the contact-button 49 of switch 50, the pivot of which is connected by a wire, 51, to a binding-post, 52, fixed
 15 upon platform 3. From the binding-post a wire, 53, connects with contact-button 54 of switch 55, which in turn is connected with the line-wire, as shown. A second contact-button, 56, of the switch connects, by means of
 20 a wire, 57, with an electric signal bell, 58, which is grounded by a conductor, 59. Another wire, 60, connects binding-post 52 with one terminal of the coil of magnet 42, the other terminal of which is connected by a wire, 61, with the spacing-magnets 35 and 36. From the said magnets
 25 35 and 36 the circuit proceeds by wire 62 to wire 63 to and through the coil of said magnet, which coil terminates by a wire, 64, at a binding-post, 65, upon bracket 29. From binding-post 65 one wire, 66, connects with a contact-brush, 67, bearing upon a contact-sleeve,
 30 69, on the common shaft of the cylinders 9 9. When a stop lever comes in contact with one of the lugs upon the cylinder 9, the circuit is continued through such stop-lever, casting 23,
 35 and wire 70 to the battery. Upon casting 23 is mounted a switch-lever, 71, which is designed to make and break contact with a button, 72, upon the platform, and said button is connected by a wire, 73, with the binding-post 65
 40 upon bracket 29. The line is in circuit with battery 46, through connections before described, while the bell 58 is in circuit with battery at distant station through the line, and
 45 for that reason is shown grounded by wire 59. (See Fig. 1.)

The operation of this apparatus will now be readily understood. It is only to be remembered that when two or more type-writers at
 50 different stations are in circuit the shafts 40 of the same are rotated in unison by synchro-nal motors located at those stations, so that in all of them the same types upon the type-wheels pass in front of the striking-heads of
 55 the printing-levers at the same instant.

The operation of synchro-nal motors is well understood by those skilled in the art, and need not be here described.

If the apparatus is used as a transmitter,
 60 switches 50 and 71 are thrown open and switch-arm 55 is turned upon button 54. The message which it is desired to transmit is spelled out by the successive depression and release of the keys marked with the letters or characters composing the desired words and sentences. Suppose the key marked with the
 65 letter A be depressed, the rear end of that le-

ver being elevated, its nose 20, engaging nose 21 of the respective stop-lever 22, the latter will be tipped over until arrested by its back
 70 stop 25. In this position the upper end of the stop-lever will be just out of contact with the surface of the cylinder 9, in conjunction with which it operates, and the key is held depressed, until, by the rotation of the cylinders, the lug
 75 13, which corresponds to this particular key and stop-lever, is intercepted by the latter, whereby the type-wheel is stopped with the type A facing the head of the printing-levers. By the contact of lug 13 with the stop-lever, a
 80 circuit is closed, as follows: From one pole of battery 46 by wire 70 to casting 23, stop-lever 22, cylinder 9, collar 69 upon the common shaft of the cylinders and type-wheel, brush
 85 67, wires 66 and 64 to and through coil of electro-magnet 31, and by wires 63 and 62 to the spacing-magnet 35 and 36. From the coils of the spacing-magnets the circuit continues by
 wire 61 to brake-magnet 42, and then by wire 60 to binding-post 52, and by wire 53, contact-
 90 button 54, and switch arm 55 to line. At the distant station the circuit includes an apparatus, identical with that herein shown, arranged for receiving the message, as will be presently explained, and is completed by the ground
 95 back to the other pole of battery 46. The current traversing this circuit energizes the magnets 31, 42, and 35; but the latter magnet is constructed to be rather sluggish by making its cores comparatively solid and heavy, as is
 100 well understood by those well skilled in the art, while magnets 31 and 42 are constructed to be rapidly energized and discharged. The effect of this is, that as soon as the circuit is
 105 closed, as above described, the printing-lever is instantly actuated and prints the letter A upon the paper, (not shown,) and a part of magnetic disk 41 is instantly exposed to a dense magnetic field, whereby said disk and the
 110 mechanism connected therewith would be suddenly arrested if it had not been already arrested by the interception of lug 13 by a stop-lever. However, the magnetic disk is arrested
 115 at a distant or receiving station by its magnet, which is energized by the transmission of an electric impulse over the line, so that the shaft carrying the magnetic disk is stopped
 120 mechanically at the transmitting station and electro-magnetically at the receiving station. (See operation, as hereinafter described.) In transmitting, the brake-magnet has thus only
 an auxiliary function. It assists in holding the cylinders and type-wheel in position and
 125 relieves the stop-lever of part of the pressure of the lug upon the same.

The printing-lever is somewhat elastic, and after impact with the type-wheel it rebounds, leaving the paper free to be fed forward. At this instant the spacing-magnet attains its full
 130 force and actuates the carriage to feed the paper in position to receive the next stroke of the printing-lever. If now the key is released, all parts return to their normal positions and are ready for the repetition of the operation

just described. In this manner any desired message is printed by the manipulation of the proper keys, and at the same time electrical impulses are sent over the line, which at the distant station cause the printing of the message in the receiver.

In order to enable the operator to make a space between a word just printed and the next succeeding word of the message, one of the keys—denominated the “spacing-key”—is joined with a stop-lever, which intercepts a lug upon one of the cylinders so located as to arrest the type-wheel with the space 10' facing the head of the printing-lever. If this spacing-key is depressed, all the operation above described will be repeated, with this difference, however, that no letter or other character will be printed upon the paper.

If the apparatus is to be used as a receiver, switch 71 is closed and switch 50 is opened, while switch-arm 55 is turned upon button 54, as in transmitting.

In order to clearly understand the operation of the apparatus as a recording-receiver, it should be remembered that the transmitter, which is now supposed to be at the distant station, has its type-wheel rotated in unison with the type-wheel of the receiver at the home station, so that the same letters or characters upon the two type-wheels are simultaneously passing before the heads of the printing-levers at both stations. This being understood, it will be seen that, if a given letter (say A) is being printed at the distant transmitter, the same letter A upon the type-wheel at the receiver will face the head of the printing-lever and the printing of said letter at the receiver will be effected as follows: The electrical impulse sent to line by transmitter, simultaneously with the printing of the letter A, will enter the receiver at the switch-arm 55, and will then proceed, by wire 53, binding-post 52, wire 60, to and through the coils of magnet 42. Leaving said coil by wire 61, the current will traverse the coils of spacing-magnets 35 and 36, from whence it will continue by wires 62 and 63 to and through coils of electro-magnet 31, leaving the same by wires 64 and then by wires 73, contact-button 72, switch 71, wire 70, battery 46, and by wire 47 to ground. It will be understood that the battery at the transmitter is in series with that at the receiver, so that both instruments are actuated by the combined current from the two batteries. The electrical impulse sent to line by the transmitter simultaneously with the printing of a letter (in this instance the letter A) traverses at the receiving-station, as has been seen, the coils of magnets 42, 35, and 31 at the instant when letter A upon the type-wheel appears in front of the head of the printing-lever. Magnets 42 and 31 being instantly energized, the rotation of magnetic disk 41 and of the type-wheel is suddenly arrested. At the same instant armature 30 is attracted by magnet 31 and the printing-lever strikes the paper (not shown) against the type A upon the type-

wheel. An instant later, while the printing-lever is rebounding, the sluggish spacing-magnet attains its full force, and the carriage is actuated to move the paper one space in position to receive the next imprint.

When it is desired to use the instrument as a local instrument, like an ordinary mechanical type-writer, switch 71 is opened, switch 50 is closed, and switch-arm 55 is disconnected from button 54. Preferably this switch-arm is thrown over into contact with button 56, whereby the line is grounded through the call-bell 58. Thus if at any time while the home-instrument is used as a local type-writer a key at the distant transmitter is depressed the bell 58 will respond, warning the attendant to set the switches for receiving.

If arranged for local use, as above described, the circuit of battery 46 is a local circuit, which is closed by the depression of any key of the key-board, the same as in transmitting. If such key is depressed, the corresponding stop-lever will intercept the corresponding lug upon one of the cylinders 9 9, will arrest the type-wheel in proper position to receive the stroke of the printing-lever, and will close the local circuit, which will be as follows: From one pole of battery 46 by wire 70 to casting 23, stop-lever 22, and by the intercepted lug 13 and the cylinders to brush 67; then by wires 66 and 64 to and through coil of electro-magnet 31, wires 63 and 62 to and through the coils of spacing-magnet 35 36, and by wire 61 to brake-magnet 42. From this magnet the circuit continues by wire 60, binding-post 52, wire 51, switch 50, and by wires 48 and 47 back to the other pole of the battery. The current traversing this circuit will actuate the apparatus in the same manner as in transmitting, and it is therefore unnecessary to further explain this phase of operation.

It will be noticed that by the construction shown the shock received at the free end of a stop-lever when a lug of one of the cylinders is intercepted by the same passes through the fulcrum of such lever, and is consequently not transmitted to the key-lever. The finger of the operator resting upon the button of the key-lever does not therefore receive a shock, which greatly adds to the ease and comfort of operation, and also prevents the bending of the key-levers and the loosening of their pivots.

The type-wheel which I prefer to use in my improved apparatus is illustrated in Figs. 3 and 4.

The shaft 11 upon which the type-wheel is mounted has a number of segmental recesses, 74, separated from each other by ridges 75. The type-wheel itself is composed of a number of sectors, 76, each sector composed of a part of the rim of the wheel and a segmental part of the hub of the same. The hub portion of each sector fits exactly into one of the recesses 74, and the projecting inner ends, 77, of the web of the sector overlap each one-half of a ridge, 75. When the sectors of the type-wheel are assembled, as indicated in Fig. 4, a

sleeve, 78, is passed over the hub-segments and is tightened about the same by clamp-screws, as shown. The type-wheel has then the appearance as if it were made of one piece, but may be removed from the shaft without removing the cylinders 9 9.

A more detailed description of my improved type-wheel is deemed unnecessary, since this improvement is fully set forth in another application of even date, Serial No. 252,727, wherein it is made the subject of claims.

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

1. In an electrical type-writer, the combination, with a type-wheel and metallic cylinders, all rotating in unison, metallic lugs upon said cylinders corresponding to the types upon the type-wheel, of circuit-controlling stop-levers, one for each lug, a printing and a spacing magnet included in a local circuit with the cylinders and stop-levers, a key-board controlling said stop-levers, a line circuit, and switches and connections whereby the local circuit may be connected with the line-circuit.

2. The combination, with a circuit-controlling key-board, of stop-cylinders controlled by said key-board, a local circuit also controlled by said key-board, printing and spacing mechanism controlled by said local circuit, a main-line circuit, and switches and connections for connecting and disconnecting said local circuit with the main-line circuit.

3. In an electrical type-writer, the combination of a type-wheel and cylinders of conducting material rotating with the same about a common axis and provided with metallic lugs corresponding to the types upon the wheel, with an independent metallic stop-lever for each lug, normally out of contact with the cylinder, but movable into the path of the lug, an electromagnet and a printing-lever actuated thereby, a sluggish spacing-magnet for moving the paper after the imprint has been made, and a key-board for actuating the stop-levers to stop the type-wheel and cylinders and to close the circuit of the magnets, substantially as described.

4. In an electrical type-writer, the combination of a type-wheel and metallic cylinders rotating with the same about a common axis

and provided upon their surfaces with metallic lugs corresponding to the types upon the wheel, with circuit-controlling stop-levers, one for each lug, a printing and a spacing magnet included in a local circuit with the cylinders and stop-levers, and a mechanical key-board for controlling the stop-levers, substantially as described.

5. In an electrical type-writer, the combination of a type-wheel and cylinders rotating with the same about a common axis and provided with stop-lugs corresponding to the types upon the wheel, with a stop-lever for each lug, having one straight arm movable into the path of the lug and the other arm provided with a hook or nose, and a key-lever for each stop-lever, having a hook or nose at one end engaging the nose on the stop-lever, substantially as described.

6. In an electrical type-writer, a pivotal support for the operating-key levers, consisting of a casting having upon a central stem or branch a series of parallel slots for the reception of the levers, and a series of lugs alternating with the slots for the reception of a pivotal rod common to all the levers, and two lateral branches constituting the common front and back stops, respectively, substantially as described.

7. In an electrical type-writer, the combination of a series of levers in operative relation to the type keys, with a pivotal support for the stop-levers, consisting of a casting having a longitudinal rib divided into alternate slots and lugs, the latter being connected by a web serving as the front stop of the levers, substantially as described.

8. A pivotal support for a series of independent levers, consisting of a casting having a longitudinal rib divided into alternate lugs and slots, the former being connected by a web serving as the front stop of the levers, and a flange parallel to the rib, serving as a back stop for the levers, substantially as described.

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

J. F. McLAUGHLIN.

Witnesses:

THOS. J. HUNT,
GEO. H. TICHENOR.