

No. 854,401.

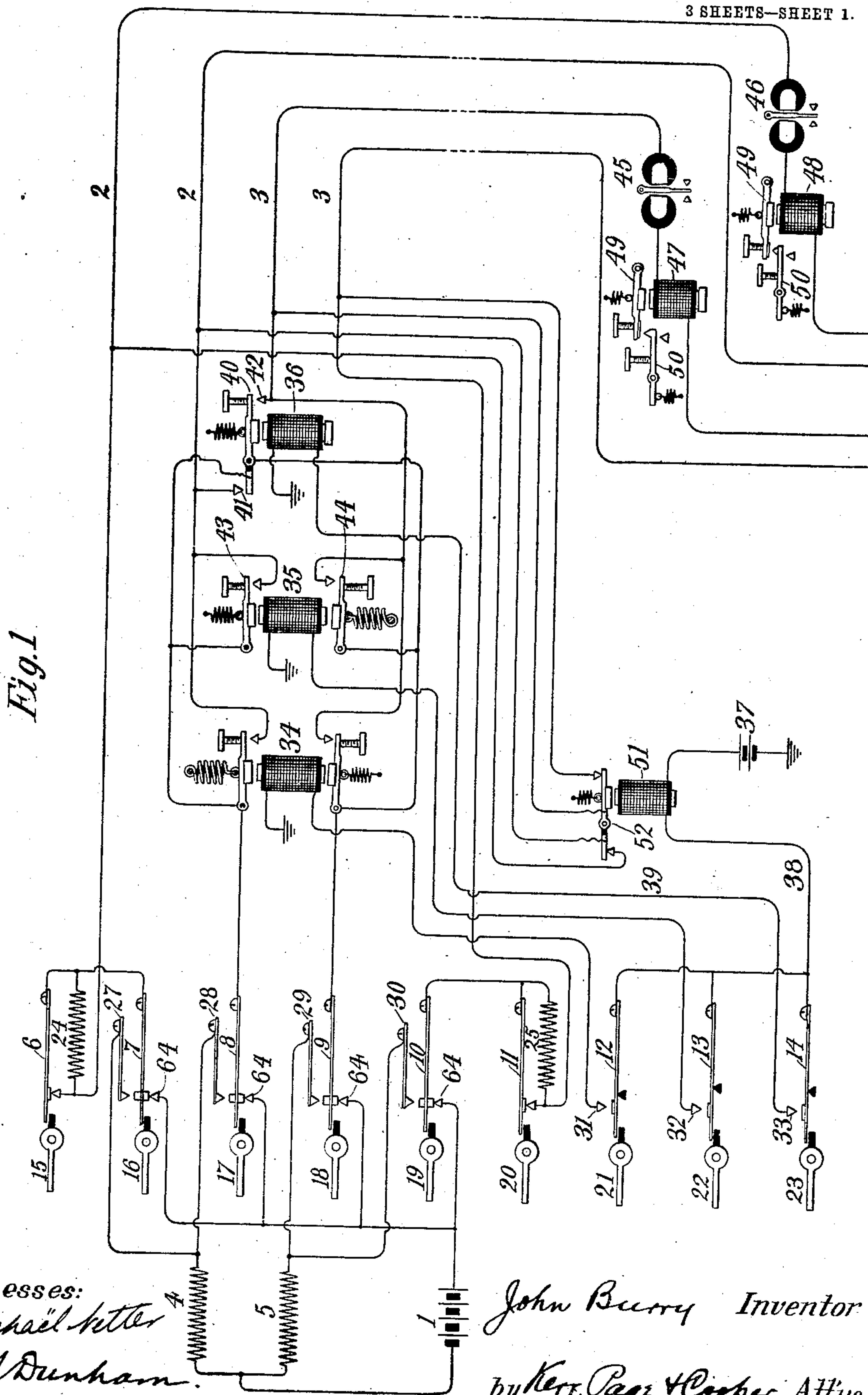
PATENTED MAY 21, 1907.

J. BURRY.

TELEGRAPH TRANSMITTER.

APPLICATION FILED JULY 21, 1904.

3 SHEETS—SHEET 1.



Witnesses:

Rapphael better

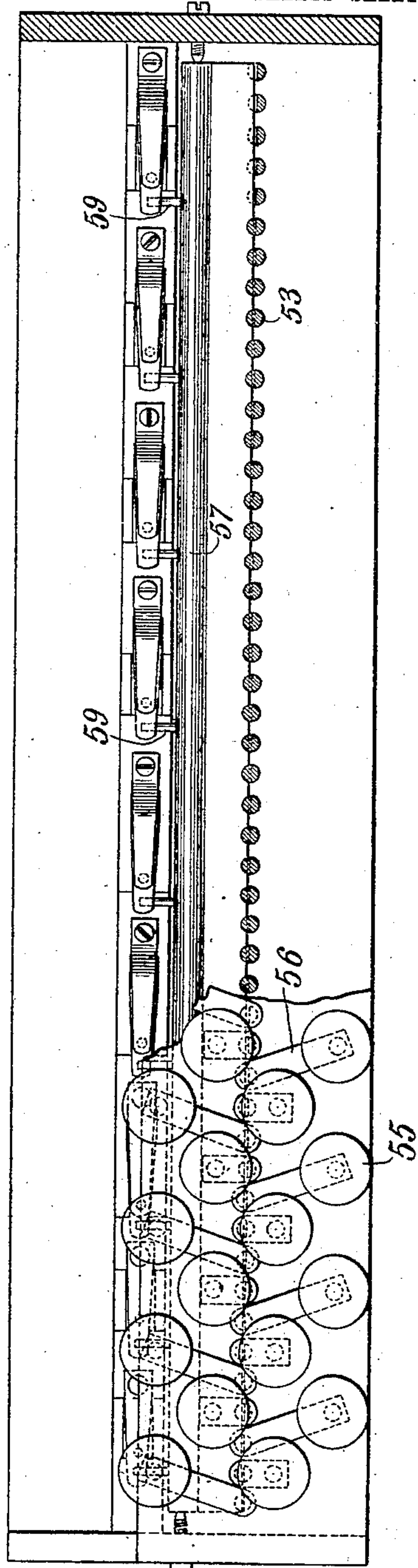
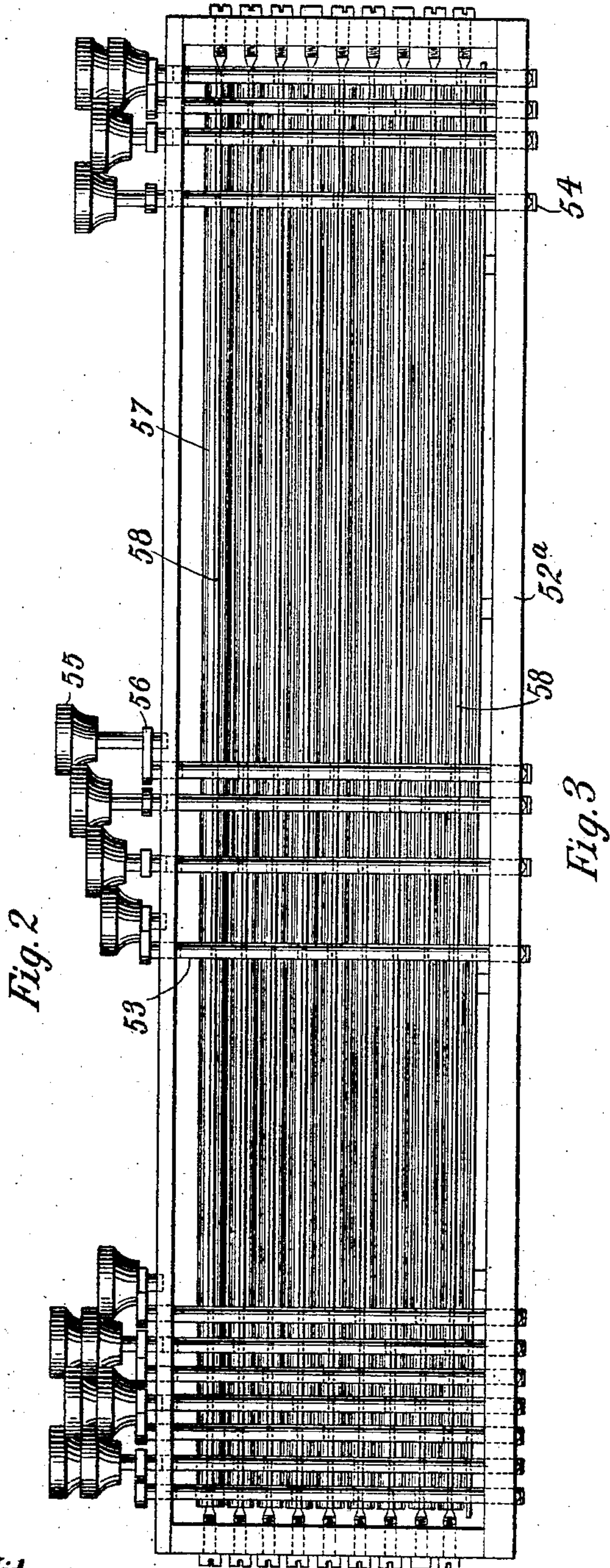
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3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

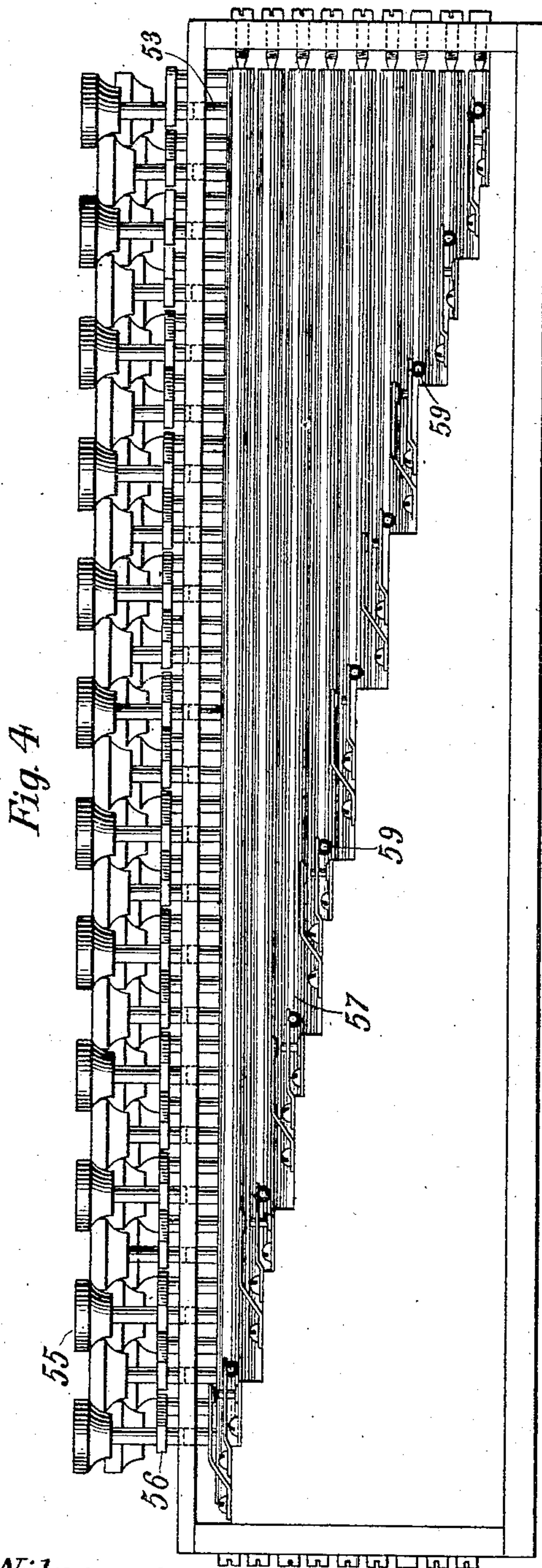


Fig. 4

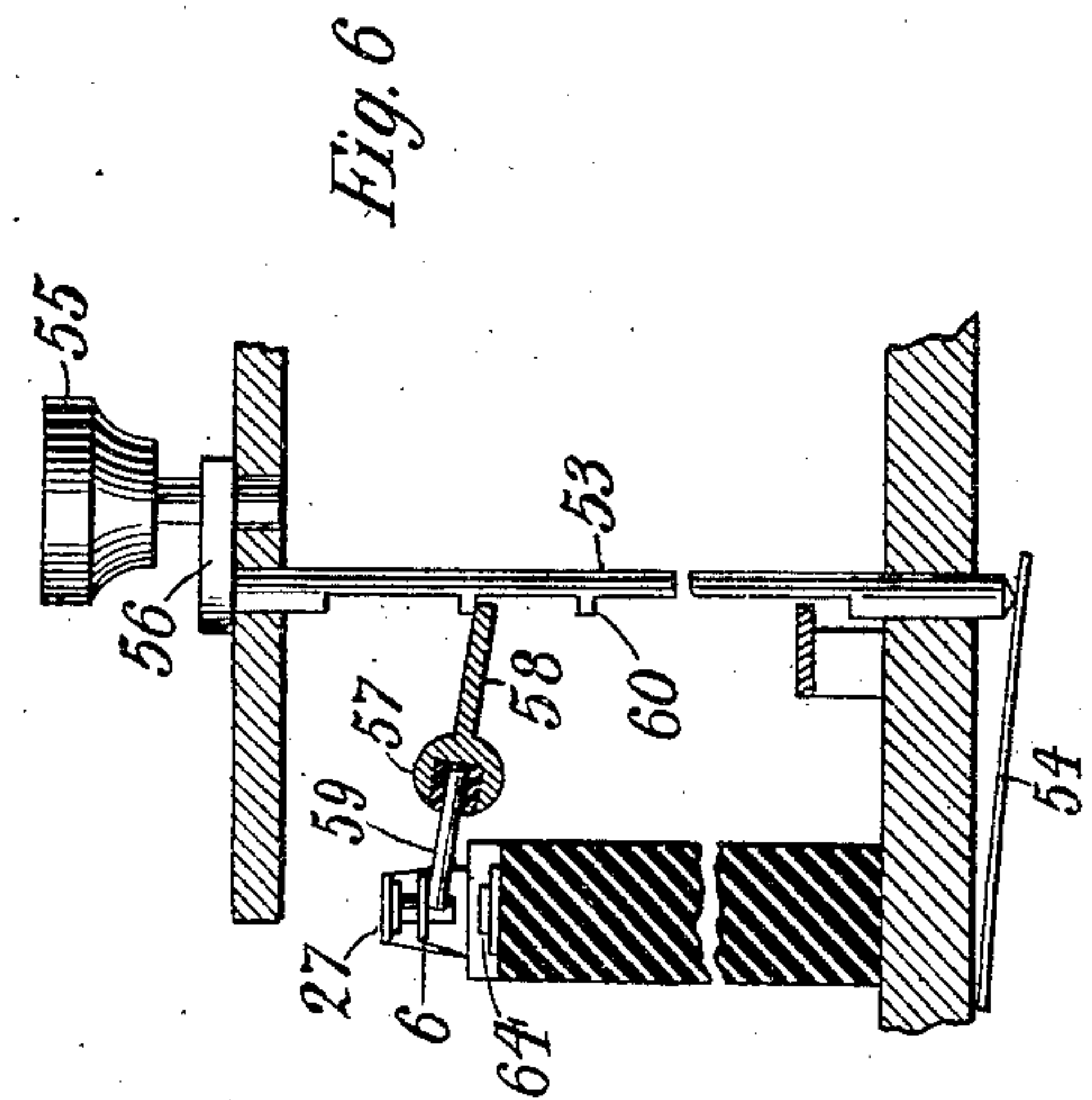


Fig. 6

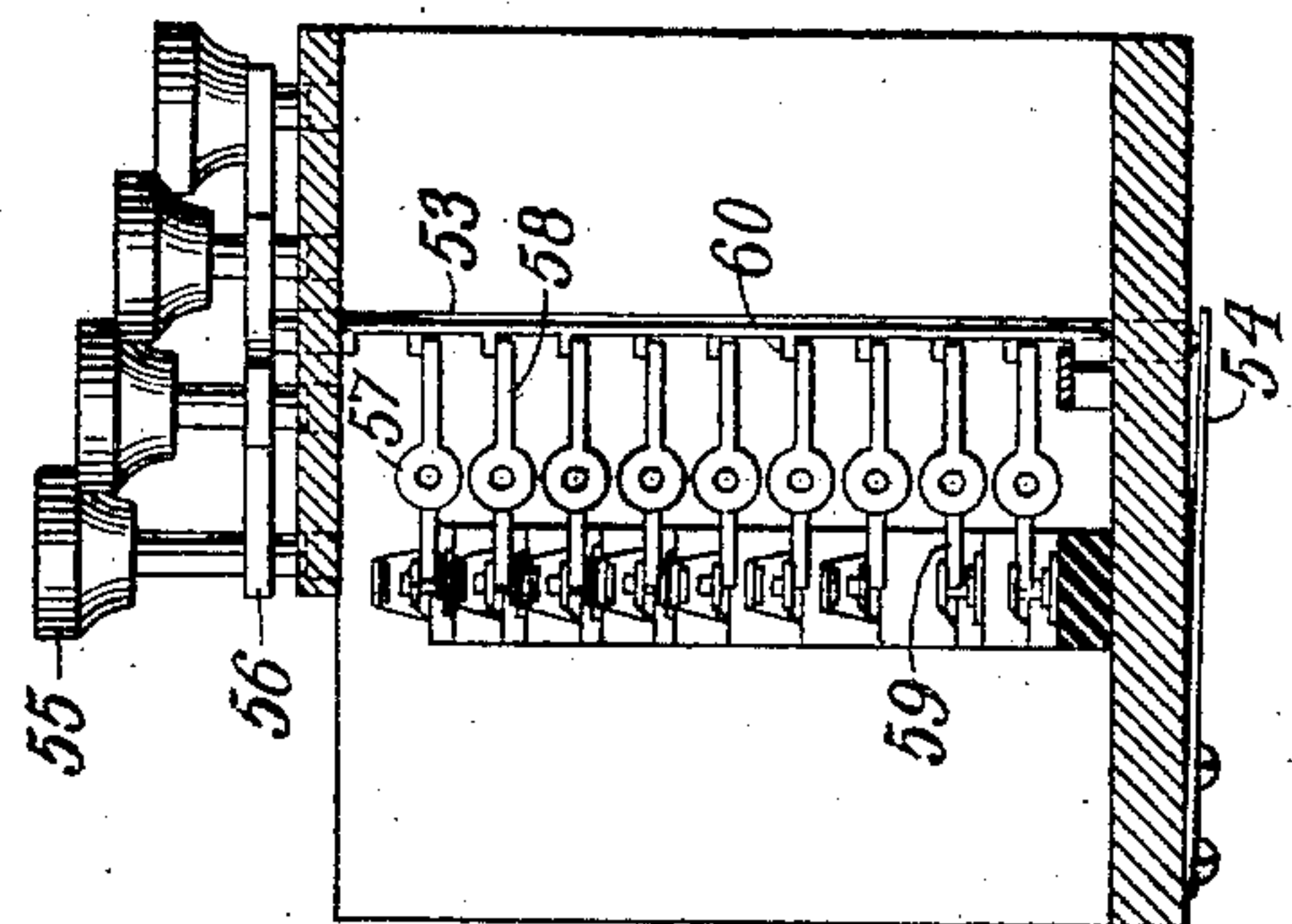


Fig. 5

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UNITED STATES PATENT OFFICE.

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TELEGRAPH-TRANSMITTER.

No. 854,401.

Specification of Letters Patent.

Patented May 21, 1907.

Application filed July 21, 1904. Serial No. 217,570.

To all whom it may concern:

Be it known that I, JOHN BURRY, a citizen of the United States, residing at Ridgefield Park, in the county of Bergen and State of New Jersey, have invented certain new and useful Improvements in Telegraph-Transmitters, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same.

My invention is an improvement in apparatus for transmitting over a plurality of conducting paths, impulses of distinctive character for the purpose of operating or controlling by their conjoint action or effect the operation of appropriate receiving mechanism.

The improvement is primarily designed for use as a transmitter for operating one or more printing telegraph receivers, but from the nature of the invention hereinafter disclosed, it will be seen that its applicability to cases where distinctive combinations of electrical effects are required for the operation of a given instrument, is very general.

The purpose of the improvement is, chiefly, the provision of a transmitting instrument of the simplest possible mode of manipulation. One, in other words, with as many character keys as the ordinary requirements of business correspondence demand, which will invariably and automatically effect the proper printing or recording of any desired matter merely by the depression of the keys corresponding to the characters to be transmitted, and which; therefore, requires for its proper manipulation no more skill than that necessary for the operation of an ordinary typewriter. To accomplish this I employ two transmitting circuits, a source of current and means operated by the depression of the several keys of any suitable key board for sending to the said lines impulses of strong or weak current from either pole of the source, and for varying the time relations of the said impulses. The object of this plan and the results secured thereby, will appear from the following considerations. If I have two lines or circuits, and employ suitable circuit controlling mechanism in connection therewith, it is possible to send over either or both lines a positive strong or weak, or a negative strong or weak impulse of current, so that if the two lines conjointly control the operation of a suitable receiver sixteen combinations are possible, assuming an impulse to be di-

rected over each line by the depression of every key.—That is to say, over one line there may be sent a strong positive and over the other a weak negative current, or conversely, and so on for sixteen different combinations, and it is easy to devise a receiving instrument in which each one of these combinations will bring to the printing point and impress a corresponding character. Such devices have been long known in the art. As the number of combinations thus secured is, however, inadequate to meet the requirements of ordinary correspondence, I increase the number of possible combinations by combining with the devices for sending them means for varying the time relation or order of succession of the impulses in the two circuits, by causing the impulses in one to precede or to follow those of the other, or to be transmitted simultaneously. In this way I obtain forty-eight distinctive combinations by which to operate the receiver, each of which is produced by the simple depression of a single lever or key.

I shall explain hereinafter, so far as may be necessary to an intelligent understanding of my present improvement, how these various combinations may be used to print corresponding characters, but my main object herein is to describe the means by which such combinations may be produced or transmitted by the mere depression of ordinary keys, designated by appropriate letters and characters as are those of an ordinary typewriter, so that anyone may transmit the necessary impulses without any knowledge of the requirements or principle of operation of the instruments, such as is now demanded of those who operate even the simplest forms of printing telegraphs. I refer therefore to the accompanying drawings which illustrate the principle and the preferred form or embodiment of my invention.

Figure 1 illustrates the electrical connections and general arrangement of the devices employed. Fig. 2 is a front view in elevation of the transmitter, showing a portion of the keys. Fig. 3 is a top plan view of the same with a portion of the top plate removed. Fig. 4 is a rear view in elevation of the transmitter. Fig. 5 is an end view of the same with the end plate of the box or case removed. Fig. 6 is a cross-section showing one of the keys and the circuit controlling mechanism connected therewith.

Referring, for the present to Fig. 1, let 1

represent a source of current which is generally an incandescent lamp circuit, the current from which is reduced to meet the practical conditions of the two transmission circuits, 2, 2 and 3, 3 by being caused to pass to these lines through rheostats, 4, 5. For convenience of illustration the lines are shown as complete metallic circuits.

Numerals 6 to 14, inclusive, designate resilient metal strips carrying ordinary platinum contact points and normally resting on terminal stops.

Numerals 15 to 23 designate levers or keys with insulating ends lying under the said strips respectively, and arranged when depressed to raise the strips off their terminal stops.

The strips 11 and 6 by engagement with their terminal stops short circuit resistances 24 and 25 respectively, while with each of the remaining strips there is associated a contact terminal connected to one of the two line or one of the three local circuits respectively, as will be more fully described.

Following now the connections from the battery 1 as they normally exist when the apparatus is out of action, it will be seen that the path from one pole of the battery divides between resistances 4 and 5. From the former it further divides to the terminals 27 and 28 of the keys 16 and 17, and from the latter to terminals 29 and 30 of keys 18 and 19. The opposite pole of the battery is connected permanently with the stops 64 of keys 16, 17, 18 and 19, from which it results that the depression of keys 16 and 18 sends impulses of a given direction through each line circuit, while a similar operation of keys 17 and 19 sends impulses of opposite direction through these circuits. The path for such currents however, is normally through the strip 6 in circuit 2 and strip 11 in circuit 3, which shunt the resistances 24 and 25 respectively, but if simultaneously with the depression of the keys which send such impulses, keys 15 or 20 be depressed, the path for the currents will be through said resistances, and hence the currents will be correspondingly weakened. Thus, it will be seen that by the depression of keys 15, 16, 17, 18 and 19 and 20, in proper groups, any one of sixteen combinations of weak, strong, positive or negative impulses of current may be sent over the two lines, 2 and 3.

The numerals 34, 35 and 36 designate three relay magnets employed for varying the time relations of the impulses transmitted by the above described means over the two line circuits. Magnets 34 and 35 have each two armatures, one quick acting, the other sluggish, this difference being secured by varying the mass of the armatures, or the sensitiveness of their retractile springs or otherwise. The magnet 36 has a single quick acting armature.

The magnets 34, 35 and 36 are energized by a local battery 37, through circuit connections controlled by keys 21, 22 and 23 respectively, and operate to direct the weak or strong impulses through one circuit in advance of, subsequently to, or simultaneously with the impulse in the other circuit, as will be understood by the following description of the operation of the instrument.

Assume that a strong impulse of current in a direction which we may call positive, is to be sent through both lines simultaneously. Keys 16, 18 and 23 will be depressed. The closing of key 23 directs the current from battery 37, through wires 38 and 39 and the magnet 36. Its armature 40 is attracted and simultaneously closes a break in each of the circuits 2 and 3, by engagement with its stops 41 and 42, hence as these two circuits have been connected with the main battery by keys 16 and 18, each will receive an impulse of strong current of a given direction. Assume, however, that while each circuit is to receive the same impulse as in the preceding illustration, that in circuit 2 is to precede that in circuit 3. Keys 16 and 18 and 22 will therefore be depressed. The last named key closes the circuit of magnet 35, which first attracts its sensitive armature 43 that closes a break in circuit 2, and then its sluggish armature 44 which closes a similar break in circuit 3. The impulse in the first named circuit will therefore precede that in the other.

As another illustration, assume that a weak impulse of given direction in circuit 2 is to follow a strong impulse of the same direction in circuit 3. Key 15 will be depressed to throw in resistance 24. Key 16 to send a positive impulse in circuit 2; key 18 to send a strong impulse in circuit 3, and key 21 to operate magnet 34 to close the break in circuit 3 in advance of that in circuit 2.

If in any of the illustrations given the key 17 or 19 had been closed in lieu of key 16 or 18, the current would have been directed through the respective circuits in an opposite direction.

Further description of the operation of the instrument would be superfluous in view of what now appears, that each key has its special function, which it always performs when depressed. That is to say, keys 15 and 20, weaken the current impulse, whatever its direction, by interposing a resistance in the circuits, keys 16 and 18 send impulses in a given direction over the two circuits respectively, while keys 17 and 19 send impulses in an opposite direction over their respective circuits. So likewise key 23 causes the impulses in the two circuits to flow at substantially the same instant of time; key 22 causes the impulse in circuit 2 to precede that in circuit 3, and key 21 reverses this order of succession. By depressing, therefore, at least three, or at most five, of the keys si-

multaneously, any of forty eight different combinations of impulses may be transmitted to the receiving apparatus.

I have not illustrated herein in detail the mechanism for utilizing these combinations, reserving this as subject matter for another application, but I will explain the principle of such apparatus so that it may be applied to such specific apparatus as one skilled in the art may devise.

In each of the two circuits at the receiving end is a polarized relay 45, 46. A positive impulse whether weak or strong will therefore throw the armature or vibrating tongue over to one side and in contact with the stop on that side, while a negative impulse will throw said armature to the opposite side. In each of said circuits is also a neutral relay, 47, 48, with two armatures of different degrees of sensitiveness, or their equivalents. For example, each magnet is provided with an armature 49 having a comparatively weak retractile spring, so that all impulses flowing through the magnet will draw said armature down into contact with a spring retracted lever 50, while a strong impulse will draw down both levers 49 and 50. The movement of such lever may be availed of to make or to break local circuits, and if these circuits be in turn controlled by the tongues of the polarized relays so that, for example, one will be made or broken when the tongue is on one of its contacts and the other when it is on the opposite contact, it is evident that a large number of mechanical conditions in the receiver may be established according to the particular combination of impulses received by the two polarized and neutral relays. These conditions may be taken advantage of in many ways to operate or control a suitable recording mechanism.

As the lines are normally open at the transmitting end, or at both ends through the transmitter, if the system be equipped with a double set of instruments, it is necessary for the person operating a transmitter to switch in or out the receiver, so as to leave it always in condition to be operated from the opposite end of the line when impulses are not being actually transmitted. To accomplish this automatically, I interpose in that portion of the circuits which includes the receiver, a cut-out magnet 51, having a pivoted armature 52 with an insulating section which divides it into two portions. Two contact stops are fixed on opposite sides of the ends of the armature, so that when the magnet is inactive each half of the lever will close a shunt to or short circuit the transmitting instruments of each line, but whenever the battery 37 is brought in, as it will always be by one of the keys 21, 22 or 23, the armature 52 is attracted and opens the shunts of both circuits.

From the nature and object of my improve-

ment thus described, it is evident that its realization demands a suitable form of keyboard with keys corresponding to all of the letters and characters used in ordinary correspondence, and each of which by a single movement will operate all of the levers or circuit controllers necessary for producing the combination of impulses corresponding to the character for which the key stands. This result may be secured by many forms of mechanism, but that which I have illustrated in the accompanying drawings is the best and most effective arrangement which I have been able to devise. This instrument consists of a box or casing 52, containing a series of vertical plungers or rods 53, arranged in a line, and adapted to be depressed against the force of springs 54. To each of these plungers is attached a head or key 55, by an arm 56, the latter being of suitable length and extending in such direction as to bring the keys in convenient positions to be touched and depressed.

Immediately in the rear of the line of plungers, is a series of shafts 57 pivoted one over the other in a vertical plane, and each provided with a web or plate 58 extending across the entire width of the series of plungers. Extending rearwardly from each of said shafts 57 is a pin 59, insulated from the shaft and with its end extending under a contact spring which corresponds to one of the springs 6 to 14 of Fig. 1, so that when a shaft 57 is turned on its axis, the pin extending from it raises its spring off from its conducting stop as 64 and into engagement with its appropriate contact 27, 28 etc.

Each plunger 53 has a certain number of projections 60, the position of which is determined by the particular shafts 57 which the plunger on being depressed is required to turn, so that the depression of a key results in the transmission of the combination of current impulses over the two circuits which corresponds to and produces in the receiver the character for which said key stands.

In all ordinary cases two circuits will afford an ample number of combinations of impulses, but the improvement is not limited in this respect, nor is the character of the circuits or paths over which the impulses are directed an essential feature of the improvement, it being only necessary that the several impulses shall preserve their independence at least in so far as their effect upon the receiver is concerned.

Having now described my invention, what I claim is:

1. A telegraph instrument for transmitting distinctive combinations of current impulses over a plurality of circuits comprising in combination a plurality of circuits, means for controlling the strength, means for varying the direction, and means for determining the order of succession of the impulses sent

over the circuits, and keys adapted to engage and operate said means in distinctive combinations, as set forth.

2. A telegraph instrument for transmitting distinctive combinations of current impulses over a plurality of lines or circuits, comprising in combination, a plurality of circuits, devices for varying the strength, devices for controlling the direction, and devices for determining the order of succession of the impulses sent over the lines or circuits, and a series of keys, each engaging with and operating those devices which produce the combination of impulses appropriate to the letter or character corresponding to such key, as set forth.

3. A telegraph instrument for transmitting distinctive combinations of current impulses over a plurality of lines or circuits comprising in combination a source of current, devices for directing the current in either direction through a plurality of line circuits, devices for interposing and withdrawing resistance into and from the line circuits, devices for closing breaks in the said circuits in different order of succession, and a series of keys each of which when depressed engages with and operates those devices which produce the combination of impulses appropriate to the letter or character corresponding to such key, as set forth.

4. The combination with two lines or transmission circuits and a source of current, of devices for varying the resistance of the

lines, devices for directing the current through the circuits in either direction and devices for closing breaks in the two lines simultaneously or in either order of succession, a series of keys each engaging with a certain number of said devices, whereby the depression of a key will produce a distinctive combination of impulses in the two lines, as set forth.

5. The combination with two line circuits and controllers for varying the strength and direction of current impulses transmitted over the same, of three controllers, one adapted to close breaks in each circuit simultaneously, and the others adapted to close breaks in different order of succession, and keys adapted to engage or operate the controllers in varying combinations, as set forth.

6. The combination with two line circuits of a source of current and a transmitting instrument comprising a series of keys, each of which, when depressed connects the source to both lines, so as to produce therein current impulses in given directions, resistances in each circuit under the control of certain keys, and circuit controllers for closing breaks in the two circuits simultaneously or in different order of succession, with one of which each key is in operative engagement, as set forth.

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Witnesses:

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