

Oct. 19, 1937.

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2,096,108

TELETYPEWRITER SWITCHING SYSTEM

Filed July 10, 1935

2 Sheets-Sheet 1

FIG. 1

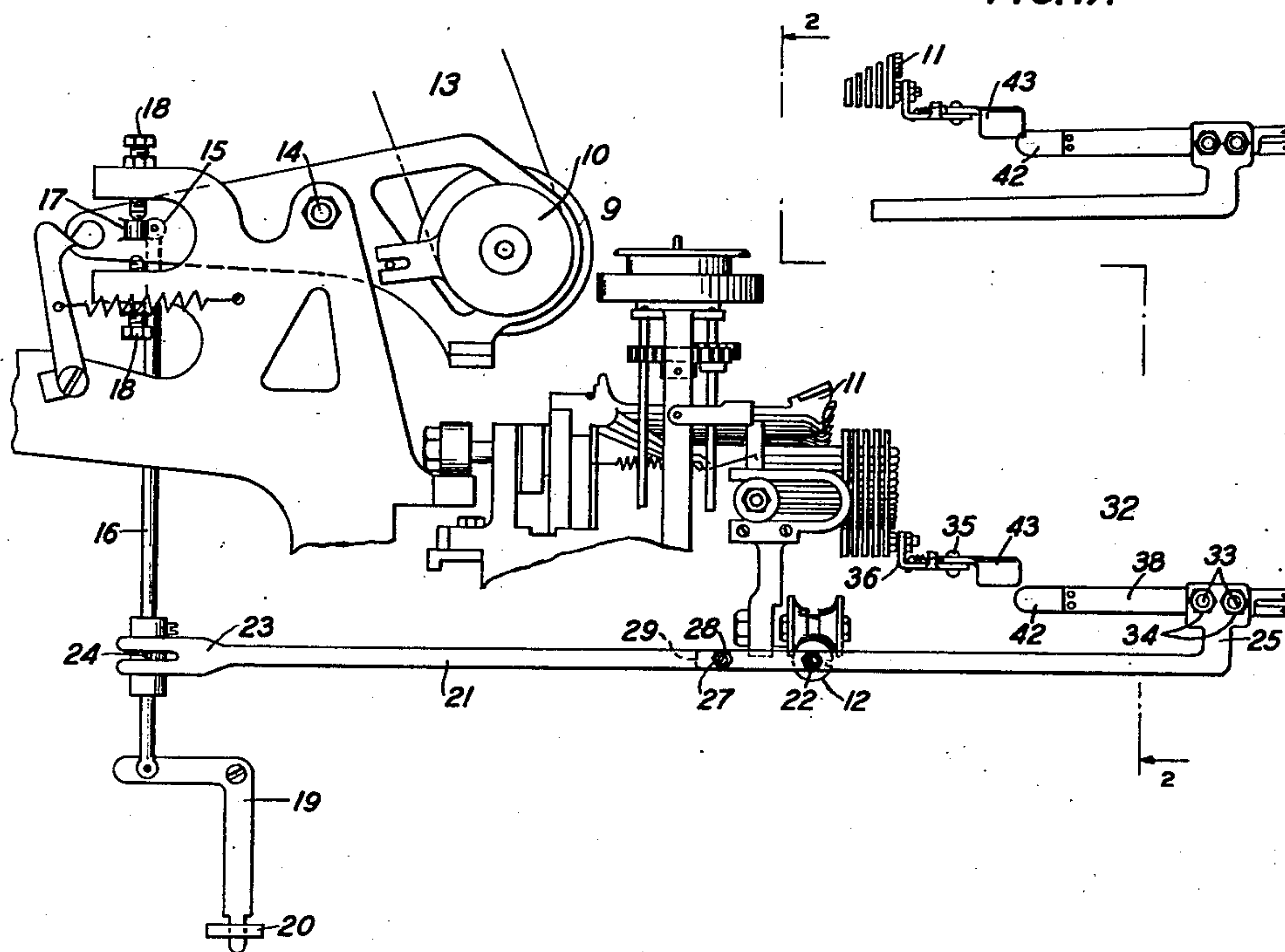


FIG. 1A

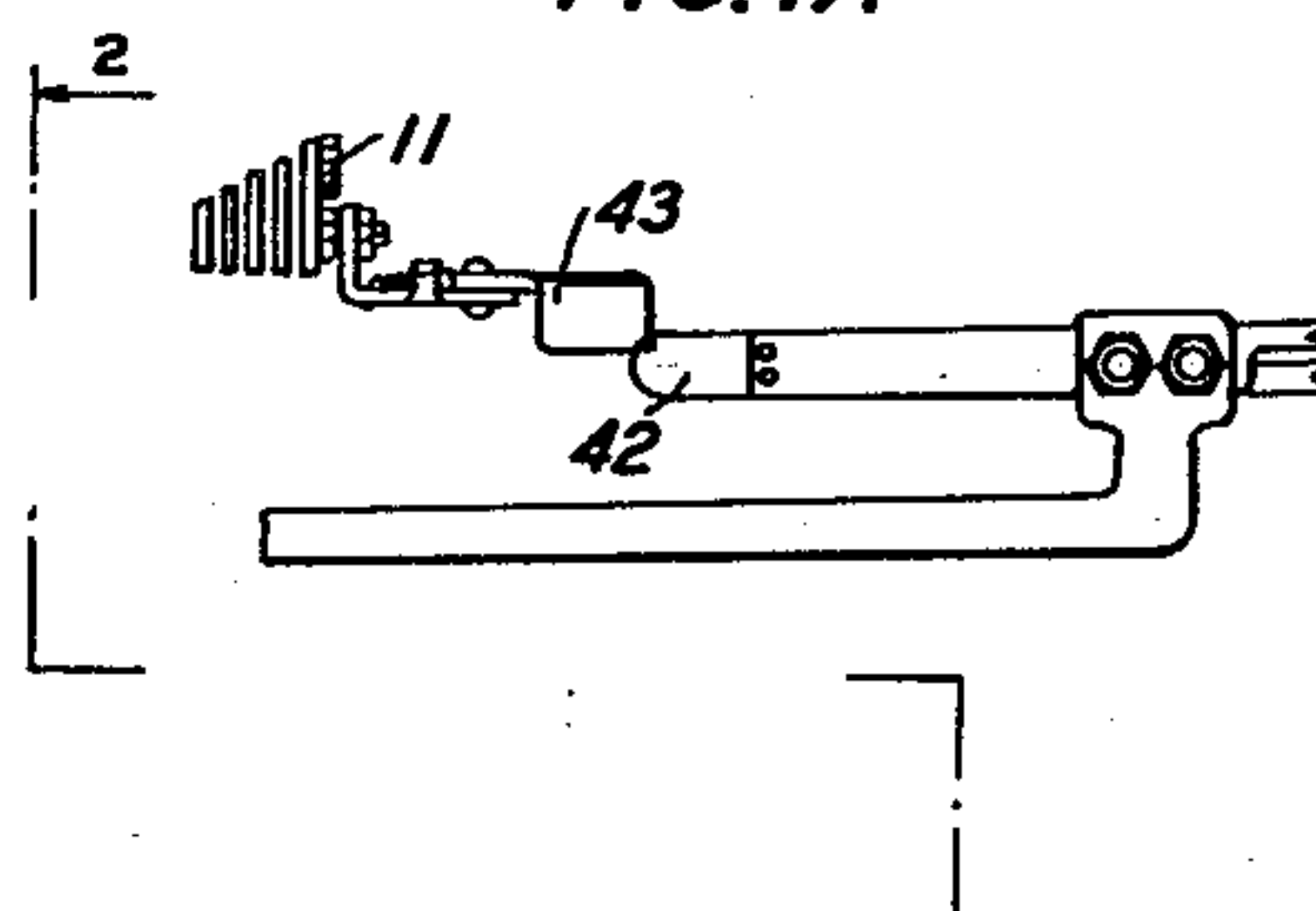
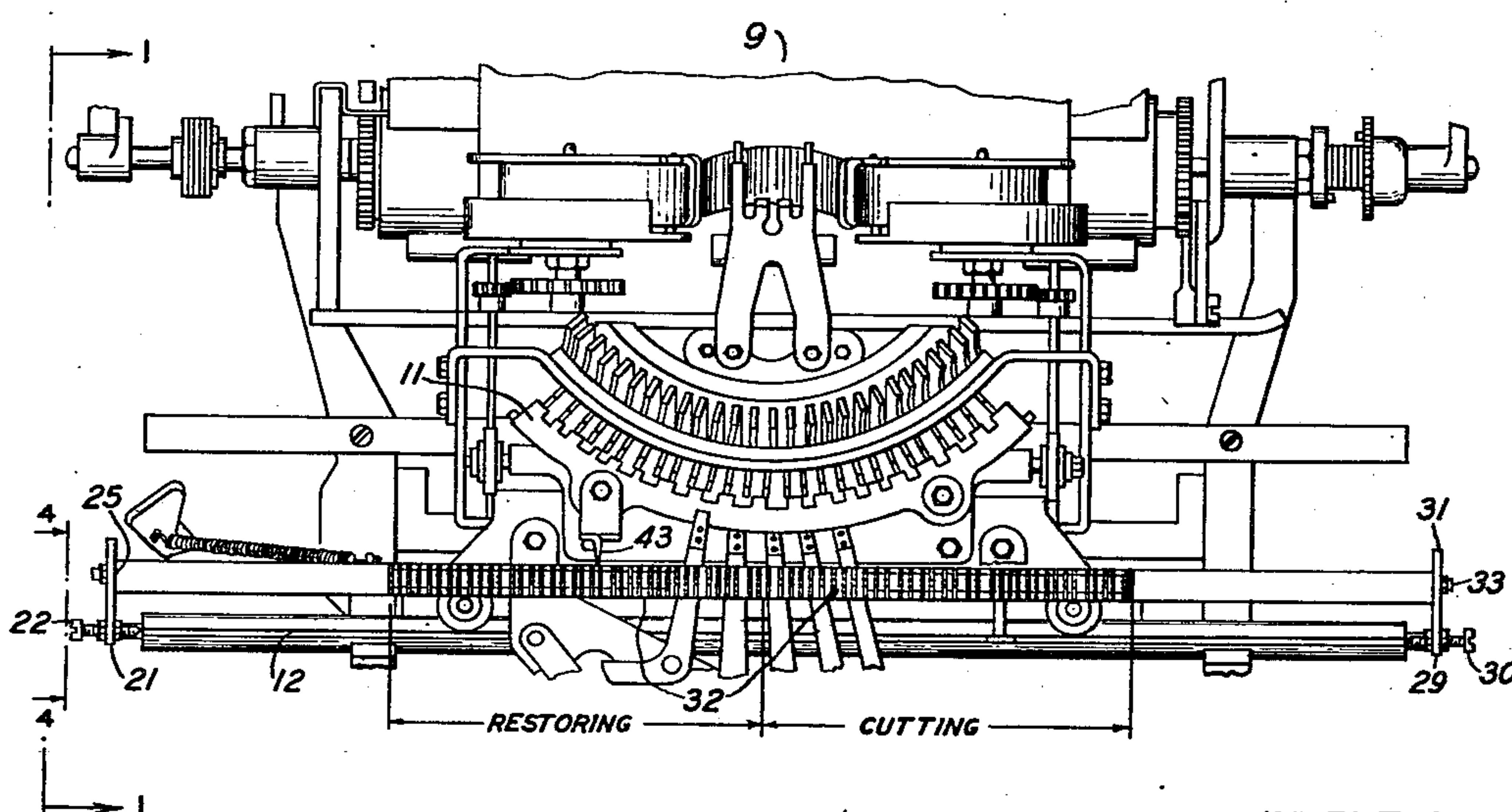


FIG. 2



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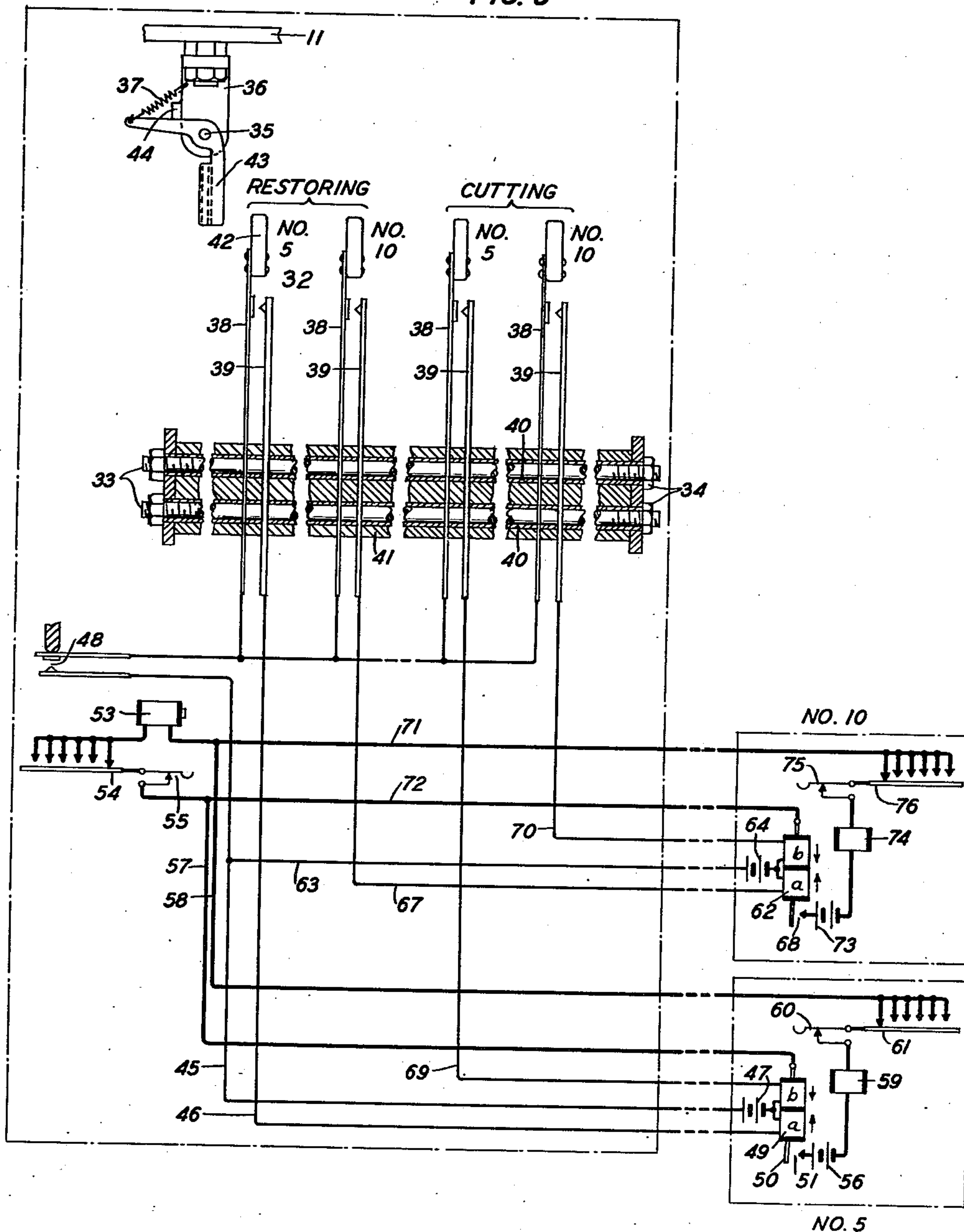
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A FIG. 3



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TELETYPEWRITER SWITCHING SYSTEM

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Application July 10, 1935, Serial No. 30,705

12 Claims. (Cl. 178—2)

This invention relates to teletypewriter systems and, more particularly, to apparatus embodying switching arrangements therefor.

It is an object of this invention to provide a switching mechanism for controlling the switching arrangements of a plurality of remote teletypewriter stations from a central teletypewriter station.

Certain teletypewriter switching systems employ a broadcasting, or central, teletypewriter station for transmitting information from a central point to a plurality of outlying teletypewriter stations. For this type of service, certain messages are sent simultaneously to some of the outlying stations and other messages are sent simultaneously to others of these stations. Therefore, it is desirable to have switching apparatus for cutting-in those outlying stations which are intended to receive a particular message and thereafter to cut out those stations and cut-in other stations for receiving another message.

In accordance with this invention, a broadcasting teletypewriter, arranged with a plurality of normally open restoring and cutting contacts, each of which controls a communicative line connecting the broadcasting teletypewriter and an individual outlying teletypewriter, is adapted to close the contacts, one by one in response to actuations by a function lever. When a restoring contact identified with a desired outlying station is closed, a function key may be struck to close a contact which is common to all communicative lines thereby causing an operation only of the relay equipment individual to the desired outlying teletypewriter to hold its associated communicative line closed and in condition to receive signals from the broadcasting teletypewriter. This procedure may be repeated until the desired group of outlying teletypewriters is connected to the broadcasting teletypewriter.

After the message has been transmitted to this group, the broadcasting teletypewriter is further actuated to close the cutting contacts one by one until a cutting contact identified with one of the previously conditioned communicative lines is closed. The function key may again be struck to close the common contact thereby occasioning an operation of relay equipment individual at that particular outlying teletypewriter to effect an opening of its associated communicative line. This procedure may be repeated until all, or particular ones, of the previously conditioned communicative lines are disconnected from the broadcasting teletypewriter. These actuations of the restoring and cutting contacts may then be re-

peated to arrange another group of outlying teletypewriters to effect the transmission of the next message.

These and other features of the invention will be described in detail in connection with the drawings in which:

Figure 1 is a partial side elevational view taken along lines 1—1 of Fig. 2 and showing so much of a teletypewriter assembly as is necessary for a complete understanding of apparatus embodied in the invention;

Fig. 1A is a fragmentary view taken along lines 4—4 of Fig. 2 and showing the contacts in position to be closed by the type bar carriage.

Fig. 2 is a partial front elevational view taken along lines 2—2 of Fig. 1; and

Fig. 3 is a diagram illustrating the preferred embodiment of the invention.

In Figs. 1 and 2 there is shown a partial assembly 9 of a well known teletypewriter such, for example, as that disclosed in Patent No. 1,904,164, issued to Morton et al. on April 18, 1933. As indicated in Fig. 3, this apparatus is located at broadcasting station A. The assembly includes a type bar carriage 11 adapted to be moved along a carriage track 12 one character space at a time in the well known manner by actuating an appropriate function lever, preferably the spacing lever.

Also, the partial teletypewriter assembly embraces a platen roll assembly 13 rotatably mounted at 14 and having the rearward portion thereof secured pivotally at 15 to a vertical shift link 16 which is connected through a bell crank, or shift lever, 19 to a horizontal shift link 20. The latter is operatively connected to a figures shift function lever, not shown, which, when selected by the striking of the figures key on the keyboard, not shown, actuates the shift link 16 in a downward direction to rotate the platen roll assembly in a counter-clockwise direction on its pivot 14. This rotation causes the platen 10 to be moved upwardly to its shifted, or figures, position when lying initially in its unshifted, or letters, position as shown in Fig. 1.

The shift link 16 is also operatively connected to a letters shift function lever, not shown, which, when selected by the letters key on the keyboard, not shown, actuates the shift link 16 in an upward direction to rotate the platen roll assembly in a clockwise direction to return the platen to its initial, or unshifted, position. The rearward portion of the platen roll assembly is also provided with an integral boss 17 that is moved between adjustable stops 18, 18 affixed to the teletypewriter framework for limiting the aforede-

scribed angular movements of the platen roll assembly. The operation of this mechanism is well known and for a more detailed description thereof reference may be had to Morton et al., supra.

In the preferred embodiment, the invention comprises a lever 21 mounted transversely to the vertical shift link 16 on the left side of the teletypewriter assembly and secured at its approximate center point to the left end of the carriage track 12 by an adjustable pivot 22. One end of the lever 21 is formed with a bifurcated end portion 23 which engages a pin 24 fixed on the lower end of the shift link 16, and the opposite end of the lever 21 is provided with a right angle portion 25 having the free end thereof projecting vertically upward.

On the right side of the teletypewriter assembly there is disposed a horizontal lever 29 having one end secured to the right end of the carriage track 12 by an adjustable pivot 30 and the opposite end formed with a right angle portion 31 having its free end projecting vertically upward. Opposite ends of a transverse bar 28 disposed behind the carriage track 12 in a plane parallel therewith are connected to the horizontal levers 21 and 29 by nuts 27. This provides a rigid structure whereby the levers 21 and 29 may be readily rotated on their pivots 22 and 30, respectively, when the lever 21 is actuated by the vertical shift link 16. It will be understood that the center lines of the right angle portions 25 and 31 of the levers 21 and 29, respectively, lie in the same plane.

Arranged two character spaces apart and disposed along the path of travel of the type bar carriage are forty (40) individual normally open electrical contacts 32 preferably mounted on bolts 33, 33 positioned between the right angle portions 25 and 29 and fixedly secured thereto by nuts 34 as seen in Figs. 1, 2 and 3. Each of the contacts 32 consists of flexible contact members 38 and 39. The bolts 33, 33 are provided with electrical insulating sleeves 40, 40. Suitable electrical insulating material 41 mounted between the right angle portions 25 and 29 serves to separate the individual contacts 32 and the contact members 38 and 39, and to effect an accurate disposition of the contacts 32 along the path of travel of the type bar carriage. In addition, on an extended end portion of each of the contact members 38 there is suitably affixed an electrical insulating strip 42.

A finger 43 pivotally attached at 35 to a support 36 rigidly affixed to the left portion of the type bar carriage 11, as seen in Figs. 1 and 3, is normally held by a spring 37 against a stop 44 in a vertically projecting position against further clockwise rotation to engage the insulating strips 42 as the type bar carriage 11 is moved to the right with the platen in its shifted position to close the contacts 32 one by one. Obviously, when the finger 43 disengages from the preceding insulating strips 42, that particular contact returns to its open position. In the carriage return operation the finger 43 rotates freely on its pivot in a counter-clockwise direction so as to ride lightly over the insulating strips 42 to obviate unnecessary flexing of the contact members 38. The contact members 38 and 39 are made of a material sufficiently flexible so as not to interfere with the free movements of the type bar carriage occasioned by the normal operation of the teletypewriter. Forty contacts 32 have been selected for purposes of this descrip-

tion. This number may be decreased or increased as desired. It is to be understood that the maximum number of contacts is determined by the effective length of travel of the finger 43 and the number of character spaces intervening between contiguous contacts. The maximum number of contacts 32 is, of course, limited to the number of characters contained in a printed line.

The contacts 32 are so arranged that any one or a group of twenty remote teletypewriter stations may be connected to the broadcasting teletypewriter for the purpose of receiving a particular message, and thereafter any one, or the entire group, may be switched out, and other stations switched in to comprise a new group to receive another message which is not intended for some stations of the first group. It is to be understood that each of the remote stations is provided with a well known type of teletypewriter apparatus such, for example, as that disclosed in Morton et al., supra. The flexibility of the arrangement enables the operator of the broadcasting teletypewriter to restrict each transmission of messages to only those stations having an interest therein. Facing the teletypewriter keyboard, as in Fig. 2, the twenty contacts 32 on the left are designated the restoring contacts since these are arranged to switch in each of the remote stations one by one, and the twenty contacts 32 on the right are designated the cutting contacts since these are arranged to switch out each of the remote stations in the same fashion. The restoring contacts are numbered serially from 1 to 20 beginning with No. 1 at a point on the left side of the teletypewriter keyboard. The cutting contacts are numbered serially from 1 to 20, commencing at a point where the restoring contacts terminate. For convenience of operation, it may be desirable to have several character spaces intervening between the groups of restoring and cutting contacts but it is to be understood that the contacts 32 must be positioned within the limits of the effective travel of the finger 43.

Referring to Fig. 3 it is seen that the members 38 associated with both restoring and cutting contacts are connected to an upper side of a common contact 48 which is normally open and has its lower side connected by a common lead through battery to a terminal of each of the coils *a* and *b* of the polar relay located at individual outlying teletypewriter stations. The remaining terminal of each coil *a* is connected by an independent lead to a member 39 associated with a restoring contact identifying the outlying teletypewriter station at which the polar relay is located. Also, it is seen that the remaining terminal of each coil *b* is connected by a separate lead to the member 39 of that cutting contact which is associated with the restoring contact to which its companion coil *a* is connected. Thus, a common lead and two independent leads comprise the switching connections required between the broadcasting teletypewriter and an individual outlying teletypewriter station to effect a control of the communicative line extending therebetween. As shown in heavy lines, the two leads comprising the communicative line are opened and closed under control of a polar relay located at the individual outlying teletypewriter stations. The armature of this polar relay at each station is of the type that is designed to remain in the position to which it was last operated until the relay is energized to move it to the opposite position.

For the purpose of illustrating the operation of the device let it be assumed that the operator at the broadcasting station is desirous of switching in the remote stations connected to Nos. 5 and 10 restoring and cutting contacts. To accomplish this, the first step involves bringing the type bar carriage 11 to its extreme left hand position by means of the carriage return operation.

It will be noted in Fig. 1 that when the platen 21 is in its unshifted position, the transverse lever 21 lies in a horizontal plane thereby precluding an engagement between the finger 43 and the insulating strips 42. Therefore the second step requires the moving of the platen to its shifted position which is accomplished as previously described. As hereinbefore seen the latter movement causes an actuation of shift link 16 in a downward direction to rotate transverse lever 21 in a counter-clockwise direction about its pivot 22 to project the insulating strips 42 into the path of travel of the finger 43 as the type bar carriage moves to the right. The shifted position of the contacts 32 is shown in Fig. 1A.

The third step is to cause the type bar carriage 11 to move longitudinally one character space at a time. Inasmuch as the space key is the least likely to confuse the copy, it is selected to actuate the type bar carriage for this purpose. It is to be understood that any key effecting an actuation of the type bar carriage one character space at a time is equally satisfactory. Since the type bar carriage travels one character space in response to each actuation of the space key, the finger will first engage the insulating strip 42 of No. 1 restoring contact to close this contact by bringing contact members 38 and 39 into engagement. Inasmuch as it is desired to switch in remote No. 5 station, the type bar carriage will be caused to continue its movement to the right. The finger 43 will be disengaged from the insulating strip 42 of No. 1 contact as the type bar carriage is moved into the position corresponding to the second character space to the right of No. 1 restoring contact. The finger 43 is now ready to engage the insulating strip 42 associated with No. 2 restoring contact to close this contact, which it does upon the next actuation of the space key. Nos. 2, 3 and 4 restoring contacts are passed over similarly to No. 1 until the finger 43 closes No. 5 restoring contact which results in an engagement between the contact members 38 and 39 associated therewith.

With the closing of No. 5 restoring contact, the "bell" key is actuated to close the contact 48. The closing of contact 48 is preferably accomplished in a manner similar to that disclosed in Fig. 4 of Patent No. 1,939,613 issued to E. F. Watson on December 12, 1933. Since No. 5 is the only restoring contact closed at this time, all others remaining in the open condition, an energization circuit for polar relay 49 is completed through No. 5 restoring contact 32, contact 48, lead 45, battery 47, coil *a*, lead 46, and then back to the No. 5 restoring contact 32.

The operation of polar relay 49 moves armature 50 into engagement with contact 51 thereby closing the communicative line extending between the broadcasting station and remote No. 5 station. The closed line may be traced through non-locking key 55, sending contacts 54, and selector magnet 53 at the broadcasting station, line leads 57 and 58, and armature 50, contact 51, battery 56, selector magnet 59, non-locking key 60, and sending contacts 61 at remote No. 5 station.

The motor at No. 5 station may be started to condition the teletypewriter to receive messages by employing the remote motor control arrangement disclosed in Morton et al., supra. The invention may also be readily employed with other teletypewriter systems such, for example, as those having motor control arrangements of the kind disclosed in Patent No. 1,655,448 issued to E. F. Watson on January 10, 1928, and Patent No. 1,712,528 issued to B. S. Swezey on May 14, 1929. Also, it is to be understood that while the preferred form of the invention shows the polar relay 49 located at the remote station, the invention contemplates also the locating of these relays at the broadcasting station. In the latter event, the three switching leads associated with each polar relay would be contained within the broadcasting station so that only the communicative line would extend between the broadcasting station and each outlying station.

Now that No. 5 remote station is properly switched in and awaiting the commencement of the message transmission, the space key is further actuated to move the finger over Nos. 6, 7, 8 and 9 restoring contacts until No. 10 restoring contact is closed. Simultaneously with the closing of No. 10 restoring contact, the "bell" key may again be operated to close contact 48 to provide an energization circuit for polar relay 62 located at remote station No. 10. This energization circuit may be traced through No. 10 restoring contact 32, contact 48, lead 63, battery 64, coil *a*, lead 67 and then back to the No. 10 restoring contact 32.

Relay 62 operates to close contact 68 and thereby to close the communicative line extending between the broadcasting station and remote No. 10 station to allow the conditioning of the teletypewriter located thereat in the manner disclosed in Morton et al., supra. The closed communicative line may be traced through non-locking key 55, sending contacts 54, and selector magnet 53 at the broadcasting station, line leads 71 and 72, and contact 68, battery 73, selector magnet 74, non-locking key 75 and sending contacts 76 at No. 10 receiving station. By a similar procedure the teletypewriters at other remote stations may be switched in and conditioned to receive messages.

After the transmission of the message has been completed, remote station Nos. 5 and 10 may be switched out by first moving the type bar carriage to the extreme left position by the carriage return operation, and thereafter bringing the platen to its shifted position and moving the type bar carriage to the right by successive actuations of the space key. Obviously, when the platen lies in its shifted position, the aforementioned shift operation is unnecessary. The type bar carriage movement continues until the finger 43 has passed over Nos. 1 to 20, inclusive, restoring contacts and Nos. 1 to 4, inclusive, cutting contacts. The finger continues its movement to the right until No. 5 cutting contact is closed by bringing into engagement the contact members 38 and 39 associated with this cutting contact.

With the closing of No. 5 cutting contact, the "bell" key is again actuated to close contact 48. Since No. 5 cutting contact is the only one of the contacts 32 in the closed condition, the others continuing for the present in the open condition, an energization circuit for the coil *b* of polar relay 49, associated with No. 5 station, is completed through No. 5 cutting contact, con-

tact 48, lead 45, battery 47, coil b, lead 69, and then back to the No. 5 cutting contact 32. The polar relay 49 operates to disengage armature 50 from contact 51 and thereby to open the communicative line connecting the broadcasting station and remote No. 5 station. As seen in the motor control arrangement of Morton et al., supra, a prolonged opening of the communicative line effects an interruption of the power supply for the motor at the No. 5 station to cause the motor to come to a state of rest.

The space key is again actuated to move the finger 43 over Nos. 6, 7, 8 and 9 cutting contacts and then to close No. 10 cutting contact. With the closing of No. 10 cutting contact, the "bell" key is actuated to close contact 48. Inasmuch as No. 10 cutting contact is the only one of the contacts 32 in the closed state, the other remaining in the open condition, an energization circuit for coil b of polar relay 62 at No. 10 station is completed through No. 10 cutting contact, contact 48, lead 63, battery 64, coil b, lead 70, and then back to the No. 10 cutting contact 32. Polar relay 62 operates to open contact 68 thereby opening the communicative line associated therewith. As disclosed in Morton et al., supra, a prolonged opening of the communicative line results in an interruption of the power supply to stop the motor at the No. 10 station. Similarly, the closing operations may be repeated for other cutting contacts to effect a disconnection of the outlying stations controlled thereby. The system is now in condition for the operator at the broadcasting, or control, station to connect, in a similar manner, another group of remote teletypewriter stations to the transmission line 71-72 for simultaneously receiving a message not intended for the first group of stations. This procedure may be repeated as often as desired. It may be seen, therefore, that one or several outlying teletypewriter stations may be connected with a broadcasting station to simultaneously receive a particular message, and that thereafter these stations, or any particular one, may be readily disconnected and other stations switched in to receive a message not intended for the preceding group. Of course, if it is intended that one of the stations in the first group be also included in the second group of stations to receive the second message, then the broadcasting operator will not disconnect that station after the termination of the first message but will let it stay connected to the transmission line 71-72. By means of this apparatus, the broadcasting teletypewriter operator is enabled to manipulate the switching arrangement in such a manner that the message is restricted exclusively to those stations for which it is intended. It is to be understood that the invention may be readily adapted for use in connection with teletypewriters having movable platens and fixedly located carriages.

What is claimed is:

1. In a teletypewriter switching system, a broadcasting teletypewriter station having a teletypewriter with a movable carriage, a plurality of outlying teletypewriter stations, a plurality of communicative lines for connecting each of the outlying stations to the broadcasting station, and switching means controlled by movements of the carriage of the broadcasting teletypewriter for selectively controlling the communicative lines to restrict the broadcast of a particular message to only certain selected outlying teletypewriter stations.

2. A teletypewriter having in combination, a movable carriage, a shiftable platen, a contact strip located in the teletypewriter along the path of movement of the carriage, a plurality of contacts mounted on the strip, and an instrumentality mounted upon the carriage for operating the contacts one by one as the carriage is actuated with the platen in its shifted position.

3. A teletypewriter having in combination, a movable type bar carriage, a shiftable platen, a plurality of contacts disposed along the path of movement of the carriage, a contact common to the plurality of contacts, a member mounted on the carriage for operating the plurality of contacts one by one as the carriage is moved with the platen in the shifted position, and an instrumentality for closing the common contact when one of the plurality of contacts is closed.

4. A teletypewriter switching system having in combination a broadcasting teletypewriter, a plurality of other teletypewriters having means for enabling them to receive messages broadcast from the broadcasting teletypewriter, a plurality of telegraph lines connecting each of the other teletypewriters to the broadcasting teletypewriter, and means responsive to certain preassigned operations of the broadcasting teletypewriter for selectively controlling the telegraph lines for enabling a message to be broadcast simultaneously to a selected plurality of the other teletypewriters.

5. A teletypewriter switching system comprising in combination a broadcasting teletypewriter station, a plurality of receiving teletypewriter stations, a plurality of control circuits leading from each receiving teletypewriter station to the broadcasting teletypewriter station, first switching means individual to each control circuit, and second switching means common to all the control circuits, both of said switching means being operable directly by certain preassigned mechanical operations of the broadcasting teletypewriter for effecting the selection of particular receiving teletypewriter stations to receive a message to be transmitted from the broadcasting teletypewriter.

6. A teletypewriter switching system having in combination a broadcasting teletypewriter having a movable type bar carriage and a shiftable platen, a plurality of receiving teletypewriters, a plurality of control circuits for connecting the broadcasting teletypewriter with each of the receiving teletypewriters, a plurality of individual contacts, each contact being connected to a control circuit, a contact common to all the control circuits, the individual contacts being operated by actuations of the carriage only when the platen is in its shifted position, an instrumentality for operating the common contact, and electromagnetic switching means responsive to the closure of the common contact and one of the individual contacts for conditioning one of the receiving teletypewriters for receiving a message to be transmitted from the broadcasting teletypewriter.

7. In a teletypewriter switching system, a broadcasting teletypewriter having a movable type bar carriage and a shiftable platen, a plurality of receiving teletypewriters, a plurality of control circuits for connecting the broadcasting teletypewriter to each of the receiving teletypewriters, a plurality of individual switching contacts disposed along the path of movement of the carriage, a pair of the individual switching contacts being connected to each of the control circuits, a switching contact common to all of the

control circuits, means affixed to the carriage for successively operating each individual contact when the carriage is moved with the platen in its shifted position, an instrumentality for operating the common contact, and control means responsive to the closure of the common contact and one of the individual contacts for conditioning one of the receiving teletypewriters to receive a message to be transmitted from the broadcasting teletypewriter.

8. A teletypewriter system having in combination a broadcasting teletypewriter station, a plurality of subscribers' teletypewriter stations, a plurality of control circuits for connecting the subscribers' stations to the broadcasting station for control thereby, a plurality of message transmission lines for connecting the subscribers' stations to the broadcasting station for the transmission of messages, control means connected into the control circuits for conditioning one of the subscribers' stations to receive a message from the broadcasting station, and independent control means also connected into the control circuits for independently conditioning another subscriber's station to receive a message from the broadcasting station simultaneously with the aforementioned subscriber's station.

9. A teletypewriter system having in combination a broadcasting teletypewriter station, a plurality of subscribers' teletypewriter stations, a plurality of control circuits for connecting the subscribers' stations to the broadcasting station for control thereby, a plurality of normally open message transmission lines for connecting the subscribers' stations to the broadcasting station for the transmission of messages, control means connected into the control circuits for selectively closing certain of the normally open message transmission lines, and other control means for independently closing certain others of the normally open message transmission lines.

10. A teletypewriter having in combination a movable carriage, a contact strip located in the teletypewriter along the path of movement of the carriage, a plurality of contacts mounted on the strip, and an instrumentality secured to the carriage for operating the contacts as the carriage is moved.

11. A teletypewriter having in combination a movable carriage, a contact strip located in the teletypewriter along the path of movement of the carriage, a plurality of contacts mounted on the strip, and a movable finger attached to the carriage for operating the contacts seriatim as the carriage is moved.

12. A teletypewriter switching system including in combination a broadcasting teletypewriter station, a plurality of receiving teletypewriter stations, a plurality of control circuits for connecting the receiving stations to the control station for control thereby, a plurality of normally open message transmission lines for connecting the receiving stations to the broadcasting station for the transmission of messages, a plurality of individual switching contacts, a pair of each of said switching contacts being connected into each of the control circuits, a contact common to all of the control circuits, an instrumentality for selectively closing the individual contacts, means for closing the common contact, and electromagnetic means at each of the receiving stations responsive to the closure of the common contact and a particular individual contact for closing the normally open message transmission line leading to a particular receiving station, said electromagnetic means being also responsive to the closure of the common contact and another particular individual contact for opening a message transmission line after it has been closed.

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