

Dec. 1, 1931.

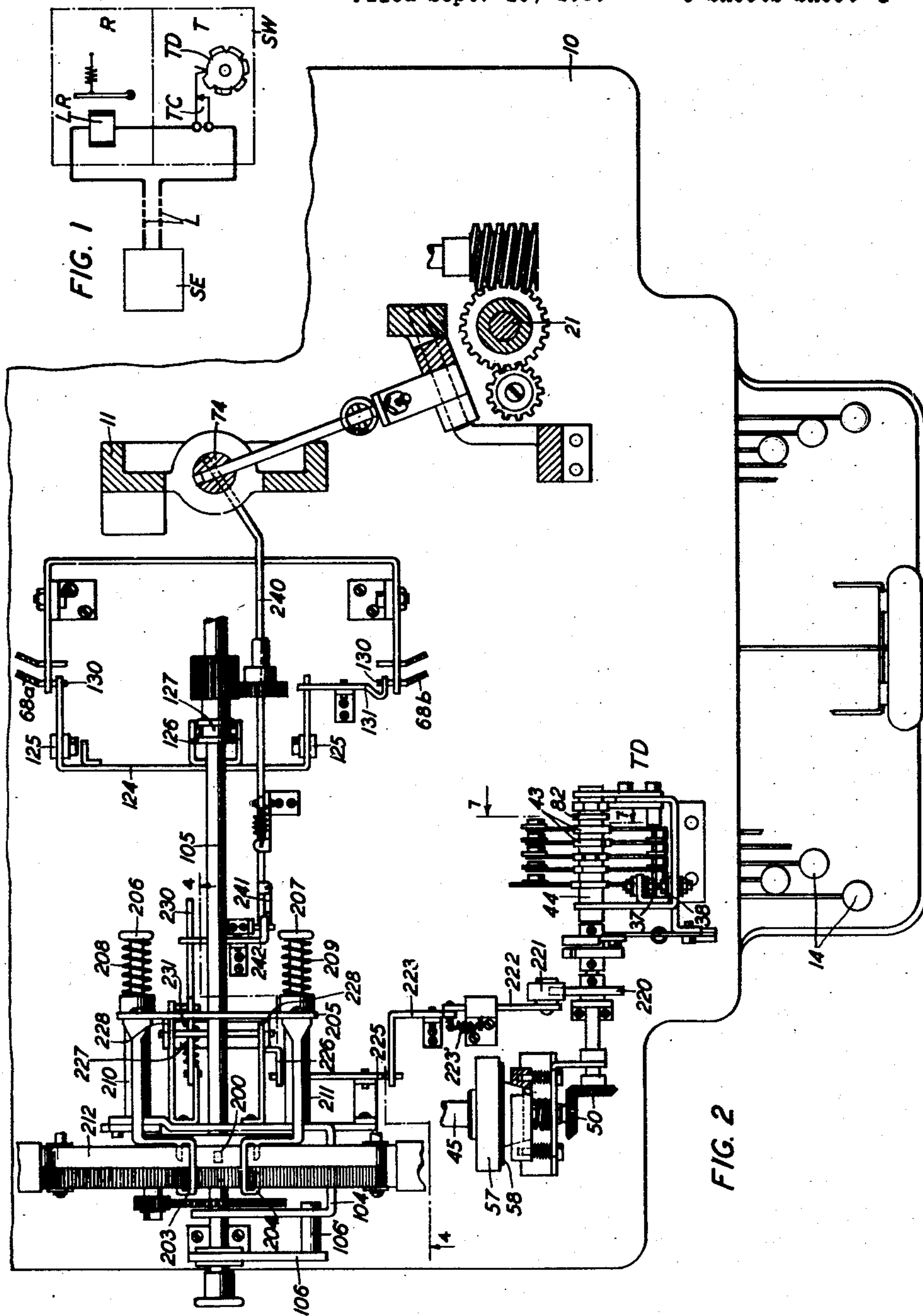
E. F. WATSON ET AL

1,833,958

TELEGRAPH SIGNAL RECORDING SYSTEM

Filed Sept. 10, 1930

3 Sheets-Sheet 1



INVENTORS E. F. WATSON
T. A. MC CANN
BY

g E for
ATTORNEY

Dec. 1, 1931.

E. F. WATSON ET AL

1,833,958

TELEGRAPH SIGNAL RECORDING SYSTEM

Filed Sept. 10, 1930

3 Sheets-Sheet 2

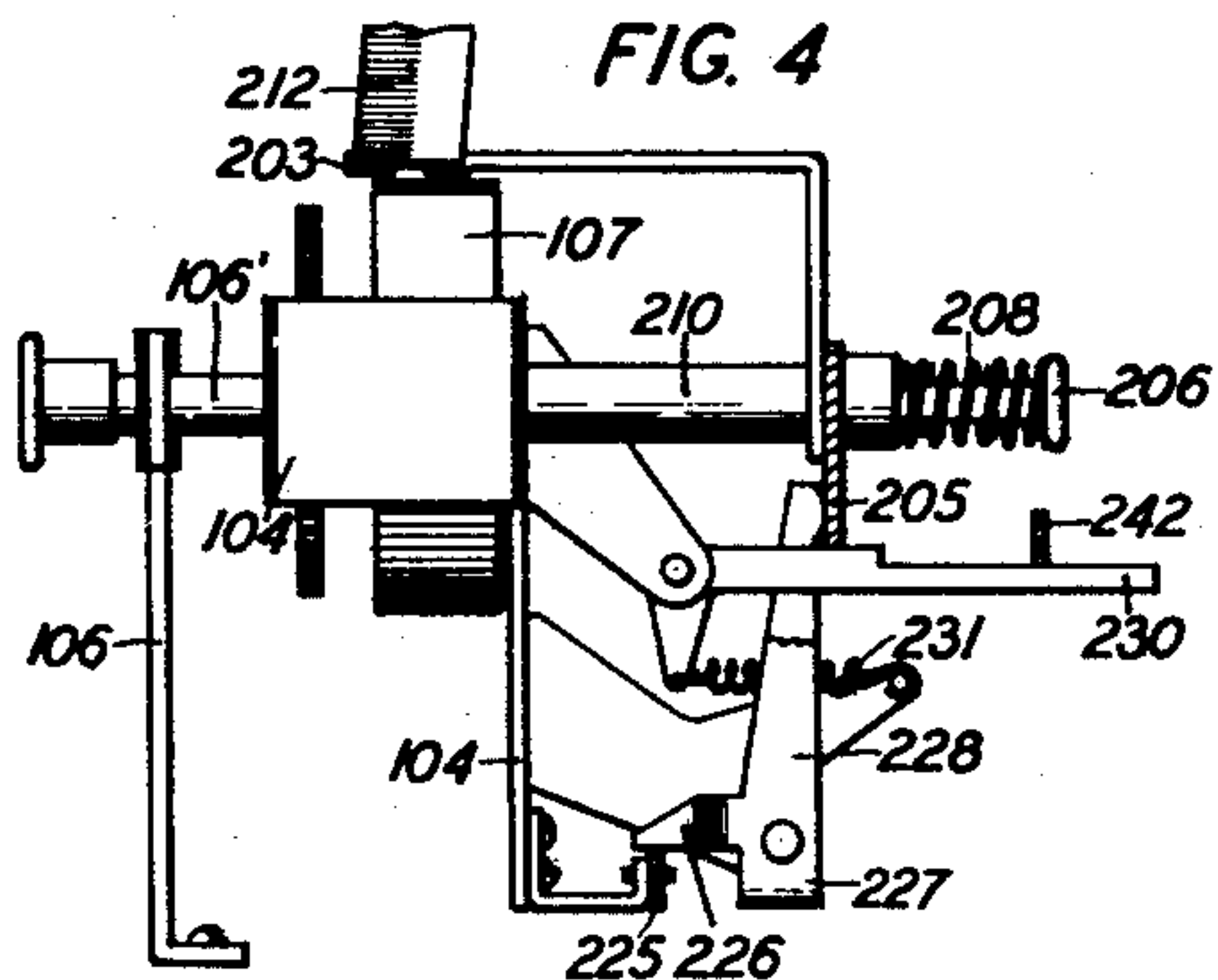
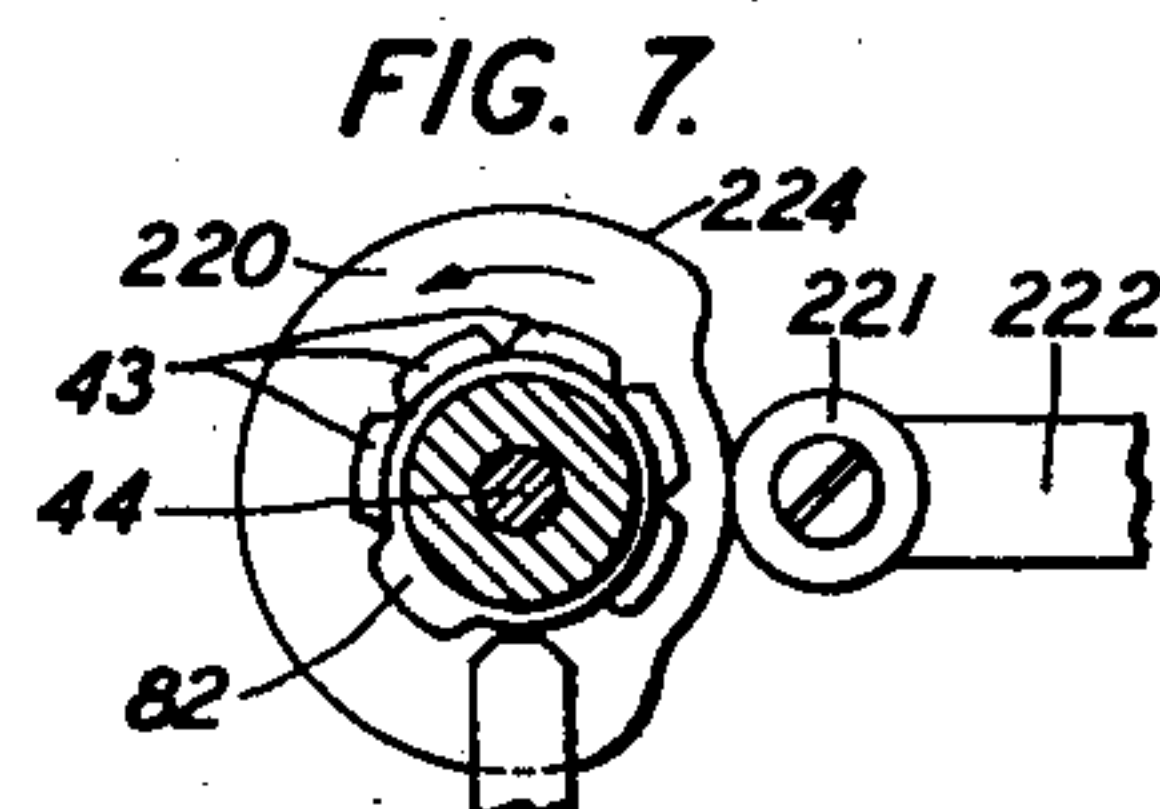
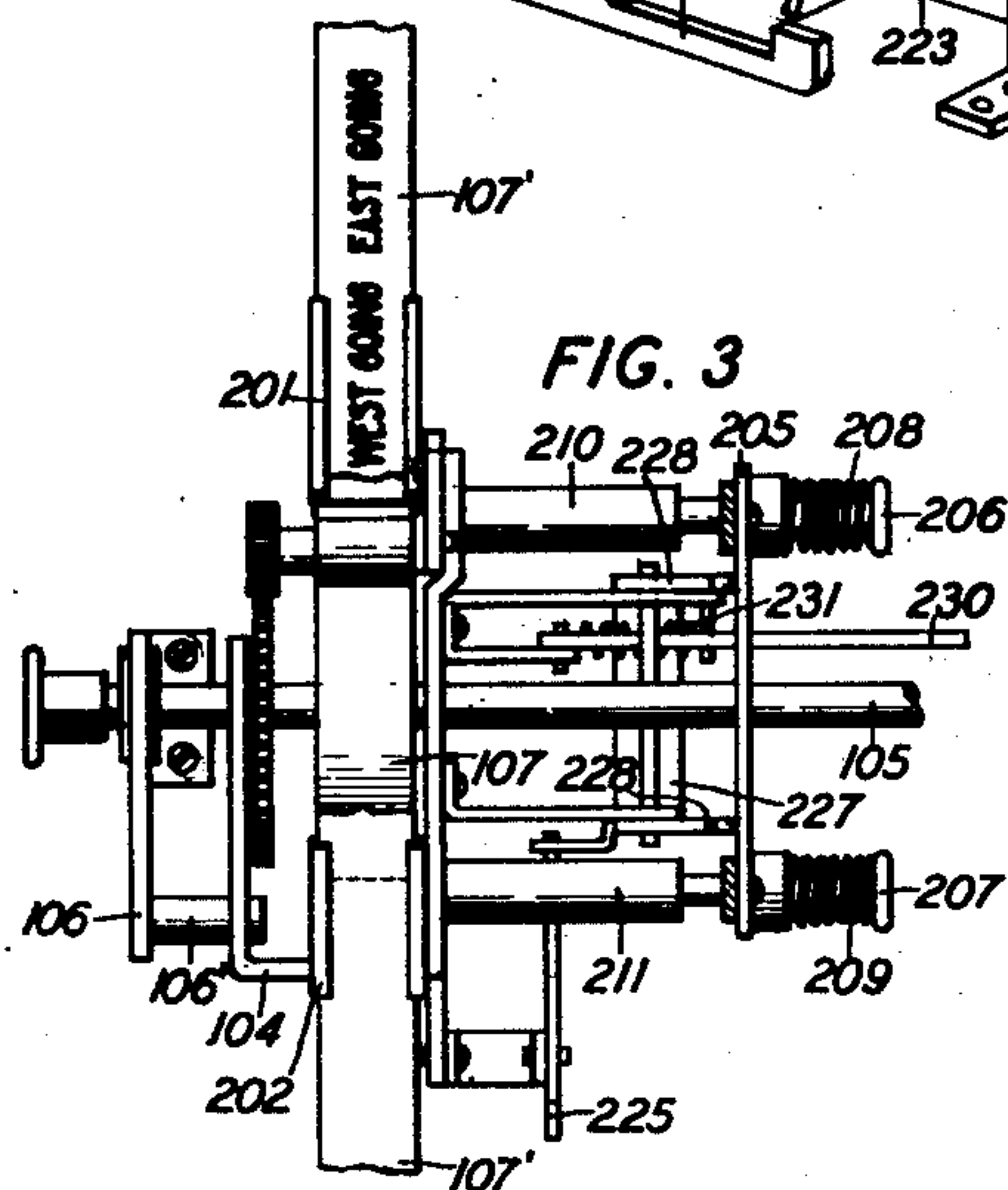
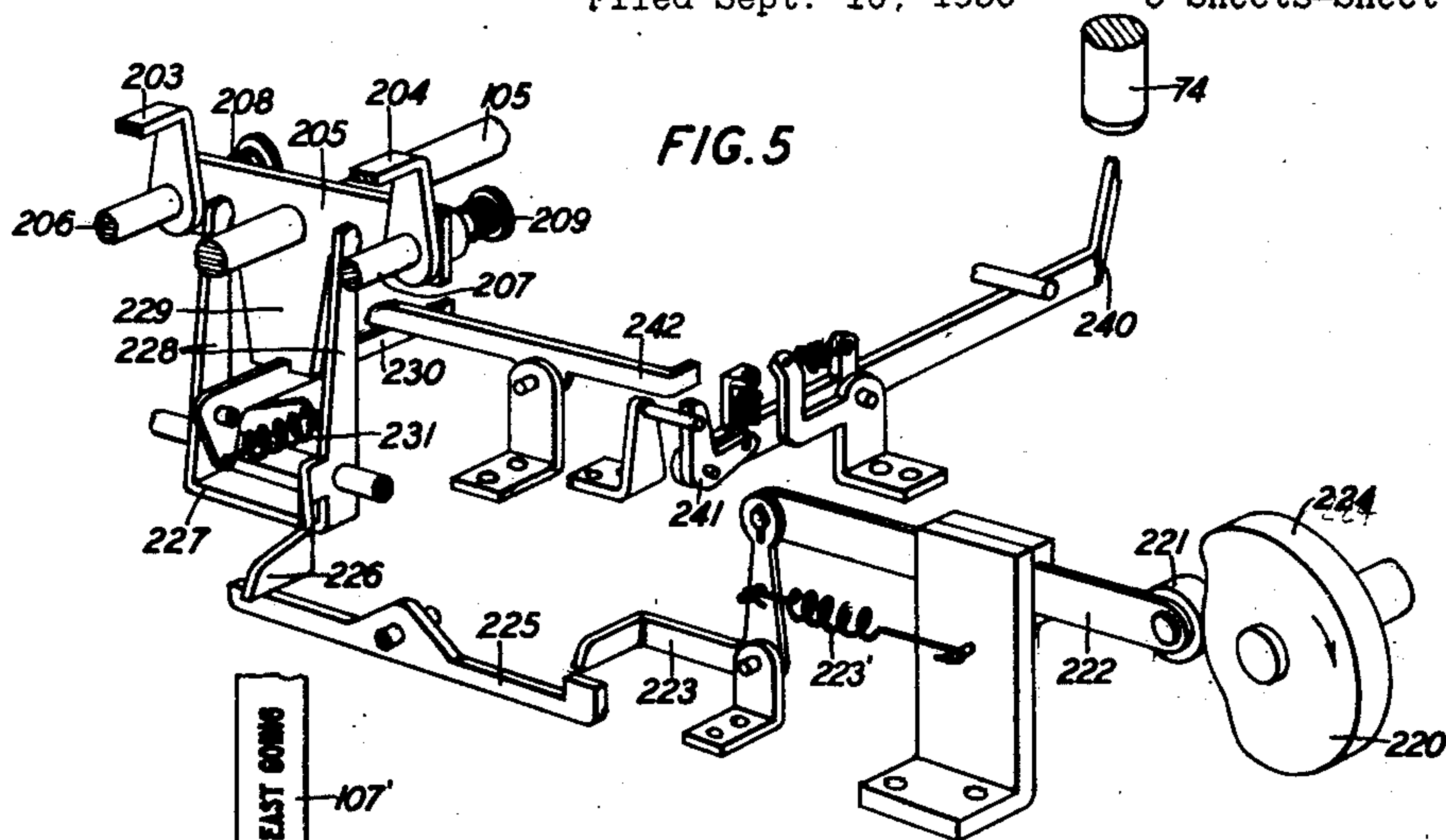


FIG. 6-A

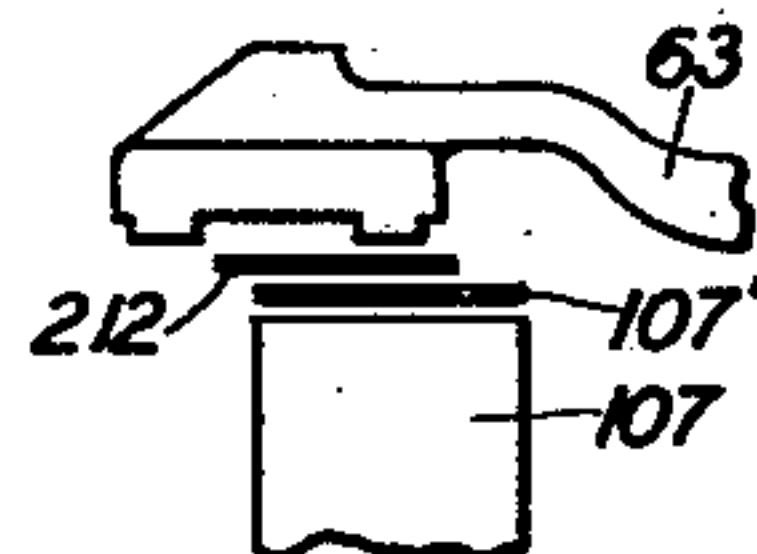


FIG. 6-B

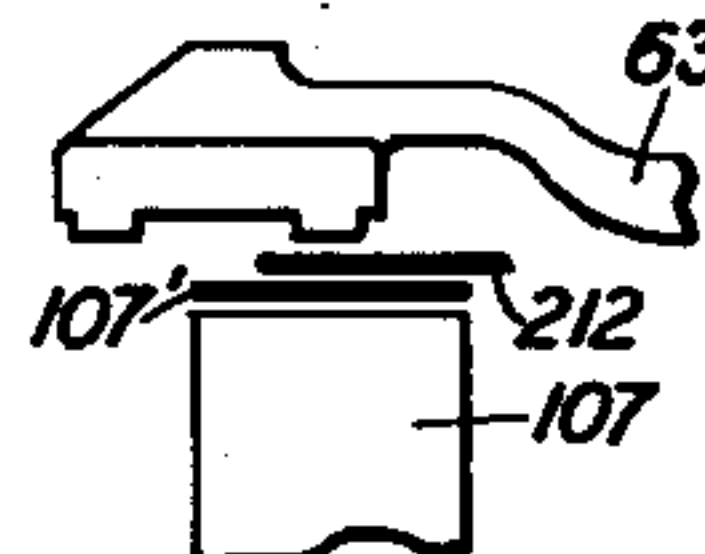


FIG. 6-C

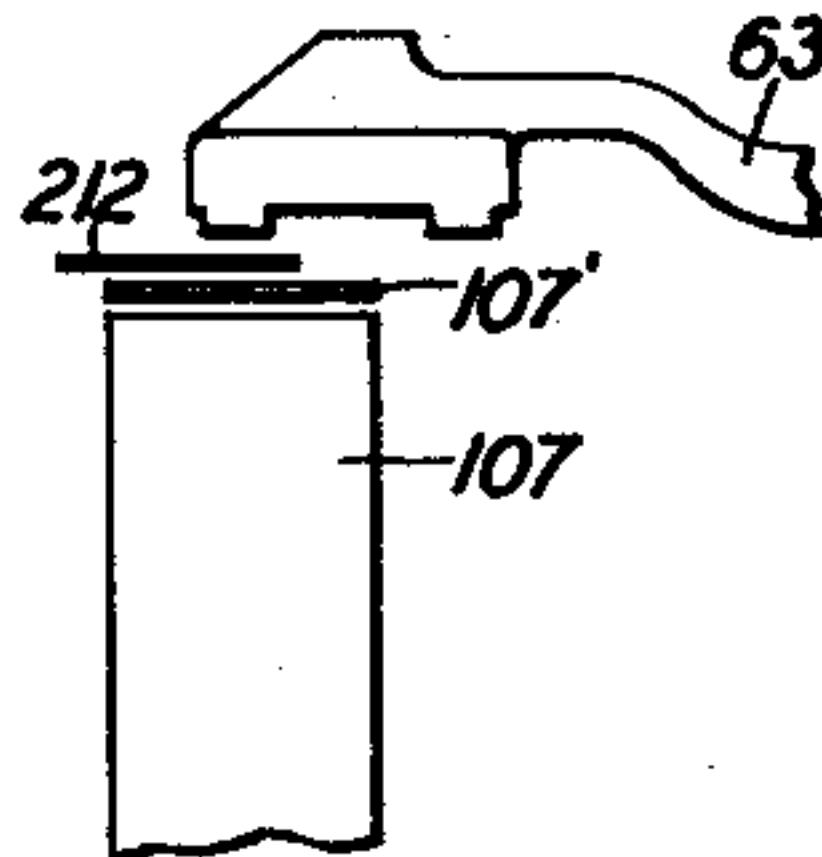
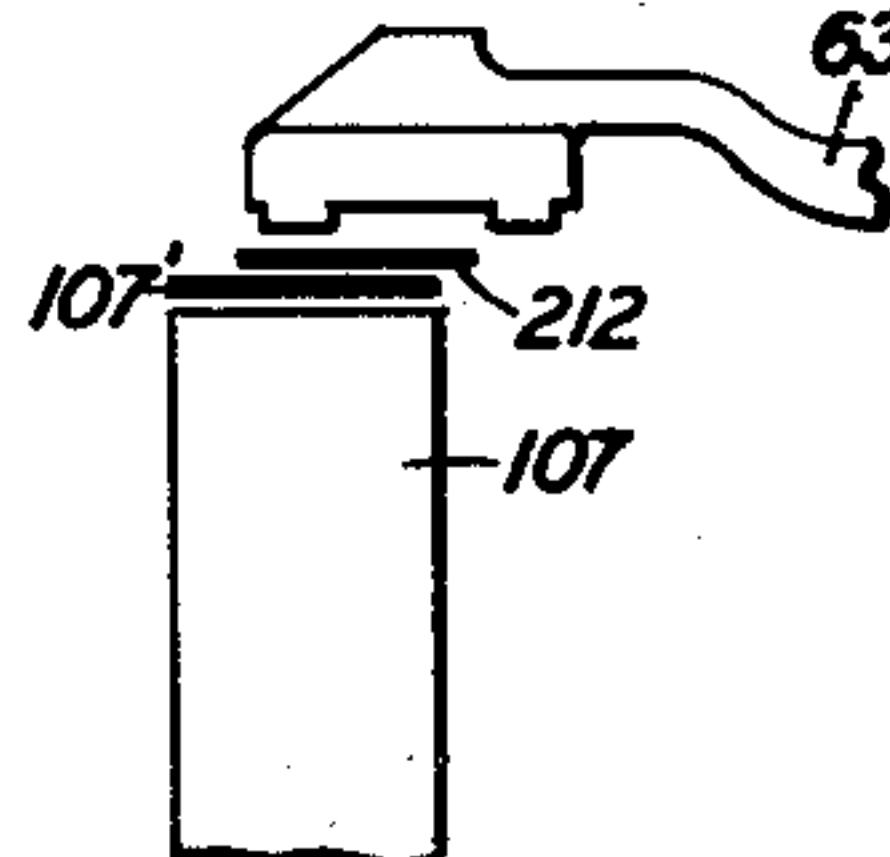


FIG. 6-D



INVENTORS E. F. WATSON
T. A. MC CANN
BY

g. f. h.
ATTORNEY

Dec. 1, 1931.

E. F. WATSON ET AL

1,833,958

TELEGRAPH SIGNAL RECORDING SYSTEM

Filed Sept. 10, 1930

3 Sheets-Sheet 3

FIG. 8

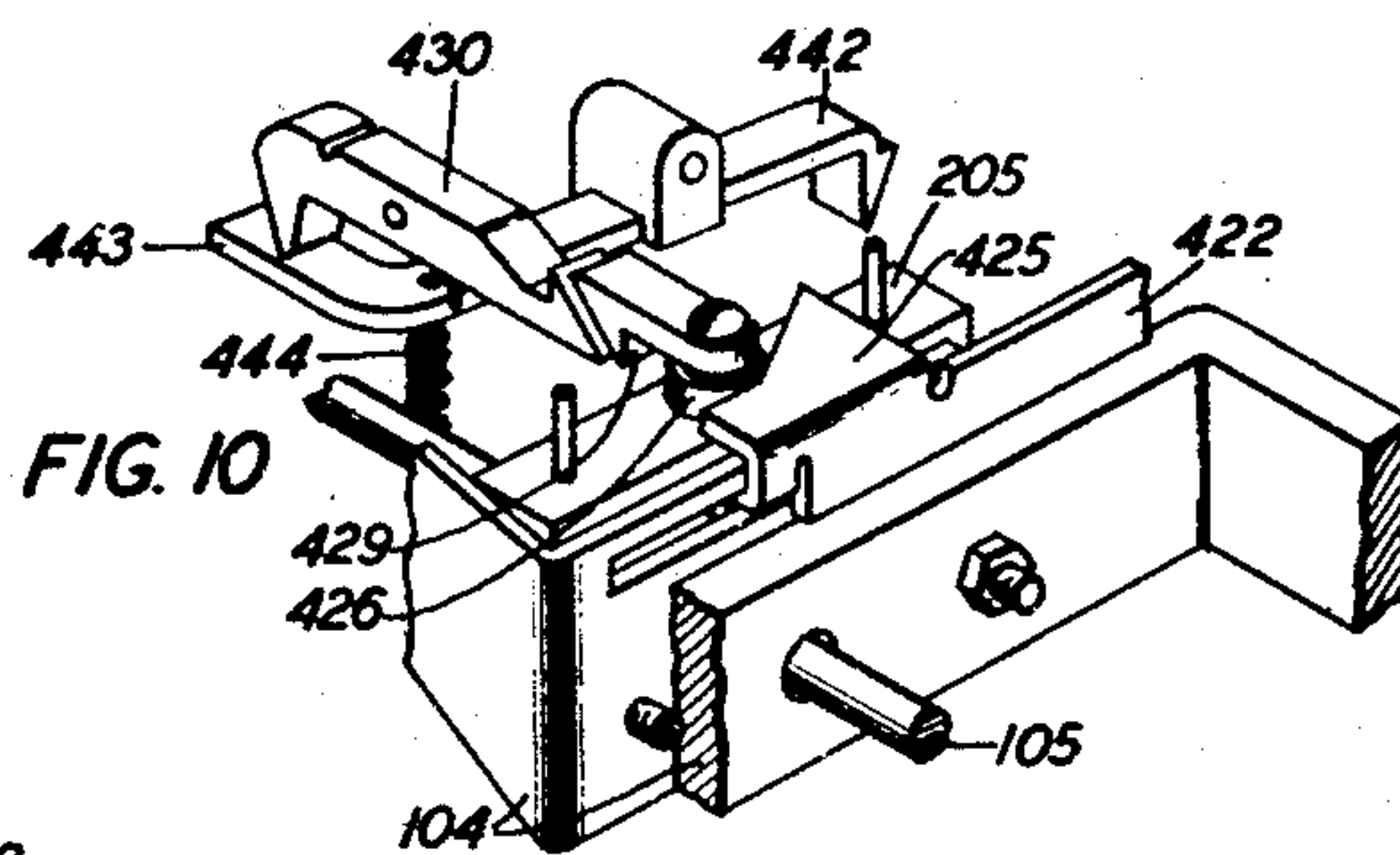
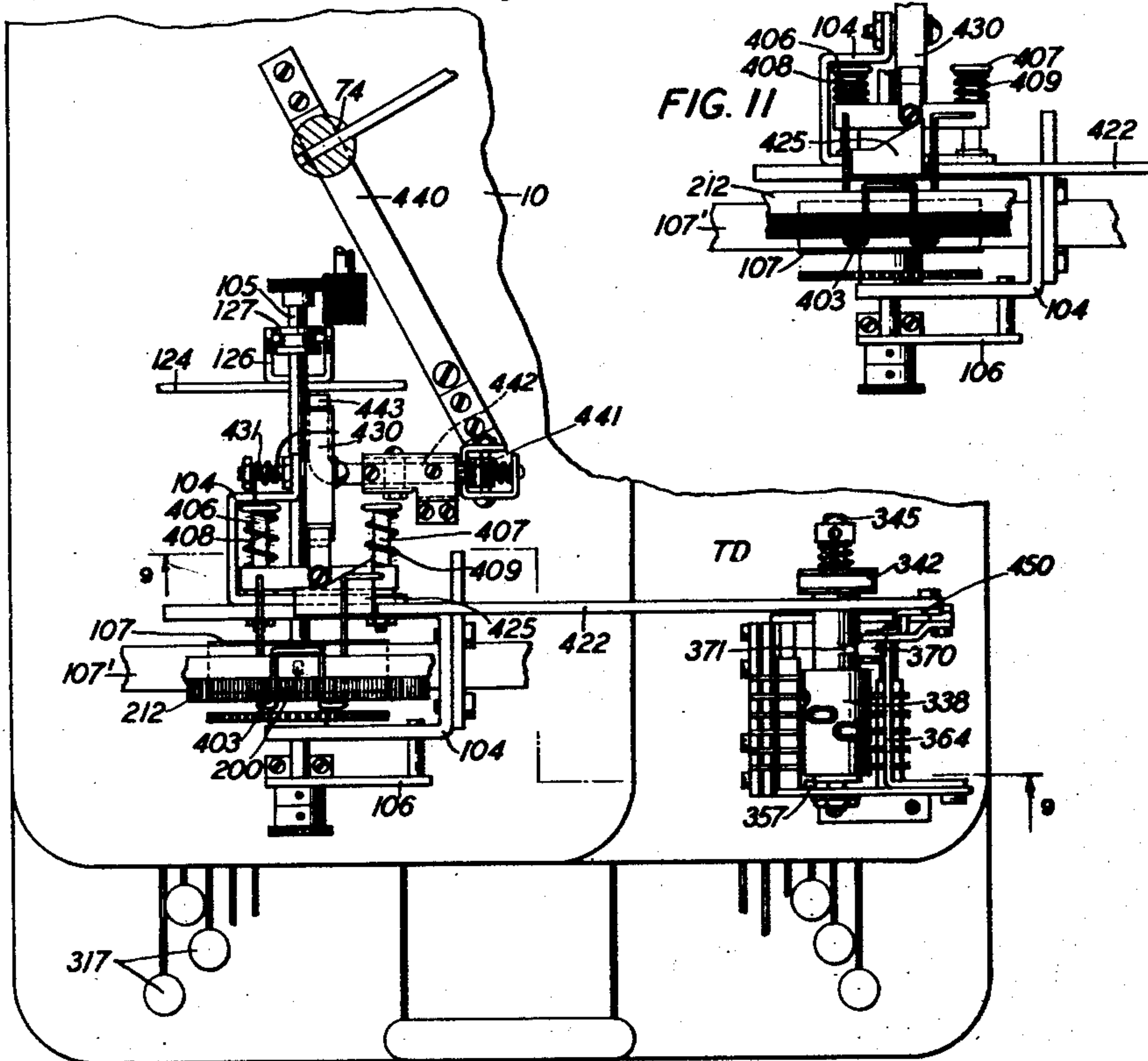


FIG. 9

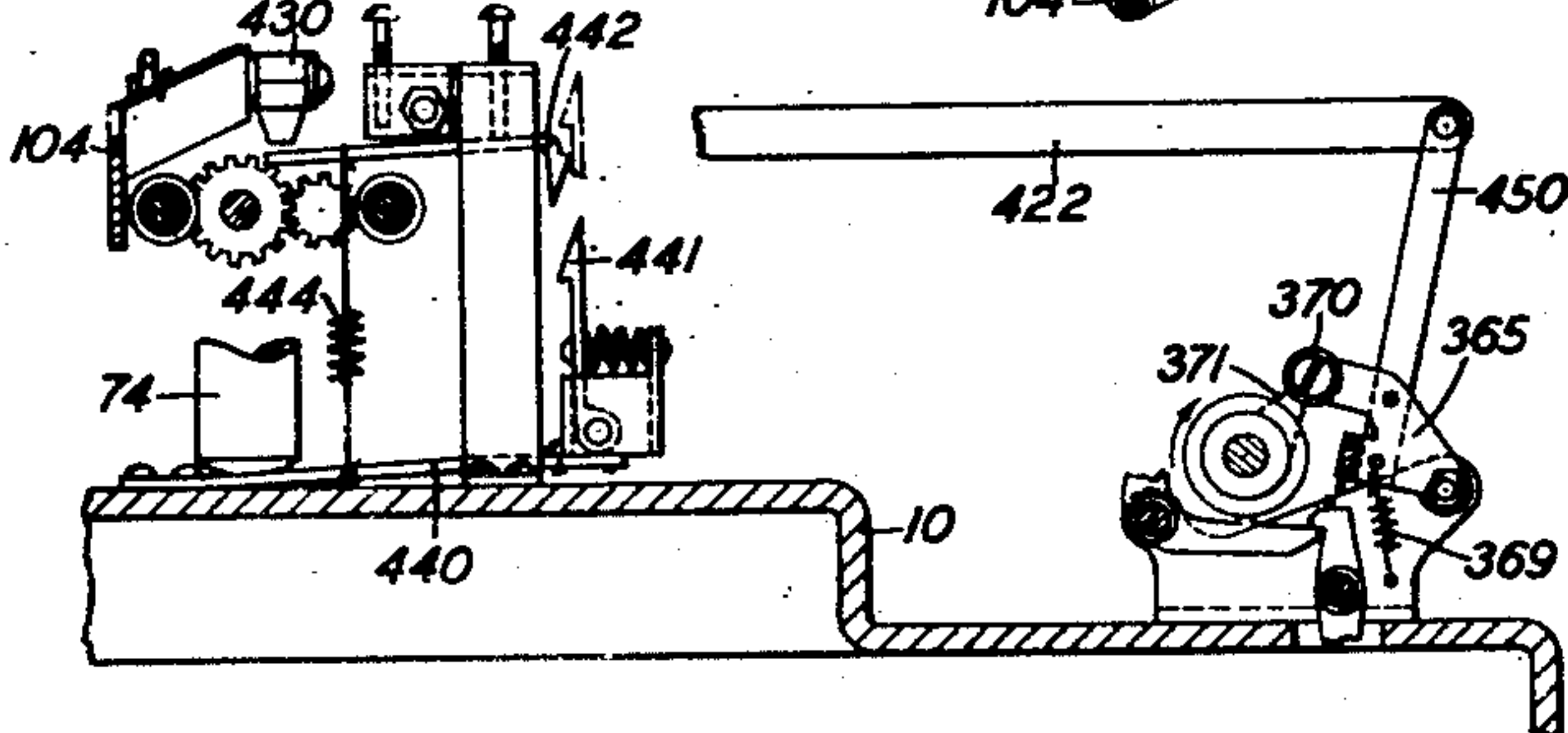
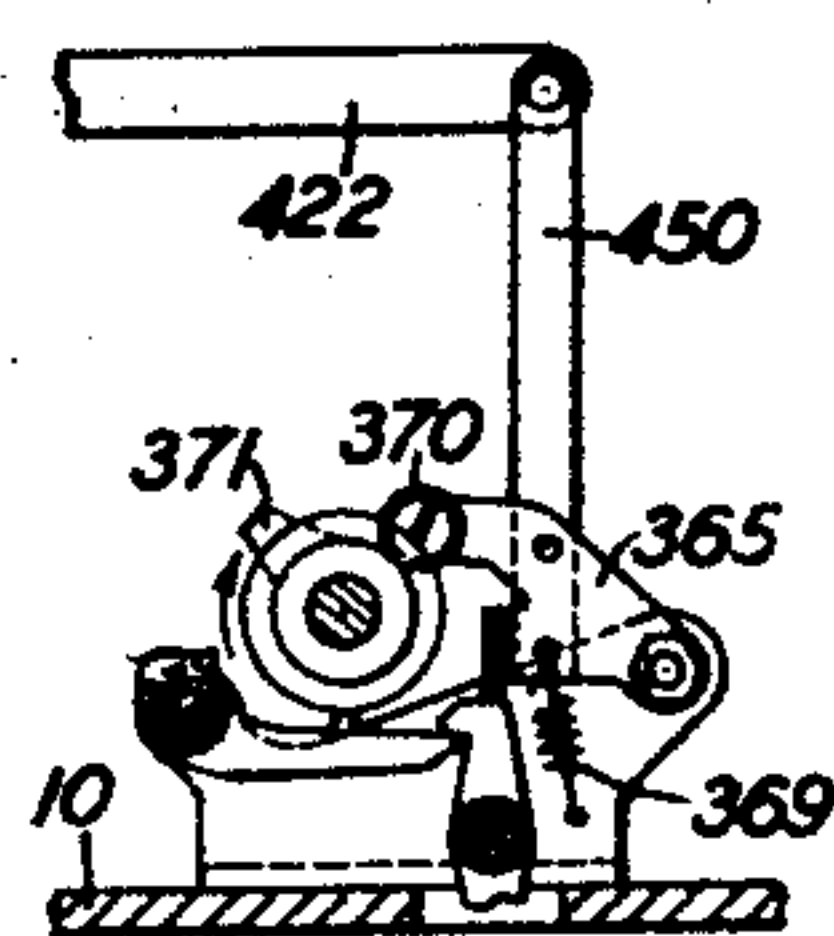


FIG. 12



INVENTORS
E. F. WATSON
T. A. McCANN
BY
J. E. FOLEY
ATTORNEY

UNITED STATES PATENT OFFICE

EDWARD F. WATSON, OF LARCHMONT, NEW YORK, AND THOMAS A. McCANN, OF EAST ORANGE, NEW JERSEY, ASSIGNORS TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK

TELEGRAPH SIGNAL RECORDING SYSTEM

Application filed September 10, 1930. Serial No. 481,044.

This invention relates to telegraph signal recording systems and more particularly to signal recording in simplex telegraph systems having common mechanism at a station for recording messages sent in opposite directions.

It may be desirable to arrange stations of this type so that the east-going and west-going messages are recorded upon the same page or tape. If, in this case, the records are made with the same kind of characters or symbols for both messages, confusion is likely to result as to the origin of the messages.

It is an object of this invention to provide an arrangement at such stations whereby east-going and west-going messages or incoming and outgoing messages, which are recorded upon the same page or tape, may be readily distinguished from one another.

A feature of this invention resides in means associated with the recording device whereby, under the control of the source of one of the messages, the recording device will produce a record of that message which is readily distinguishable from the record produced of the other message.

Another feature of this invention resides in the arrangement in a simplex start-stop telegraph system of means for controlling the recording device during the reception of one of the messages and without loss of line time, to render the record of that message distinguishable from the other message.

In accordance with another feature of the invention, the recording device is provided with means whereby, in response to the impulse of one message, the color medium is shifted relative to the recording base to effect a change in color.

A more specific feature resides in the arrangement in a telegraph printer of means, controlled by a telegraph transmitter, for automatically shifting the two-color ribbon with respect to the platen in either the upper or the lower case, to print the message from that transmitter in a color distinguishable from that in which the message from another transmitter is printed on the same page or tape.

In accordance with a still more specific fea-

ture of this invention, the automatic ribbon shifting means, under the control of the printing mechanism, is held in its shifted position until after the completion of the printing operation for the character for which the ribbon had been shifted.

The invention is applicable to various types of telegraph systems in which at least two messages are recorded on a common recorder, and the recorder may be of various types. Various types of telegraph signals may be used and the differentiation in the records of the two messages may be obtained in different ways known in the art such as by difference in color, in kind of symbols, or in placing of the symbols on the recording base which may be a tape or a page.

In its preferred form the invention is applied to a start-stop telegraph system in which a single tape printer is used for recording of messages incoming over a line and messages transmitted by a local keyboard transmitter which forms a mechanical unit with the printer.

For an example of the tape printer to which the invention may be applied in its preferred form, reference is made to Patent 1,745,633 to Morton and Krum issued February 4, 1930. For an example of a local keyboard transmitter to which the invention may be applied in its preferred form, reference is made to Patent 1,635,129 to Krum and Krum issued July 5, 1927. For another example of a local keyboard transmitter, suitable for the present purpose, reference is made to Patent No. 1,595,472 to Krum issued August 10, 1926.

In accordance with the preferred arrangement the tape printer and the keyboard, disclosed in the patents referred to, are joined into a mechanical unit thus forming a complete transmitting and receiving unit. This unit is equipped with a receiving magnet which may be included directly in the loop circuit or else may be controlled by a line relay. The unit also includes transmitting contacts controlled by the keyboard and included in the line circuit to transmit signals to a remote station and at the same time to the receiving magnet for local recording.

According to this arrangement the receiving magnet is operated by the distant transmitter as well as by the local transmitter and since it controls the selecting mechanism of a single printer, the records from the two sources will be made on a single paper strip, and will follow one another alternately in close succession. Confusion as to the origin of any particular part of the records may thus readily occur, especially when the system is used, for example, for supervision of traffic over parallel systems where the direction of the messages may change at frequent intervals.

In the preferred arrangement the tape printer is provided with a two-color ribbon which is guided by a carriage which in turn is adapted to follow the movements of the platen into the upper and lower cases without causing a change in color of the record. The ribbon carriage may, however, be shifted independently of the position of the platen, so that either color on the ribbon may be lined up with the effective case of the type bars to make the record in either color in both upper and lower cases.

As a part of the mechanical unit, shifting means are incorporated for the relative shifting of the ribbon carriage with respect to the effective type case. These means comprise various levels which are operated by the transmitting distributor during or shortly after the starting interval which follows upon the release of the transmitter by the operation of a key in the keyboard. The effect is a shifting of the ribbon carriage from its normal position relative to the platen sufficient to make the color which is to be characteristic of an outgoing message effective in the subsequent printing operation, and the arrangement is such that the ribbon carriage will be held in this position until after completion of the printing operation for the symbol corresponding to the depressed key. The release of the ribbon carriage is effected by the return movement of the type operating plunger. The other color is effective during the reception of signals from the loop circuit, when the ribbon carriage is in its normal position with respect to the platen.

It will thus be seen that when the printer is responding to signals from the line the color tape retains its normal relation with respect to the platen, whereas when the keyboard is operated, the color tape will be shifted at the beginning of the operating cycle of the sending transmitter to present the other color for local recording; the printer subsequently responds to the signals produced by the transmitter to print the corresponding symbol and, upon return to its normal position, releases the ribbon carriage to restore the normal color. The result is that the records of incoming messages will be printed in one color and those of outgoing

messages in the other color and the origin of the messages may thus readily be determined.

Ordinarily the keyboard is operated at such speed that a new key is depressed before the printer has completed the printing of the symbol corresponding to a previously depressed key. In this case the ribbon carriage will retain its shifted position during continuous sending, without being released by the printer mechanism.

It may readily be seen from this description that the shifting means operating in response to the local sending transmitter may accomplish various other functions, instead of that of shifting the ribbon tape, with the idea of modifying the record of the symbols for the sake of differentiation between the messages. Also in the case of recorders for signals not of the five-unit code, but such as dot and dash signals, or those produced by a change of polarity, satisfactory results may readily be obtained by arranging the shifting mechanism to be responsive to signals from one source and unresponsive to signals from the other source. In the preferred form described above in a general way, it is also possible to arrange for remote control by the keyboard of the shifting mechanism for the ribbon carriage.

The following is a description of two preferred forms of the invention and reference should be had to the attached drawings in which:

Fig. 1 is a simplified circuit diagram of a telegraph system to which the invention is applicable;

Fig. 2 is a plan view of one embodiment of the invention and shows a unit comprising a keyboard transmitter, a printer and shifting means for the color ribbon. Certain parts of the printer are shown broken away for the sake of clearness;

Fig. 3 is a partial plan view corresponding to Fig. 2, showing the shifting mechanism in operated condition;

Fig. 4 is a side view of the mechanism, shown in Fig. 3, in normal position; this view is taken on line 4—4 in Fig. 2;

Fig. 5 is a perspective view of certain parts of the shifting mechanism shown in Figs. 2, 3 and 4;

Figs. 6A, B, C and D are diagrammatic representations of the possible positions of the color tape with respect to the printing elements;

Fig. 7 is a cross-sectional detail view of the sending transmitter, shown in Fig. 2 and taken on the line 7—7 in that figure;

Fig. 8 is a plan view of another embodiment of the invention showing a unit combining a printer of the same kind as shown in Fig. 2 with a keyboard transmitter of a somewhat different construction from that shown in Fig. 2, and including the shifting means of

the color ribbon which also is of a different design from that shown in Fig. 2;

Fig. 9 is a cross-sectional view of the unit shown in Fig. 8 and is taken on the line 9—9 in that figure;

Fig. 10 is a perspective view showing details of the color ribbon shifting mechanism shown in Fig. 8;

Fig. 11 is a partial plan view corresponding to Fig. 8 showing the shifting mechanism in that figure in operated condition; and

Fig. 12 is a cross-sectional view showing in operated conditions the transmitting distributor included in the structure of Fig. 8.

For a full understanding of the operation of a complete station to which the features of the present invention may be applied, reference should be had to the disclosures of Patents 1,745,633, 1,635,127 and 1,595,472 referred to above. Only such parts of the devices, shown in these prior patents, are referred to in the following description and shown in the attached drawings as are necessary to facilitate an understanding of the features and operation of the present invention. Those parts of the prior machines, which are shown in the drawings, have been shown in views corresponding to certain views in the prior patents, and have been shown with certain distortions to provide for greater clearness.

Referring particularly to Fig. 1 which is a simplified diagrammatical view of a telegraph system to which the invention is applicable, the system comprises a loop circuit L interconnecting two telegraph stations SE and SW which may have identical equipment; other stations may be included in this loop circuit. Station SW is shown to comprise a receiving equipment R, which includes the line relay LR, which may also be the printer magnet, and a transmitting equipment T, including transmitting distributor TD and the transmitting contacts TC operated by the distributor. From this circuit it will be seen that the line relay LR is operated when the transmitting contacts TC, at any of the stations included in the loop, are operated.

A unitary receiving and transmitting equipment for a telegraph station such as SW is shown in Figs. 2 to 7 of the attached drawings. This particular embodiment of the invention comprises a printer mechanism such as is shown in Patent No. 1,745,633 and a transmitting mechanism such as shown in Patent No. 1,635,129 and a shifting mechanism for the color ribbon particularly adapted for cooperation with these mechanisms. The unit comprises a common base 10 for mounting of the tape printer and the keyboard transmitter. The printer is driven through main shaft 21 and the transmitter through main shaft 45 both shafts being

driven in any desirable manner from a single motor (not shown).

The keyboard transmitter comprises a transmitting distributor TD which is driven through clutch members 57 and 58, when these are brought into engagement in response to the operation of one of the keys 14, and through gears 50, to rotate shaft 44, which carries the helical series of cams 43 and starting cam 82. (See also Fig. 7.) Immediately upon engagement of clutch members 57 and 58 the starting cam 82 will transmit a start impulse over the line by opening the transmitting contacts 37 and 38; cams 43 will next open contacts 37 and 38, in accordance with the code corresponding to the key 14 which was depressed, to transmit that code over the line. At the end of this cycle transmitting distributor TD comes to rest by the disengagement of clutch members 57 and 58, unless a key has again been depressed in which case the transmitting distributor continues with a new cycle of operation.

The starting impulse will cause the line relay LR to release the receiving distributor (not shown), which is part of the printing machine, and the subsequent code impulses will cause the line relay to set the permutation bars of the printer for selection of the code bar corresponding to the received code. After the arrival of the stop interval the plunger 74 is raised to operate the selected code or stunt bar to perform the printing or stunt operation, as the case may be, and the plunger returns to its lower or normal position. The plunger is operated from the motor through power shaft 21 which normally is held stationary and is released for rotation when the receiving distributor returns to its normal or stop sector.

The printer comprises a paper strip feed mechanism which includes a platen 107 mounted in the platen frame 104 which in turn is fixed on the axially slidable shaft 105 to be rotated a step at a time every time the printing plunger 74 returns to its normal position. The paper strip 107' passes through suitable guides 201 and 202 which are mounted on the platen frame and thus retain a fixed relation between the paper and the platen in both upper and lower cases.

The shifting of the platen frame with its various elements takes place in response to certain signal codes. The code for "shift" results in the selection of stunt bar 68a which through the upward movement of plunger 74 causes an extension 130 at the lower end of stunt bar 68a to operate the bail 124 on its pivots 125 in an anti-clockwise direction so that fork 126, fastened to the bail and engaging grooved collar 127, will impart a shift toward the left to shaft 125 and to the platen frame and the paper strip. The platen frame remains in its shifted position until a code signal for "unshift" causes the selection

of stunt bar 686. Extension 130 on this bar through lever 131 operates bail 124 in a direction such that the fork 126 will impart a movement toward the right to shaft 125 and the platen 107.

The color ribbon guide and the shifting mechanism therefor will now be described. The color ribbon spools may be mounted in any desirable manner and the ribbon 212 in passing from one spool to the other is brought into close proximity to the platen at the space of printing 200. It is kept in alignment by ribbon guides 203 and 204. These guides are mounted on the ribbon carriage 205 which is slidably supported on posts 206 and 207 rigidly mounted on the platen frame 104. As shown in Fig. 2, the carriage 205 under the pressure of springs 208 and 209 is held in its normal position against enlarged portions 210 and 211 of posts 206 and 207 in which position the color ribbon 212 has its right hand side, say the red side, aligned with the printing space 200.

For the purpose of shifting the color ribbon a cam 220 is mounted on shaft 44 of the transmitting distributor TD and against the periphery of this cam a roller 221 mounted on slidable bar 222, is pressed by the tension of spring 223'. Cam 220 has a raised camming surface 224 the angular relation of which with respect to roller 221, is such that the roller will be moved thereby in a direction away from shaft 44 shortly after the starting of this shaft, that is, roller 221 will be operated during the starting interval or soon thereafter.

The subsequent operations will be more readily understood by reference to Fig. 5. The movement of slidable bar 222 is transferred through lever 223, which is pivoted in a bracket mounted on base 10, to levers 225 and 226 which are pivoted in brackets mounted on platen frame 104. The end of lever 223 which engages lever 225 is extended in order that this engagement may be secured in either position given to lever 225 by the shift of the platen into upper or lower cases. The lever 226 is part of a bail 227 having operating fingers 228 engaging one side of ribbon carriage 205, so that the movement of roller 221 will cause fingers 228 to force the carriage 205 to slide on posts 206 and 207 against the pressure of the springs 208 and 209 into the position shown in Fig. 3. The movement of carriage 205 in this operation is such that the left hand side, or black side, of the color ribbon 212 will be aligned with the printing space 200. In the shifted position of ribbon carriage 205 an extension 229 thereof is locked by catch 230, which also is pivoted in a bracket on platen carriage 104, and which is held in engagement with extension 229 by means of spring 231. Due to the shape of lever 223 and its relation to lever 225 this shifting and locking of ribbon car-

riage 205 may take place in either upper or lower case position of platen carriage 104. As soon as this operation, caused by cam 220, has commenced and shortly after the starting of distributor TD, the shifting of the ribbon will be completed so that the ribbon will be ready for printing in black before the transmission of the signal code is completed. The color ribbon therefore will be in its new position before the selection of a type bar takes place, that is, before the actual printing operation is started. The color shift thus is accomplished without loss of time.

The return of ribbon carriage 205 after the printing operation has been completed is brought about by the plunger 74 which, when it returns to its normal or lowermost position, engages one end of a lever 240. The other end of lever 240 carries a trigger 241 which in this operation engages a lever 242 which in turn is arranged to operate catch 230 against the action of spring 231 sufficiently to release the ribbon carriage 205 which then returns to its normal position under the action of springs 208 and 209. Levers 240 and 242 are pivoted in brackets mounted on base 210; for this reason catch 230 is of such length and so arranged with respect to lever 242 that the release of the ribbon carriage may be brought about whether the platen carriage is in position for upper or lower case.

In Fig. 6 the different possible relative positions of the color ribbon and of the upper and lower cases are illustrated diagrammatically. Thus Figs. 6a and 6b show conditions in the lower case for printing red and black in response to incoming and outgoing messages respectively and Figs. 6c and 6d show the corresponding conditions in the upper case. In these figures the end only of a type bar 63 has been shown.

The operation has been described as it would take place at the end of the transmission of a local or east-going message or when the keyboard is operated comparatively slowly. When the keyboard is operated fairly synchronously with the operating cycle of the transmitting distributor TD, the ribbon carriage 205 will be held in its locked position without releasing between characters. This is due to the shape of the raised portion 224 of cam 220 on the distributor which, through the roller 221 and the various levers operated thereby, exerts a pressure through fingers 228 on the ribbon carriage 205 for a comparatively long time.

The printing operation in response to the depression of a key does not take place during the first cycle of the transmitting distributor. Assuming fairly synchronous operation of the keyboard, the printing operation will occur during the second cycle, i. e. after a second key has been depressed. It is therefore necessary that the ribbon carriage

205 be prevented from releasing until the end of the second cycle following the depression of a key, so that the return of the plunger 74 to normal, after the printing of a character which was received during the cycle preceding the depression of the key, will not release the ribbon carriage 205. This effect is obtained by shaping the camming surface 224 to hold roller 221 in its outer position until close to the end of the cycle or at least till after the plunger 74 has returned to normal position. The ribbon carriage 205 thus will be held over in shifted position while the levers 240, 242 and 230 perform their usual release operation. At the end of the first cycle roller 221 slides off the camming surface 224 and, unless a new key is depressed, the ribbon carriage 205 will be in condition for release at the end of the following printing operation. However, when a new key is depressed soon enough the cam 220 will again prevent the release of ribbon carriage 205 by bringing roller 221 onto the cam surface 224 before the plunger 74 returns to normal during this second cycle.

A unitary receiving and transmitting equipment comprising another embodiment of the invention is shown in Figs. 8 to 12 of the attached drawings. The printing mechanism is similar to that of Patent 1,745,633, whereas the keyboard transmitter is similar to that of Patent 1,695,472, and the shifting mechanism for the color ribbon is an alternative form of that described above. Since the operation of this alternative unit is very similar to the unit already described the following description will include only such details of mechanism and operation as may not be understood from the description above.

The unit is mounted on the common base 10 and a common motor, not shown, is provided to drive the printing mechanism through shaft 105 and the transmitting mechanism through shaft 345.

The keyboard transmitter comprises a transmitting distributor TD which has a cylindrical cam 338 for the operation of the transmitting contacts. The cam 338 is driven through the friction clutch 342 by shaft 345 and rotates when the stop lever 357 is operated by the depression of one of the keys 317; a lock bar 364 serves to lock the key and the selecting mechanism during the rotation of the cylindrical cam 338; this bar is normally held in a raised position by the engagement of a lug 371 on cam 338, with a roller 317 on the arm 365, extending from bar 364. When in response to the depression of a key 317 and the consequent operation of stop lever 357 the cylindrical cam 338 is permitted to rotate in a clock-wise direction, the lug 371 will permit the roller 370 to engage with the cylindrical surface of cam 338 due to the retraction of spring 369 thereby lowering the locking bar 364 into its locking position.

This operation takes place before the first impulse has been transmitted and the locking bar is not raised again until the lug 371 reaches its position under roller 370, which will not be until the complete signal code has been transmitted.

Referring now to the color ribbon guide and the shifting mechanism therefor, the ribbon 212 is kept in alignment with the printing space 200 by ribbon guide 403 which is mounted on the ribbon carriage 405; the latter is slidably mounted on posts 406 and 407 which in turn are mounted on the platen frame 104. The ribbon carriage 405 is held in its normal position by springs 408 and 409 in which position the color ribbon has its red side aligned with the printing space 200.

The movement of roller 370 and arm 365, previously described, is taken advantage of in this embodiment for the shifting of the color ribbon to its black side whenever a key is depressed. For this purpose an arm 450 is mounted on the lever 365 and carries at its upper end a bar 422 which reaches over to the ribbon carriage 405. The bar 422 is pivoted to the lever arm 450 and its left hand end is slidably mounted on a portion of the platen carriage 104 for a transverse movement with respect to the printer shaft 105 and at this end the bar 422 carries an angular extension 425 which has a camming surface in contact with a roller 426 mounted on the ribbon carriage 205. Thus whenever the roller 370 of the transmitting distributor drops to the surface of the cam 338 arm 450 moves towards the left, in turn sliding bar 422 towards the left, whereby the camming surface of extension 425 causes the roller 426 to force the ribbon carriage to slide on posts 406 and 407 against the tension of the springs 408 and 409. A catch 429 then engages a locking member 430 to hold the ribbon carriage 205 when the bar 422 returns to its normal position. In its locked position the ribbon carriage 205 through the ribbon guide 403 positions the color ribbon so that its black side will be aligned with printing space 200 for printing of a local message.

The locking member 430 is mounted on the platen frame 104 and is normally held against the catch 429 by means of spring 431. To release the ribbon carriage 205, for return to its normal position, locking member 430 is operated by the return of the printing plunger 74 through the release member 442 and pawl 441, mounted on spring member 440 by the return of the printing plunger 74. The hook on release member 442 cooperates with a similar hook on pawl 441 and is shaped so that during the downward movement of pawl 441 the two hooks will disengage due to the clockwise movement of release member 442; release member 442 has an angular extension 443 in the direction of the shift movement of the platen, and this extension is

long enough to accomplish the release of the ribbon carriage in either position of the platen carriage. Due to the comparatively great lengths of bar 422 and arm 450 the shifting of the ribbon carriage 405 by the movement of these parts may be brought about both in upper and lower case positions of the plate.

The timing of the shifting and release operations for the ribbon carriage is similar to that of the unit described above in connection with Figs. 2 to 7.

What is claimed is:

1. In a telegraph system, a telegraph line, a transmitting device for sending outgoing signals over said line, a receiving device for producing a record of said outgoing signals and for producing a record of signals incoming over said line, and means for controlling said receiving device to make said records distinguishable from one another.

2. In a telegraph system, a plurality of signal transmitters, a recording device for producing a record of signals from said transmitters, means controlled by one of said transmitters for adjusting said recording device to make a record of signals from said one transmitter distinguishable from the record made of signals from another of said transmitters.

3. In a telegraph system, two signal transmitters, a recording device for producing on a common base alternate records of signals from said transmitters, means associated with said recording device for making said records characteristically different.

4. In a telegraph system, a signaling line, a plurality of signal transmitting means connected to said line, a recording device for producing records of signals from said transmitting means on a common recording base, means associated with said recording device for making said records individually characteristic in accordance with the direction of transmission over said line of said signals.

5. In a telegraph system, a line, a recording device connected to said line, local transmitting means associated with said recording device, said recording device being adapted to produce a single continuous record of incoming messages from said line and of messages transmitted by said transmitting device, said recording device comprising guiding means for the recording base and coloring means for supplying coloring matter to said recording base, and shifting means associated with said recording device for effecting a relative shift between said guiding means and said coloring means under the control of said transmitting means to modify the symbols representing the message from said local transmitting means to be characteristically different from those representing said incoming message.

6. In a start-stop telegraph system, a line,

a recording printer connected to said line, a local transmitter associated with said printer, said printer being adapted to record incoming messages from said line and outgoing messages from said transmitter in a continuous record, said printer comprising a platen, color ribbon guiding means, and paper guiding means, shifting means associated with said printer for changing the alignment of one of said guiding means with respect to said platen, said local transmitter comprising a control means for operating said shifting means, and restoring means for said shifting means controlled by said printer.

7. In combination, a telegraph tape printer adapted for line recording and home recording in a continuous record which comprises a receiving distributor having a color ribbon guide, a recording tape guide, a platen adapted for printing in upper and lower cases, a keyboard transmitter which comprises a sending distributor, shifting means for one of said guides to change the relative alignment of said guides in both upper and lower cases, means included in said sending distributor for setting said shifting means for one alignment during the sending cycle for a character, means included in said receiving distributor for setting said shifting means for another alignment during the printing cycle for said character.

8. In a start-stop telegraph system, a tape printer adapted to produce a continuous record of incoming and outgoing signals, a keyboard transmitter for producing said outgoing signals, said printer comprising a paper guide, a two-color ribbon, and a guide for said ribbon, shifting means for said color ribbon guide to change its alignment relative to said paper under the control of said transmitter to record outgoing signals with one of the colors of said ribbon and to record incoming signals with the other color of said ribbon.

9. In a start-stop telegraph system, a recording device for producing a continuous mixed record of eastgoing and westgoing signals, a transmitting device for producing said westgoing signals, shifting means associated with said recording device to modify the symbols used for said messages under the control of said transmitter near the start impulse and without loss of line time, and means under the control of said recording device after the stop signal of said incoming impulse, to produce unmodified symbols for said incoming signals.

10. In a start-stop telegraph system, a tape printer adapted to make a continuous record of incoming and outgoing signals which comprises a receiving distributor having a stop sector, a two-color ribbon, a guide for said ribbon, recording paper guiding means for printing in upper and lower cases, a keyboard transmitter which comprises a send-

ing distributor having a start sector, shifting means for said ribbon guide to present either of the two colors of said ribbon for printing in either of said cases, means for setting said shifting means to present one of said colors under the control of said start sector and other means for presenting the other of said colors under the control of said stop sector.

- 10 11. A start-stop tape printer comprising a receiving distributor, a platen, a two-color ribbon, a guide for said ribbon, a tape guide, means for shifting said platen into upper and lower cases and a type operating power
15 plunger, a local keyboard transmitter comprising a sending distributor, means for shifting said ribbon guide to change the color of printing in upper and lower cases, camming means on said sending distributor for
20 setting said ribbon guide through said shifting means near the end of the start impulse from said sending distributor, releasing means for said shifting means to restore said ribbon guide under the control of said power
25 plunger after completion of its type bar operating stroke.

In testimony whereof, we have signed our names to this specification this 9th day of September, 1930.

30 EDWARD F. WATSON.
THOMAS A. McCANN.

35

40

45

50

55

60

65