

March 30, 1943.

F. L. O'BRIEN

2,315,348

STYLUS CONDITIONING APPARATUS

Filed Aug. 9, 1941

FIG. 1

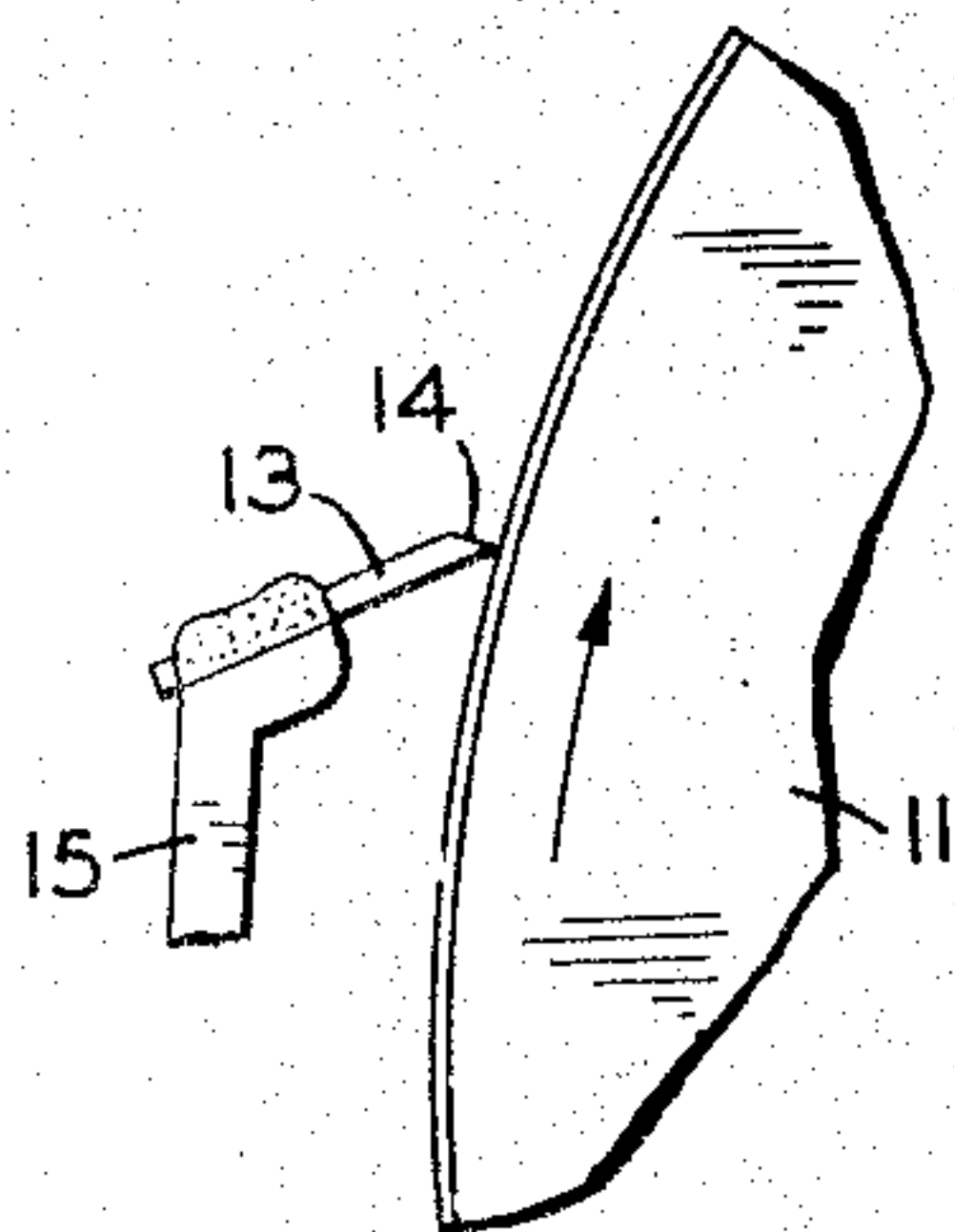


FIG. 2

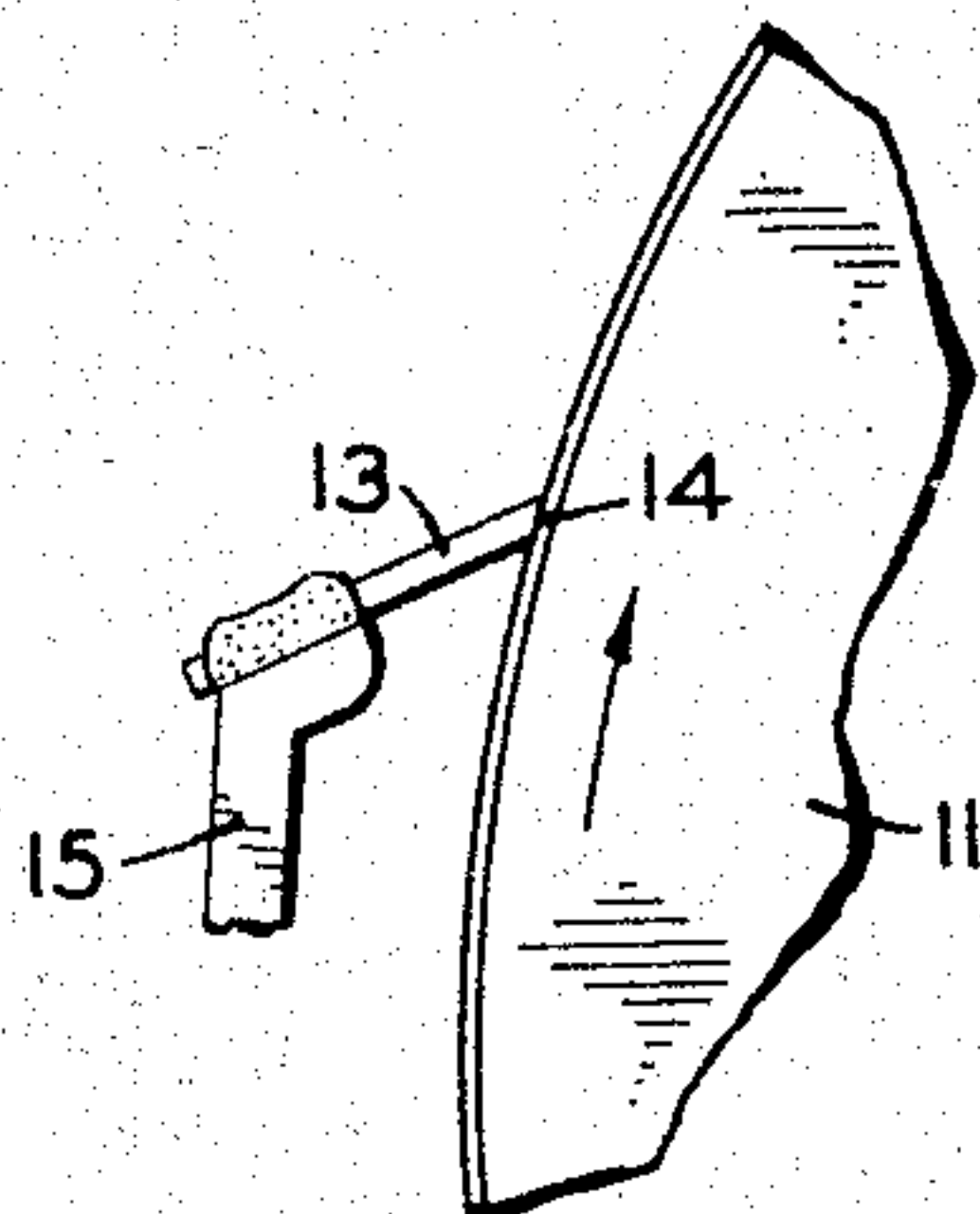


FIG. 3

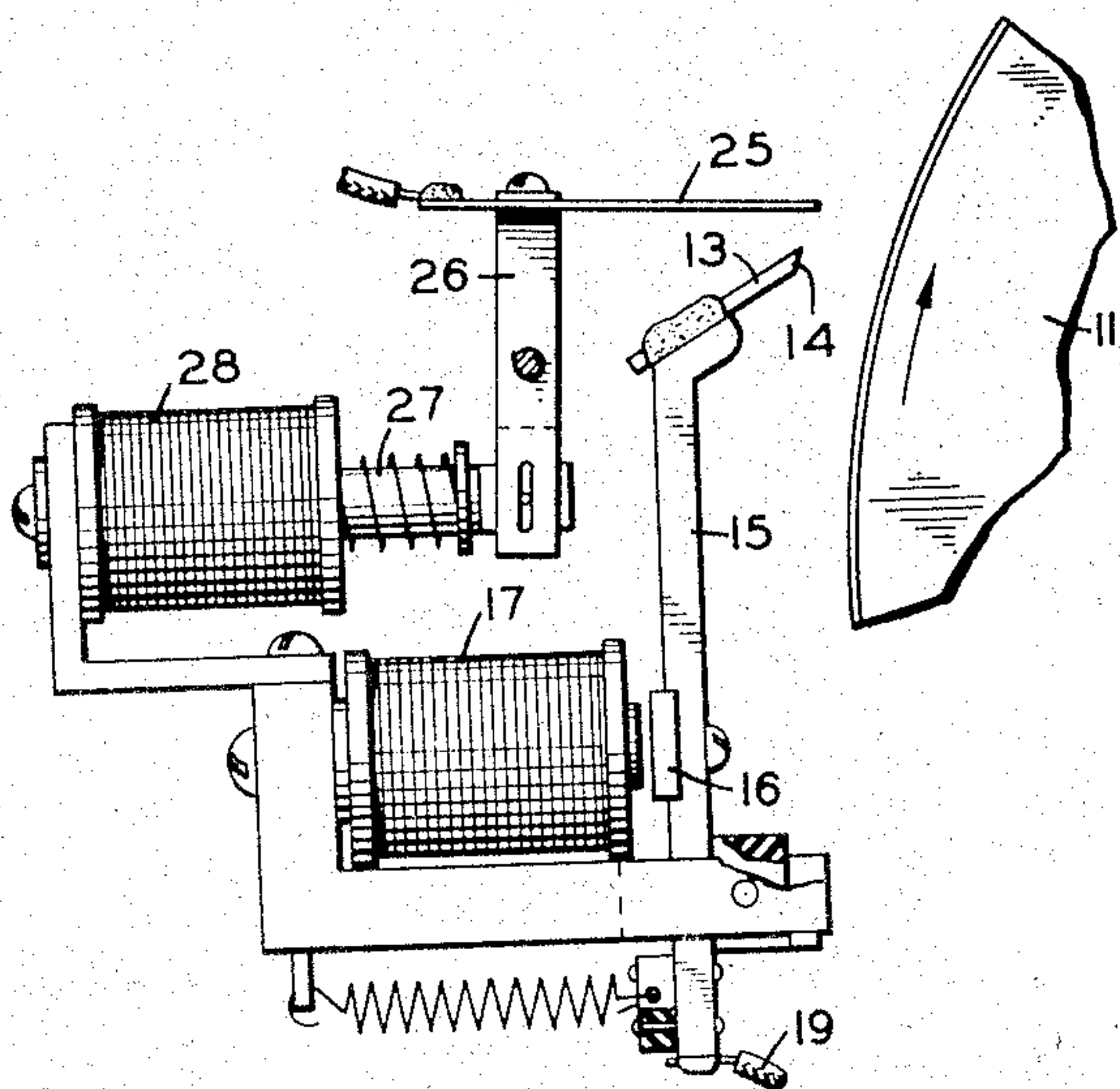


FIG. 4

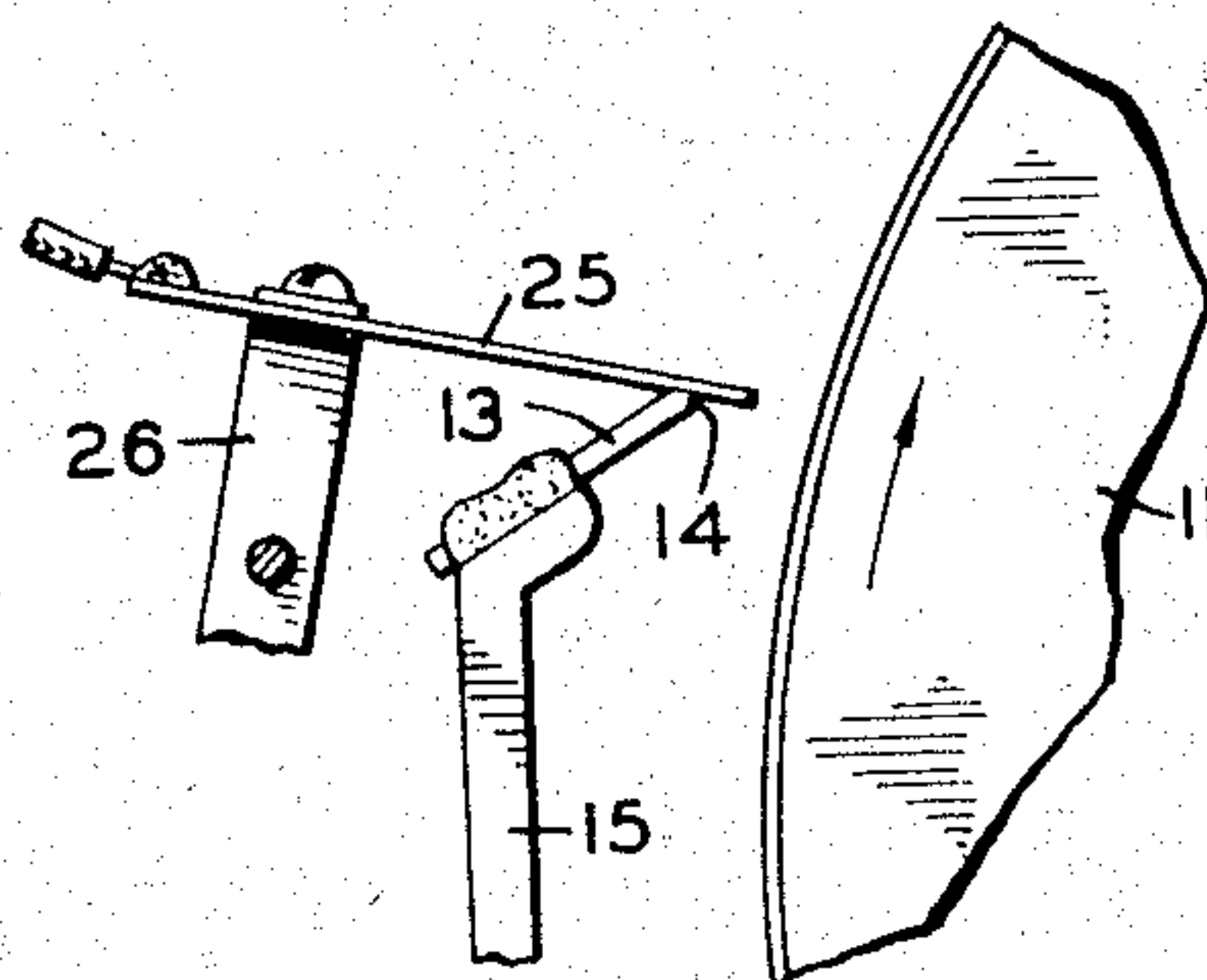


FIG. 5

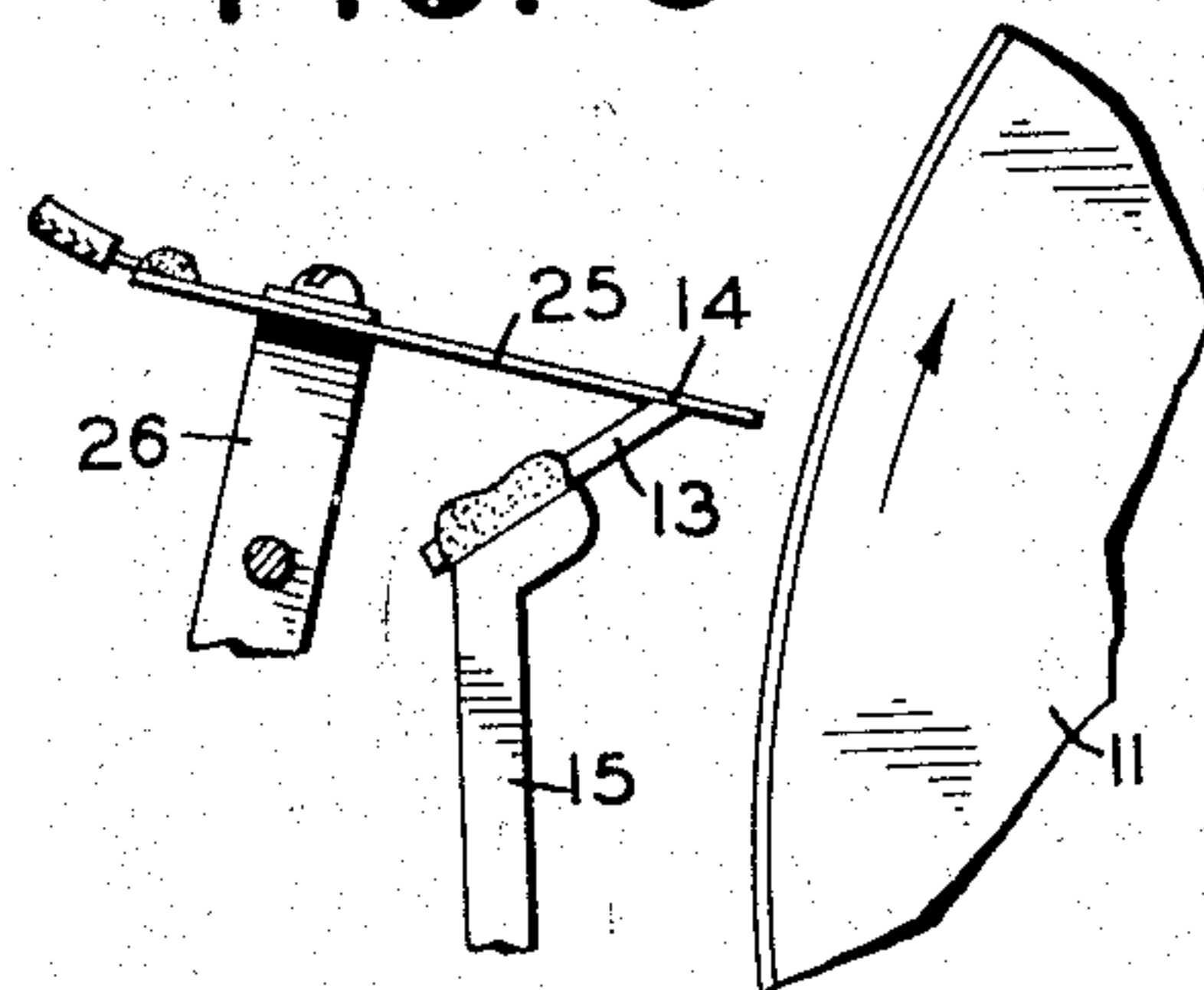
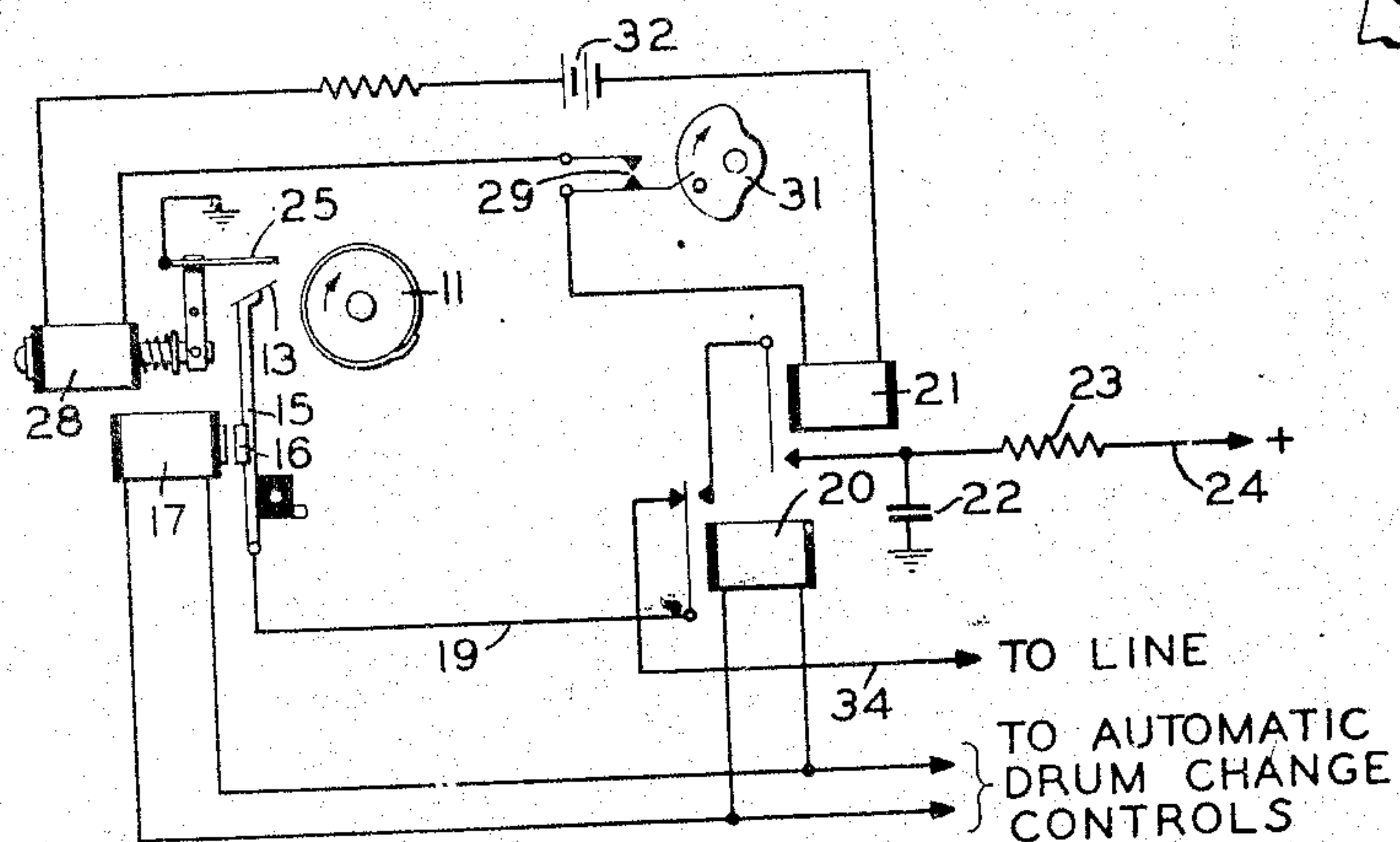


FIG. 6



INVENTOR
F. L. O'BRIEN

BY

ATTORNEY

UNITED STATES PATENT OFFICE

2,315,348

STYLUS CONDITIONING APPARATUS

Frederic L. O'Brien, Rutherford, N. J., assignor to
The Western Union Telegraph Company, New
York, N. Y., a corporation of New York

Application August 9, 1941, Serial No. 406,087

6 Claims. (Cl. 178—6.6)

This invention relates to recording telegraph systems of the type employing an electrical recording stylus for applying electric current to a recording medium to produce a record thereon.

Systems of this type usually include a metallic recording cylinder around which a recording blank is wrapped, although other types of support for the recording blank can be used. The stylus is positioned in a suitable holder with one end held yieldingly in contact with the blank. Relative movement between the blank and stylus is obtained by various means to produce scanning of the blank by the stylus for recording purposes. Such movement is rapid and produces considerable friction so that the end of the stylus is rapidly worn flat with the result that the recorded marking on the blank becomes blurred and loses the sharp definition desired.

An object of this invention is to provide a stylus mechanism for recording telegraph apparatus of the type set forth constructed and arranged to compensate for the flattening effect described by periodically re-forming the stylus bearing surface to present a fresh surface of relatively small area to the recording blank.

A further object is to provide an improved method of treating the stylus in machines of the type set forth so as to provide sharp definition of the recorded subject matter throughout the operation of the machine without having to remove the stylus from the machine or to replace it with a fresh one.

A further object is to provide a stylus conditioning mechanism for a recording telegraph apparatus which will be entirely automatic in operation.

These and other objects, which will be apparent to those skilled in the art, are obtained by the present invention, one embodiment of which is shown in the accompanying drawing, in which:

Fig. 1 is a diagrammatic view showing a marking stylus with a sharp point at the beginning of a recording operation, the support for the recording medium being shown as a cylinder;

Fig. 2 is a similar view showing the flattening effect on the stylus point, of prolonged recording;

Figs. 3, 4 and 5 are diagrammatic views illustrating a reconditioning operation carried out in accordance with one embodiment of this invention; and

Fig. 6 is a wiring diagram illustrating one circuit arrangement adapted for use in connection with the illustrated embodiment of the invention.

Although the present invention is illustrated

diagrammatically in connection with a recording machine employing a rotary cylinder as the support for the recording blank, it will be apparent that the invention is equally well adapted for use in machines having other types of platens.

Figs. 1 and 2 illustrate the flattening effect of a prolonged recording operation resulting in the loss of the desired sharp definition of the recorded characters, a condition which the present invention prevents.

Between recording operations, for example between messages in a recording telegraph apparatus, it is customary to lift the stylus away from contact with the recording cylinder, and the present invention employs this period for so treating the marking point of the stylus as to recondition it and restore it to substantially its original condition in which a bearing surface of relatively small area is provided for contact with the recording blank whereby sharpness of definition is restored.

The illustrated embodiment is particularly adapted for use with a recording mechanism such, for example, as that shown in the copending application of Wise et al., Serial No. 110,760, filed November 13, 1936, now Patent No. 2,255,868, granted September 16, 1941, for System and apparatus for facsimile telegraphy. Such a mechanism includes a recording cylinder 11 around which a recording blank is wrapped for rotation with the cylinder under a recording stylus 13 having a bearing surface 14 at one end in position to engage the blank on the cylinder 11 as indicated diagrammatically in Fig. 1 for marking purposes. The stylus is supported on a scanning carriage, not shown, and is moved longitudinally along the cylinder surface during rotation thereof. It is supported on one end of a movable arm 15 secured to the armature 16 of a stylus magnet 17 (Fig. 3) and adapted to be moved thereby into and out of operative recording position. As described in said patent, the magnet circuit is so controlled as to move the stylus away from the cylinder between message recording operations at the same time that the cylinder carrying a recorded message is being removed and a fresh cylinder with an unmarked message blank is being positioned in the apparatus.

As illustrated in Fig. 6, the stylus 13 is adapted to be connected, through the arm 15, conductor 19 and make contacts of relays 20 and 21, to a condenser 22, when the relays are both operated. It will be noted that the relay coil 20 is connected to the operating circuit of the stylus magnet 17 for simultaneous operation therewith.

One side of the condenser is connected through a resistance 23 to any suitable grounded source 24 of direct current and also to the contact of the relay 21, the other side of the condenser being grounded.

A grounded metal plate 25 is pivotally mounted for movement into and out of engagement with the end of the stylus when the latter is in inoperative position. The plate has an arm 26 or the like connected to one end of the core 27 of a solenoid 28. The solenoid circuit is controlled by contacts 29 adapted to be operated by the cylinder changing cam 31 of the associated recording machine, not shown. Cam 31 is started into operation by the automatic drum changing controls and is timed to close its contact 29 after the energizing of magnet 17 and relay 20. The relay 21 in series with solenoid 28 is provided to prevent premature discharge of the condenser 22 and possible burning of the recording blank as the stylus leaves the surface thereof. Any suitable source 22 of current for the solenoid can be employed.

In operation, assuming that a message has just been recorded in a circuit 34 by the stylus 13 on a cylinder supported blank, the drum change controls of the recording machine will operate closing the circuit to the stylus magnet 17 to lift the stylus away from the operative position shown in Figs. 1 and 2 into the inoperative position shown in Figs. 3 to 6. At the same time the relay 20 is operated to disconnect the stylus from the recording circuit 34 and to prepare a connection from the stylus to the condenser 22, already charged from the source 24 of direct current. Shortly thereafter the cam 31 closes the contacts 29 to operate the solenoid 28 and relay 21 to complete the connection of the stylus to the condenser 22 and to move the grounded metal plate 25 into contact with the bearing surface 14 of the stylus in the manner illustrated in Figs. 3 to 6. This contact permits the condenser to discharge with a spark intensity which is suitably regulated to melt a small amount of the upper edge of the stylus wire, as diagrammatically shown in Fig. 4. This will maintain a bearing surface on the stylus point of relatively small area for marking contact with the recording medium.

It should be understood that Fig. 3 illustrates an extreme condition of flatness which is seldom if ever likely to be encountered when the present invention is employed, as the conditioning operation after each message would prevent such an extreme condition from developing and would tend to maintain the desired sharp stylus shown in Figs. 1 and 5.

One feature of the present invention is the self-regulation of the conditioning operation. With a suitable condenser value the amount of stylus wire melted off decreases as the stylus approaches correct sharpness because the area of contact between the stylus and the discharge plate increases, providing for more rapid heat dissipation and reducing the melting effect. I have successfully used a two microfarad condenser 22 and a resistance 23 of fifty thousand ohms.

It will be understood that many modifications and changes can be made in the structure and circuit arrangements shown without departing

from the essential attributes of the invention, and I contemplate all such changes as come within the scope of the appended claims.

I claim:

1. The combination in a telegraph apparatus of mechanism for marking a recording medium including a recording stylus adapted to apply electric current to said medium for producing a record thereon, means for holding said stylus in contact with said medium for relative movement across the surface thereof, and heating means for reshaping the bearing face of said stylus to compensate for the flattening effect of such movement on said face to provide a fresh bearing surface of relatively small area for contact with said medium.

2. The combination in a telegraph apparatus of mechanism for marking a recording medium including a recording stylus adapted to apply electric current to said medium for producing a record thereon, means for holding said stylus in contact with said medium for relative movement across the surface thereof, and heating means for periodically removing a portion of the bearing face of said stylus to compensate for the flattening effect of such movement on said face to provide a fresh bearing surface of relatively small area for contact with said medium.

3. The combination in a telegraph apparatus of mechanism for marking a recording medium including a recording stylus adapted to apply electric current to said medium for producing a record thereon, means for holding said stylus in contact with said medium for relative movement across the surface thereof, and heating means employing an electric current to remove a portion of the bearing face of said stylus to compensate for the flattening effect of such movement on said face to provide a fresh bearing surface of relatively small area for contact with said medium.

4. The combination in a recording telegraph apparatus for marking a recording medium of a recording stylus, a stylus support, means for moving said support to position said stylus for relative movement across the surface of said medium for producing a record thereon or to move said stylus to inoperative position away from said medium, a condenser and condenser circuit, means for connecting said stylus in said circuit when in said inoperative position, a contact plate in said circuit, and means for causing the bearing face of said stylus to contact said plate whereby said condenser is discharged across said contact to cause a portion of said bearing face to be melted off to provide a fresh bearing surface of relatively small area for contact with said medium.

5. The method of reconditioning the operating point on the stylus of a recording mechanism which consists in periodically melting off a portion of said face to compensate for the flattening effect due to wear.

6. The method of reconditioning the operating point on the stylus of a recording mechanism which consists in periodically passing an electric current through the stylus to melt off a portion of said face and compensate for the flattening effect due to wear.

FREDERIC L. O'BRIEN.