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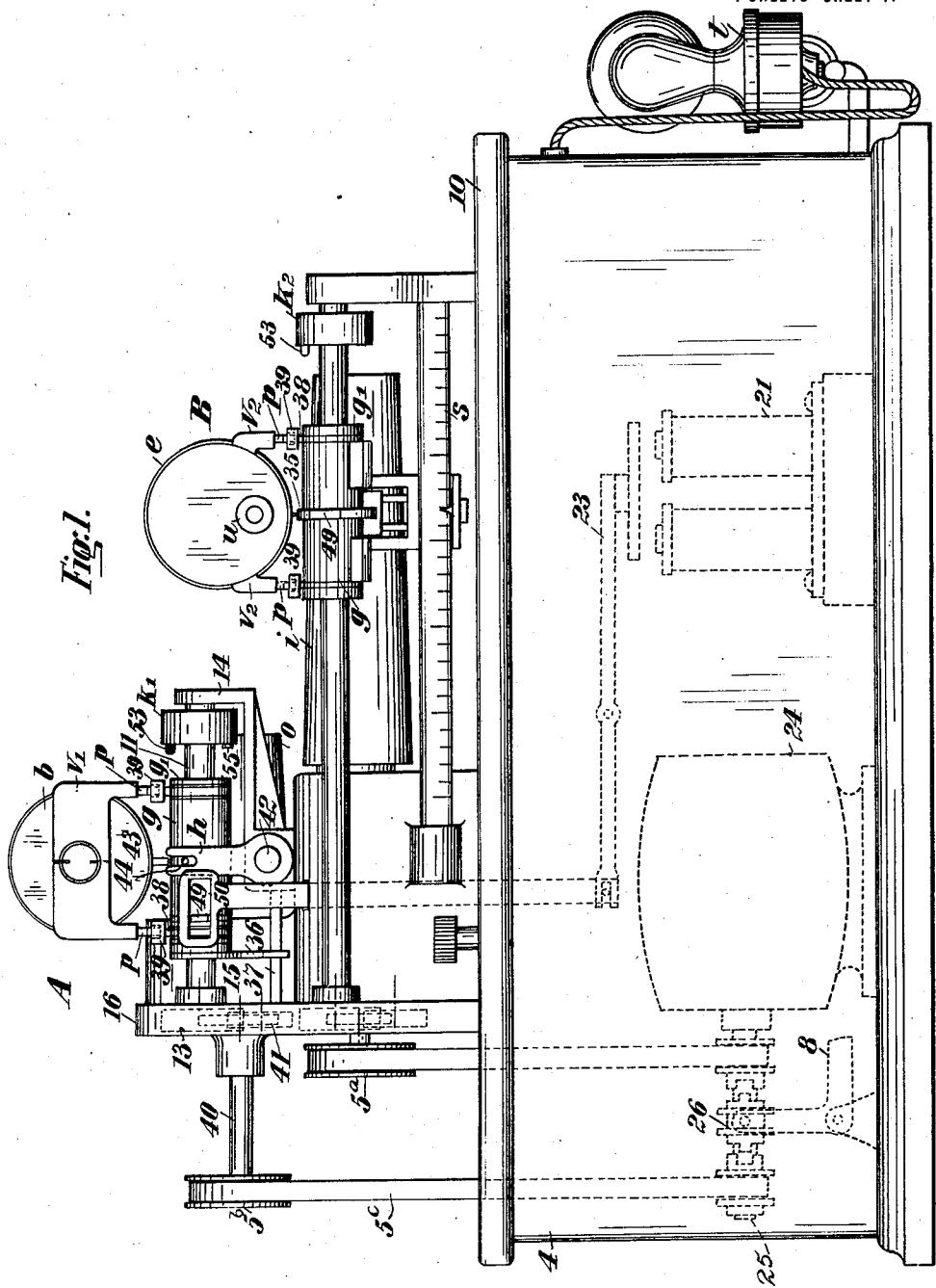
F. SEELAU.

TELEGRAPHONE.

APPLICATION FILED MAY 28, 1914.

Patented Jan. 18, 1916.

4 SHEETS—SHEET 1.



Inventor:
Franz Seelau
of Briesen, Germany
13.

F. SEELAU,

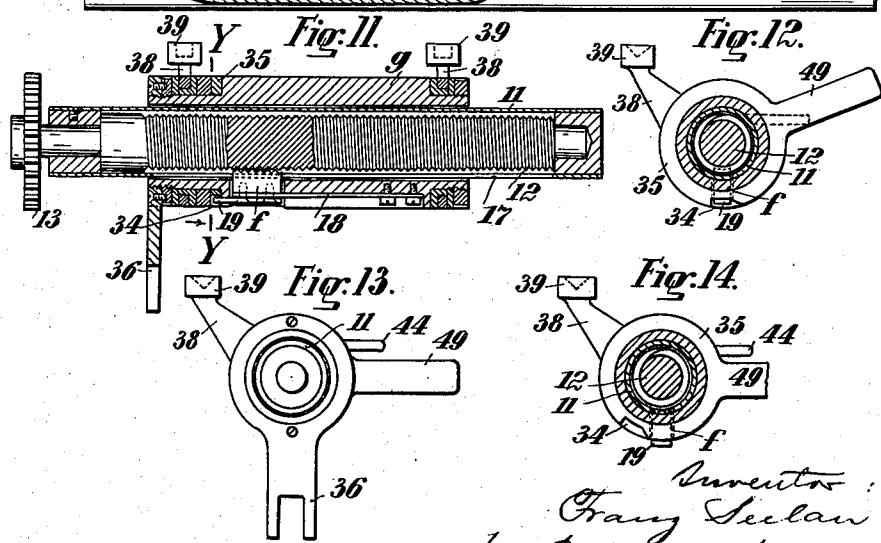
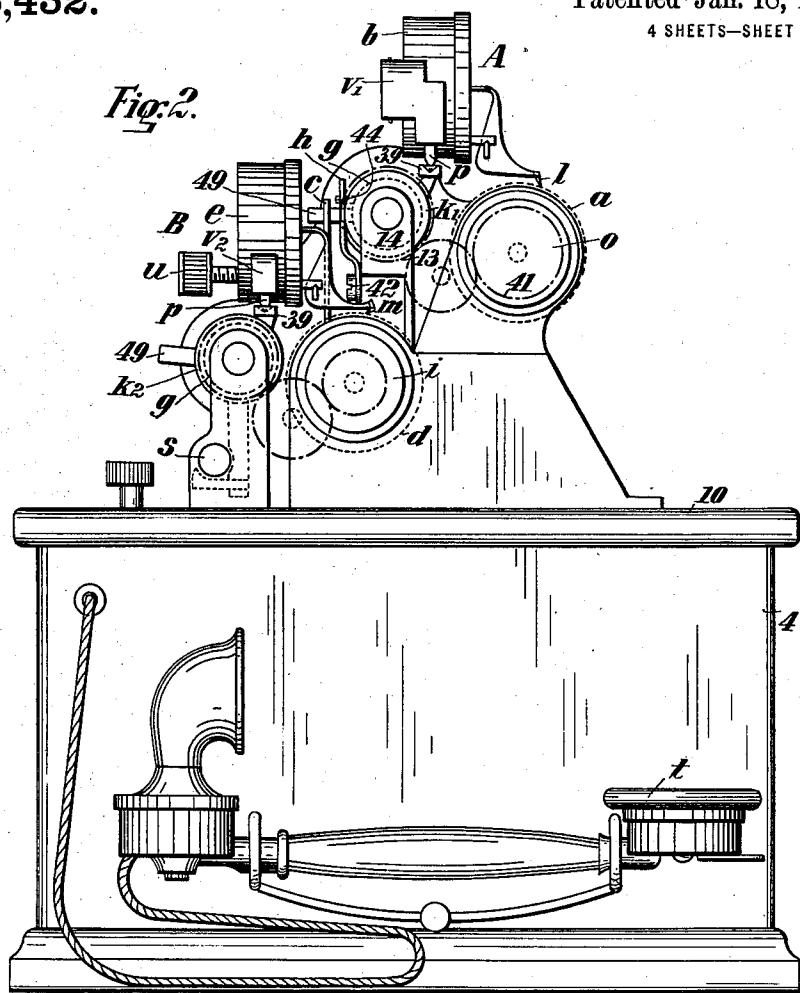
TELEGRAPHONE.

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4 SHEETS—SHEET 2.



19 Inventor :
Franz Seelan
by Briesen & Zucco 441

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4 SHEETS—SHEET 3.

Fig. 3.

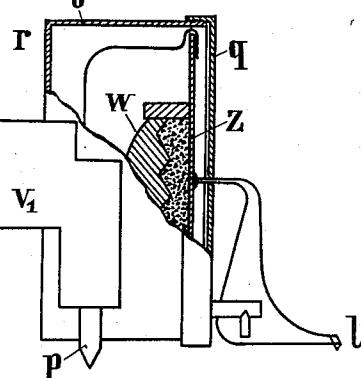


Fig. 7

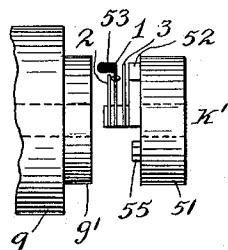


Fig. 4.

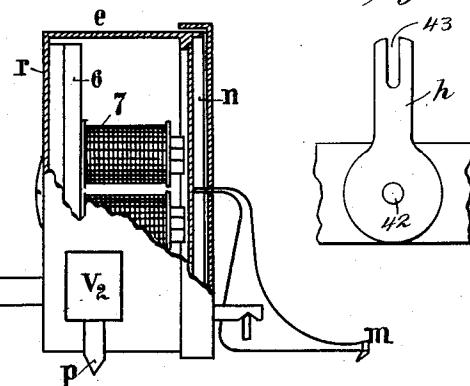


Fig. 9.

Fig. 8.

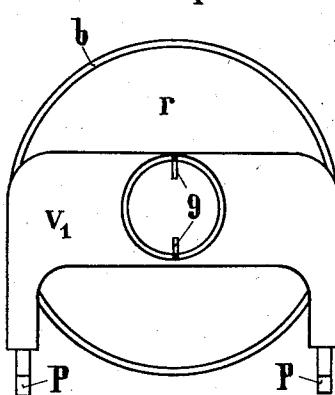
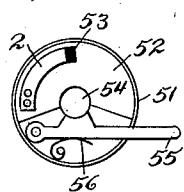


Fig. 5.

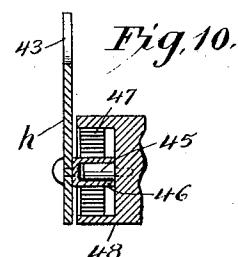


Fig. 10.

Witnesses

Emilia Rahm
Madeline Hirsch

Inventor

Franz Seelau
by his attorneys
Briesen & Junge

F. SEELAU.

TELEGRAPHONE.

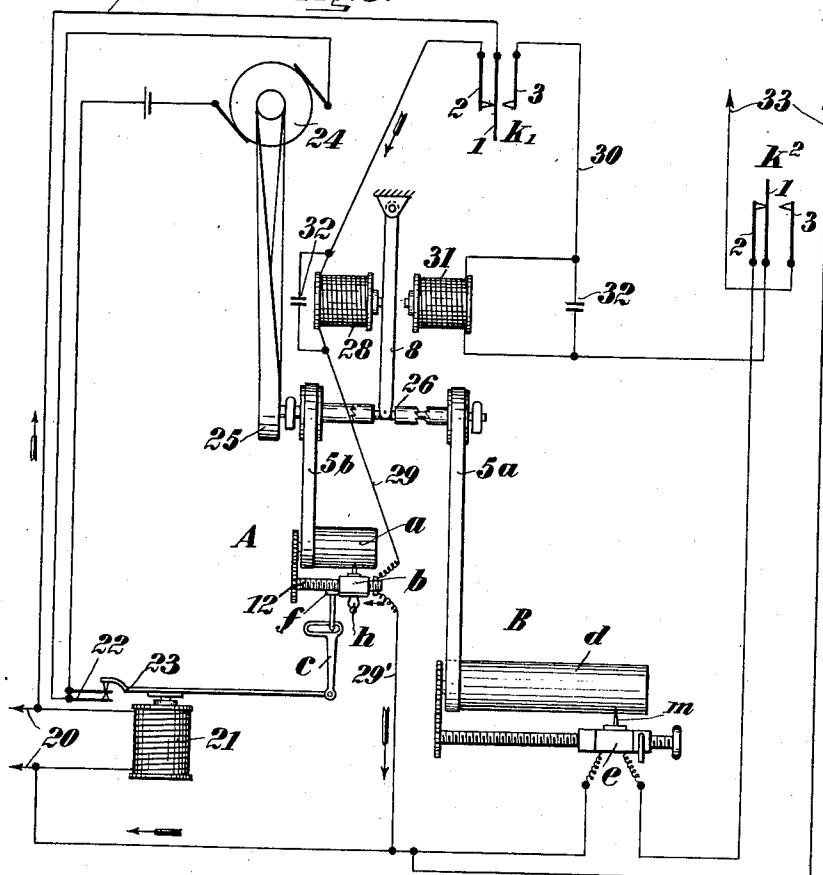
APPLICATION FILED MAY 28 1911

1,168,432.

Patented Jan. 18, 1916.

4 SHEETS—SHEET 4.

Fig. 6.



Inventor
Fang See Lam
by Priesen & Geiger

UNITED STATES PATENT OFFICE.

FRANZ SEELAU, OF BERLIN-WILMERSDORF, GERMANY, ASSIGNOR OF ONE-HALF TO
ALEXANDER M. NEWMAN, OF BERLIN-WANNSEE, GERMANY.

TELEGRAPHONE.

1,168,432.

Specification of Letters Patent. Patented Jan. 18, 1916.

Application filed May 28, 1914. Serial No. 841,408.

To all whom it may concern:

Be it known that I, FRANZ SEELAU, a subject of the German Emperor, residing at Berlin-Wilmersdorf, Kingdom of Prussia, 5 Germany, have invented certain new and useful Improvements in Telegraphones, of which the following is a specification.

The present invention relates to a device for phonographically recording conversations transmitted by telephone. Such device is generally called a telegraphone. This is a device, which is intended to be connected to a telephone line and which will be set in operation when a call arrives 10 over the telephone line. In such case a so-called responding device informs the calling party that the called subscriber is absent, but that his message will be recorded by the device. Thereupon the responding 15 device is put out of operation and the recording device is started whereupon the message of the caller is recorded on a phonographic roll.

The present invention consists in various combinations and designs, by which the said device is improved and its operation is considerably simplified. A considerable improvement resides therein that after the answer has been given to the caller the 20 switching for the recording operation is performed quite automatically and without any aid of the caller, the responding device being, at the same time, automatically put out of operation. A further improvement 25 consists in that the sound boxes, of which the one serves for responding, the other for recording, are readily interchangeable, so as to allow of listening to the message recorded or of recording any desired answer on the 30 responding roll.

All novel features are disclosed in the following specification and description of the device and are specified in the claims. Reference is therewith had to the accompanying 35 drawings.

In these drawings Figure 1 is a front elevation of the whole device. Fig. 2 is a side elevation. Fig. 3 is a side elevation of the responding sound box, a part of the wall being removed to show the interior. Fig. 4 is a rear view of the same. Fig. 5 is a recording sound box, partly in elevation, partly in inside view. Fig. 6 is a diagrammatical illustration of the device with the

required circuits. Figs. 7-14 show details, 55 the object of which will be evident from the specification.

From Figs. 1 and 2 it will be seen that the device is mounted on a box base 4 in which the mechanical driving device, e. g. 60 an electric motor 24, may be placed. This motor is coupled by the aid of a two-position coupling 26 to one of the driving pulleys 5^a or 5^b and thus sets the cylinder drum *i* or *o* in motion. The box base 4 65 furthermore contains various electromagnets required for the operation of the device of which magnets, for the sake of greater clearness only one magnet 21 is indicated. On the top plate 10 in Fig. 1, the responding 70 device *A* is shown on the left and the recorder *B* on the right. A phonographic cylinder *a* of the responding device may be fitted on to the drum *o* while the drum *i* carries the cylinder record *d* of the recording device. The other parts of the responding device are mounted near the responding cylinder *a*, and comprise a slide or carriage *g* supporting the responding sound box *b*, which consists principally of a phonograph sound box combined with a microphone. The carriage *g* is shifted in the manner usual in phonographs by a feed-nut *f* which engages with a screw spindle. The mechanism is more fully shown in 80 Figs. 11 to 14 and consists of a sleeve which is slidably fitted on a tube 11. In this tube is provided a screw spindle 12 having a fine thread, which screw spindle is turned by means of the toothed wheel 13. The tube 11 85 which is secured with its one end in the bracket 14, and with its other end at 15 in the wall 16, Fig. 1, has on its underside a longitudinal slot 17, through which a nut-like member *f* secured to the slide *g* projects. When this nut-member engages with the screw spindle 12, the slide will by means 90 of the revolving spindle 12 be gradually displaced to the right, so that the needle of a sound box placed on the slide will follow 95 the fine record grooves on the record roll *o*. The nut-member *f* is secured by means of a spring 18 to the slide *g* so that it will be pressed into the thread of the screw spindle 12 when its nose 19 engages in a notch 34 100 in a ring 35, which is fitted concentrically to the slide sleeve *g* in such a manner, that it can be turned relatively thereto. The one

edge of the notch 34 is slightly beveled, so that the nose 19 will, on the ring 35 being adjusted, be lifted from the notch 34, whereby the engagement of the nut-member *f* with the screw spindle 12 is disconnected. These two positions of the ring 35 and the nut-member *f* are illustrated in Figs. 12 and 14, both being sectional views on the line Y—Y in Fig. 11. For securing the position of slide 10 *g* a fork 36 is provided, which engages over a guide rod 37 disposed parallel to the sleeve slide *g*. To the latter are also fitted two brackets 38, each of which carries a pan for a knife edge, on which the sound box *b* is supported. The brackets 38 are secured to the sliding sleeve *g* by interposed insulating pieces, so that there is no electrically conductive connection between the brackets 38 and the bearing pan 39 with the sleeve *g* or any other metallic parts.

15 The shaft 40 of the drum *o*, which is disposed parallel to the guide of the slide *g* carries the pulley 5^b over which runs a belt 5^c which leads to the reversible coupling 26.

20 The shaft 40 drives by means of a toothed wheel 41 on wheel 15 of the screw spindle 12 so that, when the pulley 5^b is driven, both the drum *o* and the screw spindle 12 will be rotated, whereby, by the coaction of the screw spindle 12 and of the nut-member *f* the slide *g* will be slowly advanced to the right. During its travel the slide carries with it a socalled torque lever *h* which engages with its fork 43 over a pin 44 in slide *g*. The torque lever *h* which is shown separate in Figs. 9 and 10, is pivoted at 42 in the bracket of the slide. On a bearing pin 45 is fitted a sleeve 46 which is attached to the lever *h*. On sleeve 46 is fitted a spiral spring 47 which is secured at its inner end to the sleeve 46, and at its outer end to the wall of its casing 48. When lever 44 is moved to the right by the travel of the slide *g*, the spring 47 will be tightened.

25 When then the coupling of the nut-member *f* with the screw-spindle 12 is disengaged, the slide will, in consequence of the spring action 47 and by coaction of lever *h* and pin 44 be again returned to the left into its initial position. The turning of ring 35 in order to engage or disengage, respectively, the nut *f* with or from the screw spindle 12 is effected by a shoulder 49 engaging in the fork 50 of an intermediate lever *c*, which is 30 operated by means of an electric magnet in the manner hereinafter described.

The hereinbefore mentioned reversible coupling 26 can, in its second position, couple the driving motor 8 with a belt 60 pulley 5^a which drives the drum *i* of the recorder B. The recorder B consists, the same as the responder A of a drum *i*, on which a phonograph record roll *d* is placed, and a slide or carriage *g* as carrier for the 65 sound box. This carriage *g* is essentially

of the same construction as slide or carriage *g* of the responder A and also its guide and the mechanism for moving it sidewise is the same; only here the electromagnetic disengagement of the driving spindle 12 and 70 of the lever *h* for returning the carriage automatically to its initial position is omitted. For returning the carriage *g* of the recorder B, together with its sound box *e* to its initial position on the left the shoulder 75 49 of ring 35 is here displaced by hand for disengaging the feed nut *f*. The lower guide rod *s* which corresponds to the guide rod 37 of the responder, is provided with a scale, in order to allow of measuring the 80 length of the message recorded on the roll *d*, and furthermore serves as a slip contact for the hereinafter described terminal for conducting the current to the telephone part 85 of the sound box *e*.

The sound box *b* of the responder A and the sound box *e* of the recorder B are, essentially, of the same design, being a combination of a telephone sound box, a transmitter or receiver with a phonographic sound box, in such a manner that with the responder sound box *b* behind the diaphragm of the phonographic sound box a transmitter chamber is provided, or, with other words, the diaphragm of the transmitter box is connected directly to the phonograph stile. In the recorder box *e* behind the diaphragm of the phonograph box proper a system of magnets is provided, such as used for telephone receivers, or, with 100 other words, the diaphragm of the receiver box is directly coupled to a phonograph stile. Thus both sound boxes *b* and *e* consist, as evident from Figs. 3 and 4, of a casting *r*, into which a transmitter system or a 105 receiver system, respectively, is fitted, the diaphragm *q* and *n*, respectively is connected to a phonograph stile *l* and *m*, respectively.

In the responding box *b* (Fig. 3) a carbon contact *w* is arranged at a given distance from the diaphragm *q*. The space between this stationary contact and the diaphragm, which is closed at the sides by a ring *y* of any suitable insulating material, 110 is filled with carbon granules *z*. The phonograph stile or needle *l* attached to the diaphragm *q* is made of such a shape, that it can follow the fine record waves or grooves in a phonograph record roll, without injuring such record. For carrying this sound box *b* on its carriage *g* a piece of insulating material *v*₁ is attached to casing *r*, to which knife-edge projections *p* are fitted on either side of the sound box. The one of these 115 projections is conductively connected with the carbon contact *w*, the other with the diaphragm *q*. These knife-edges *p* fit into the above mentioned pans 39 on carriage *g*. The electric connection between the micro- 120

phone and the telephone is, therefore, solely effected by the sound box *b* being fitted with its projections *p* into the pans 39 on carriage *g*, from which pans the current is conducted further without any other connections having to be made. In order to allow of a lateral movement of the sound box *b*, the casing *r* may be pivotally fitted to the insulating part *v*₁ by means of short pins 9, as shown in Fig. 5, being a rear view of Fig. 3.

In the casing *r* of the recorder box *e* (Fig. 4) a magnet system 6 is fitted in the usual manner, on the pole shoes of which magnet coils 7 are arranged. This magnet system is disposed in such a manner, that the pole shoes are behind the diaphragm *n*. This diaphragm *n* is, likewise, fitted with a phonograph stile *m* but this stile is of such a shape, that it can engrave record waves into the phonograph roll. This sound box *e* is likewise supported by means of knife-edges *p* fitted with insulating parts *v*₂ to the casing *r*; also here the knife edges *p* serve for closing the electric connection with the coils 7 of the telephone system, when the sound box *e* is placed in the manner described with sound box *b* into its carriage *g*. The regulating weight indicated at *u* has the object of regulating the pressure with which the recording stile *m* bears on the roll *d*, so as to secure the proper engraved depth of the record grooves.

The switching arrangements required for the automatic operation of the whole apparatus are marked in Fig. 1 with *k*₁ at the responder A for switching from responding to recording, and with *k*₂ at the recorder B for incidentally switching the record onto a further roll.

The arrangement of these switches is shown in side elevation in Fig. 7, and in front elevation in Fig. 8. Into a ring 51, made of metal, is fitted a body 52 of insulating material, to the front surface of which three contact springs 1, 2, 3 of a sickle shape are attached. In Fig. 7 the insulating body 52 has been drawn out from the ring 51, in order to show the contact springs. In its position of rest the contact spring 1 touches the contact spring 2. For switching the contact spring 1 from 2 to 3, the contact spring 1 is provided with a nose 53 of insulating material. The so constructed switch *k*₁ is fitted with its bore 54 in such a manner on tube 11, that the carriage *g* can abut with its right face *g*₁ against the nose 53 of contact spring 1, when the carriage travels to the right, and the answer recorded on roll *a* has been completely delivered. The switch *k*₁ is displaceable on tube 11, so as to allow of its being set in such a manner as may be required by the length of the message recorded on the roll *a* of the responder A. The switch *k*₁

is fixed by a lever 55, which is pressed by a spring 56 against tube 11. When lever 55 is pressed downward, the whole switch *k*₁ may be easily displaced on tube 11. The switch *k*₂ on the recorder B has been similarly constructed, only here no adjustability is required. The switch *k*₂ is placed in such position, that the front face *g*₁ of carriage *g* of the recorder B abuts against the nose 53, when the roll *d* has been completely covered with record grooves.

In explanation of the diagram, Fig. 6, the following may be said: The driving motor 24 drives a countershaft 25, from which by means of the reversible coupling 26 either the pulley 5^b or 5^a is driven. The coupling 26 is reversed by the electric magnets 28 or 31 acting on a lever 8. When the electric magnet 28 is excited, the coupling is engaged on the left, so that the driving motor 24 drives the belt pulley 5^b and the roll *a*, together with the carriage *g* of the responder A. When, on the other hand, the electric magnet 31 is excited, the coupling 26 is engaged on the right whereupon the roll *d* with the respective carriage of the recorder B is driven by the motor 24 and the belt drive 5^a.

20 are conductors which lead to the substation of the calling subscriber. They proceed from the electric magnet 21, which effects the switching of the whole arrangement; through contact 22, which is closed by the armature 23 of this magnet 21, the driving motor 24 is started. From conductor 20 is branched off a conductor 27 which leads to the middle spring 1 of switch *k*₁. This switch *k*₁ is, as hereinbefore said, in the path of the carriage of the responder A, has, however, for allowing of a greater 101 simplicity, been indicated in Fig. 6 at another place. Spring 2 of the switch *k*₁ is connected to the winding of the electric magnet 28, from the other side of which the conductor 29 leads to the microphone of the responder sound box *b*, the passage of the current being enabled in the manner described by the bearings of the sound box *b*. The circuit for the responder box *b* is completed by the conductor 29' being connected to the second wire of the conductor 20. From spring 3 of switch *k*₁ a conductor 30 leads to the electric magnet 31, which on the other side is connected to spring 1 of the switch *k*₂. This switch *k*₂ is fitted in the 115 manner described in the path of the carriage of the recorder B, but has, likewise, for greater clearness of the drawing, been drawn in a different position. The spring 2 of switch *k*₂ is likewise electrically connected with the telephone of the recorder box *e* by means of the bearings. The other side of the telephone is connected with the return wire of conductor 20. 33 are conductors which lead to another recording 130

box in the same manner as described, when a second record roll with a corresponding sound box is provided for recording long messages. The shaft and guide spindle of this second record roll and sound box are rotated by a drive which is a substantial duplicate of that described with relation to recorder B, so that a detailed drawing and description is deemed superfluous. The 5 armature 23 of magnet 21 of the responder A is coupled to the aforementioned lever c, so that, when magnet 21 is excited, the lever c will effect the engagement of the feed-nut f into the feed screw 12 so as to produce in 10 the responder A the travel of carriage g of the responder box b. As soon as the magnet 21 is dead, the lever c moves down and thereby the engagement of the feed-nut f is disconnected, whereupon the carriage is 15 returned into its initial position by the 20 spring action of the torque lever h, in the manner described.

For leading off the talking currents from the windings of magnets 28 and 31, which 25 generally show self-induction, they are bridged by condensers 32.

The operation of the arrangement is as follows:—When a subscriber, who is connected to the conductor 20, wishes to communicate with the telegraphone, he gives the call signal in the usual manner, by switching on his telephone and sending a current into the conductor 20. Thereby the magnet 21 is excited and attracts its armature 23. The 30 contact 22 is closed and the motor 24 is started. At the same time the coupling of the carriage g of the responder A engages over the feed-nut f with the spindle 12 by the armature 23 reversing the lever c. As 35 also the magnet 28 is excited via the conductors indicated by arrows in Fig. 6, it will, throw the coupling 26 to the left, whereupon the motor 24 drives the responder A. The microphone of the responder box b likewise receives current for its excitation via the conductor 27, springs 1, 2 from switch k₁, magnet 28, conductors 29 and 29'. This is 40 illustrated in Fig. 6. Now the answer is given, by the answer recorded on the responder roll a being delivered by the sound box b: for example: "Mr. N. is not in, but your message will be recorded by the telegraphone". After the message has been 45 completely delivered, the edge g¹ of carriage g has reached the switch k₁ and the spring 1 is reversed. Thereby the magnet 28 and the sound box b become dead, and the magnet 31 is engaged. The latter when excited 50 throws the coupling 26 to the right, so that 55 now the recorder B is driven by the motor 24. The record is now made, by the talking currents coming from the calling subscriber proceeding over conductor 27, springs 1 and 3 of switch k₁, conductor 30, condenser 32, 60 springs 1 and 2 of switch k₂ to the telephone 65

of the recorder box e and flowing through the windings of the pole pieces 7, Fig. 4. Thereby the diaphragm n is vibrated, and these vibrations are directly transmitted to the recording stile m and thereby engraved 70 into the wax roll beneath it. When the record has filled this roll, the switch k₂ is reversed in the same manner as described with reference to switch k₁ by the carriage abutting against switch k₂. The continuation of 75 the message is then received by the second record roll, which with its corresponding sound box is disposed in a similar manner as the parts of the recorder B shown.

When the conversation is completed, the 80 calling subscriber switches his telephone off again, whereby the current flowing through the conductor 20 is broken. Thereby the excitation of magnet 21 ceases and the whole arrangement is stopped in the following 85 manner:—The armature 23 of the magnet 21 interrupts at the contact 22 the driving current for the motor 24. At the same time it reverses the lever c, whereupon the feed-nut f disengages the carriage, so that the 90 carriage g will be returned by the spring action of lever h. Also the magnet 31 is de-energized, whereby the coupling 26 is also reversed. The recording box e, however, remains in its position in which the record 95 was completed, so that when the next message arrives, after the response has been given to the next call in the manner described, the record will be continued from this part of the record roll d.

For listening to the message which has been recorded on the roll d, the sound box e of the recorder B must be removed from its carriage and the sound box b of the responder A be set to the beginning of roll d, 100 and the receiver and transmitter hand combination or telephone t must be switched to the conductor 20, for which purpose a double-throw switch may be provided. As the knife-edge bearings p of the sound boxes are at 105 the same time current contacts for the receiver and the transmitter system, no other connections are required after their exchange. When now the transmitter of t is switched on the apparatus will be started in 110 the same manner as described when the other subscriber called. After the switch k₁ has been thrown over, the roll d commences to revolve and delivers the message through 115 the microphone switched on from b into the telephone of the hand apparatus t.

For producing a record on a responder roll a, the recording box e is substituted for the box b over roll a, and the answer is then spoken into the microphone of the apparatus t. When the message, which is to serve as response, is completed the switch k₁ is moved up close to the carriage g and fixed in such 120 position by lever 55. By such adjustment it is obtained, that immediately after the re- 125

sponse has been given, the throw-over for the recording proceeds in the manner described.

It is obvious that details of the designs and arrangements of the various parts of the device may be modified without departing from the principle of the invention. So, for example, the roll drums may be driven by gear wheels in place of belts.

10 I claim:—

1. A device for recording messages transmitted by telephone comprising a responding roll with response impressions imprinted thereon, a responding sound box coacting

15 with the response impressions on said responding roll, recording rolls, a recording sound box for making message impressions on each said recording roll, a calling telephone line, a connection between the re-

20 sponding sound box and the calling telephone line, switching devices controlled by the responding sound box and the recording sound box, means actuated by the switching device for starting the operation of a re-

25 cording roll immediately the responding sound box reaches the end of the response impressions and for connecting the calling telephone line to a recording sound box, and means for starting the operation of another

30 recording roll and its coacting recording sound box immediately the one recording roll is covered with sound impressions.

2. A device for recording messages transmitted by telephone comprising a responding roll with response impressions imprinted thereon, a responding sound box coacting

35 with the impressions on said responding roll, recording rolls, a recording sound box for making message impressions on each

40 said recording roll, a calling telephone line, a connection between the responding sound box and the calling telephone line, a switching device controlled by the responding sound box and adjustably mounted so that

45 it may be fixed at different points of recording cylinder according to the length of the response impressions, means actuated by the adjustable switching device for starting the operation of a recording roll immediately

50 the responding sound box reaches the end of the response impressions and for connecting the calling telephone line to the recording sound box.

3. A device for recording messages transmitted by telephone comprising a responding roll with response impressions imprinted thereon, a responding sound box coacting

55 with the impressions on the said responding roll, a feed device for moving said responding sound box, recording rolls, a recording sound box for making message impressions on each said recording roll, a calling telephone line, a connection between the re-

60 sponding sound box and the calling telephone line, a switching device controlled by

the responding sound box and the recording sound box, starting means actuated by the switching device for starting the operation of the recording roll immediately the responding sound box reaches the end of the response impressions and for connecting the calling telephone line to the recording sound box, a feed device for moving the recording sound box along the recording roll while a message is being delivered through the calling line, means for restoring the response sound box to its initial position at the end of a message while leaving the recording sound box in its advanced position where it starts a new record on the transmission of the next message.

4. A device for recording messages transmitted by telephone comprising a responding roll with response impressions imprinted thereon, a responding sound box coact-

85 ing with the impressions on the said responding roll, a recording roll, a recording sound box for making message impressions on said recording roll, a mounting for said recording sound box, a calling telephone

90 line, a connection between the responding sound box and the calling telephone line, a switching device controlled by the responding sound box and the recording sound box, means actuated by the switching device for

95 starting the operation of the recording roll, immediately the responding sound box reaches the end of the response impressions and for connecting the calling telephone line to the recording sound box, a listening tele-

100 phone and means for connecting the listening telephone to the said responding sound box.

5. A device for recording messages transmitted by telephone comprising a responding roll with response impressions imprinted thereon, a responding sound box having a diaphragm acting directly on microphonic contacts and bearing a phonographic stile

105 that coacts with the impressions on the said responding roll, a recording roll, a recording sound box for making message impressions on said recording roll, a calling telephone line, a connection between the re-

110 sponding sound box and the calling telephone line, a switching device controlled by the responding sound box and the recording sound box, means actuated by the switching device for starting the operation of a re-

115 cording roll immediately the responding sound box reaches the end of the response impressions and for connecting the calling telephone line to the recording sound box.

6. A device for recording messages transmitted by telephone comprising a responding roll with response impressions imprinted thereon, a responding sound box coact-

120 ing with the impressions on said responding roll, an electromagnetic telephone receiver, a recording roll, a recording sound box hav-

ing a diaphragm that is directly under the magnetic influence of the electromagnetic receiver and bearing a phonographic stile for making message impressions on said recording roll, a calling telephone line, a connection between the responding sound box and the calling telephone line, a switching device controlled by the responding sound box and the recording sound box, means actuated by the switching device for starting the operation of a recording roll immediately the responding sound box reaches the end of the response impressions and for connecting the calling telephone line to the recording sound box.

7. A device for recording messages transmitted by telephone comprising a responding roll with response impressions imprinted thereon, a responding sound box comprising a microphone and a stile coacting with the impressions on the said responding roll, a recording roll, a recording sound box for making message impressions on said recording roll, a mounting for the said responding sound box comprising a plurality of supporting electricity conducting surfaces, an insulating piece on the responding sound box, two metallic knife edge supports attached to the insulating piece and arranged so as to contact with said supporting surfaces, electrical connections between the knife edge supports and the microphone, a calling telephone line, a connection between the said supporting surfaces and the calling telephone line, a switching device controlled by the responding sound box and the recording sound box, means actuated by the switching device for starting the operation of a recording roll immediately the responding sound box reaches the end of the response impressions and for connecting the

calling telephone line to the recording sound box.

8. A device for recording messages transmitted by telephone comprising a responding roll with response impressions imprinted thereon, a responding sound box coacting with the impressions on said responding roll, a recording roll, a recording sound box comprising a telephonic receiver and a stile for making message impressions on said recording roll, a mounting for the said recording sound box consisting of a plurality of insulated electricity conducting supporting surfaces, a calling telephone line, an insulating piece on the said recording sound box, two metallic knife edge supports attached to the insulating piece, each knife edge support resting on a supporting surface, electrical connections with the supporting surfaces that extend toward the calling telephone line, electrical connections between the knife edge supports and the telephone receiver, a connection between the responding sound box and the calling telephone line, a switching device controlled by the responding sound box and the recording sound box, means actuated by the switching device for starting the operation of the recording roll immediately the responding sound box has reached the end of the response impressions and for completing the said electrical connections with the calling telephone line to the recording sound box while disconnecting the responding sound box.

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

FRANZ SEELAU.

Witnesses:

WOLDEMAR HAUPT,
HENRY HASPER.