

Oct. 31, 1944.

O. A. SHANN

2,361,880

TELEPHONE SET

Filed Oct. 20, 1942

2 Sheets-Sheet 1

FIG. 1

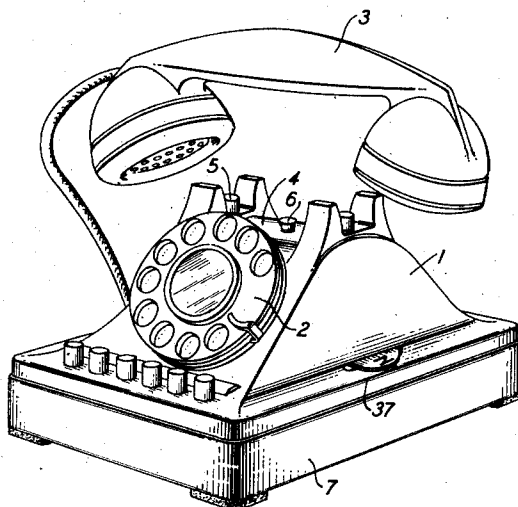
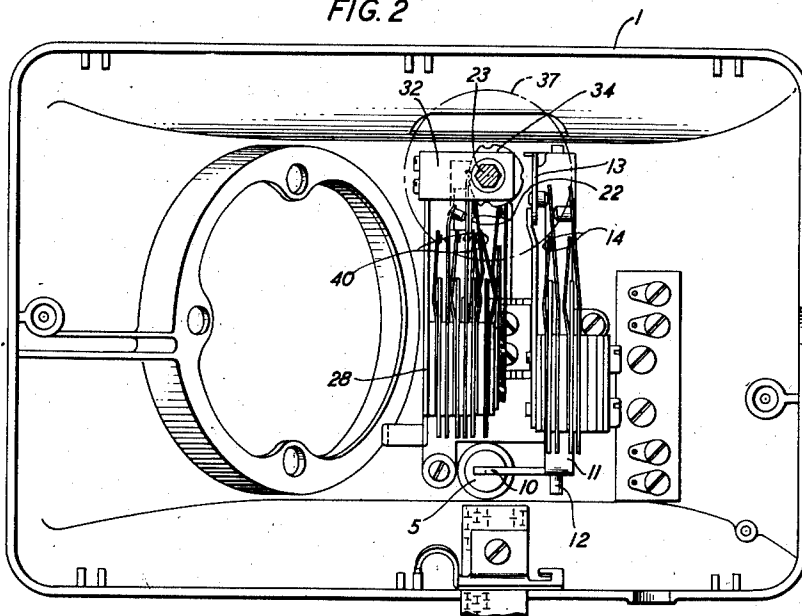


FIG. 2



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2 Sheets-Sheet 2

FIG. 3

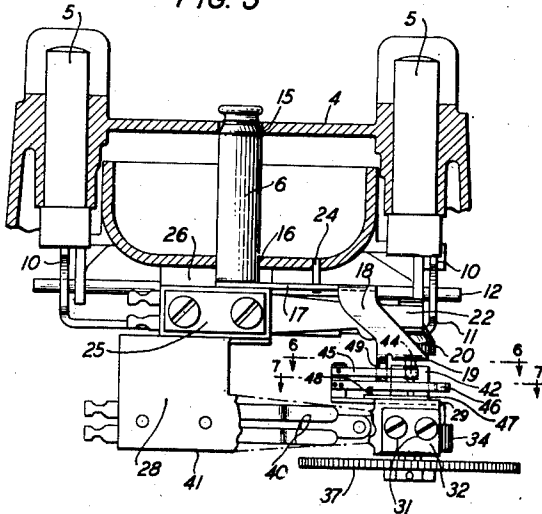


FIG. 4

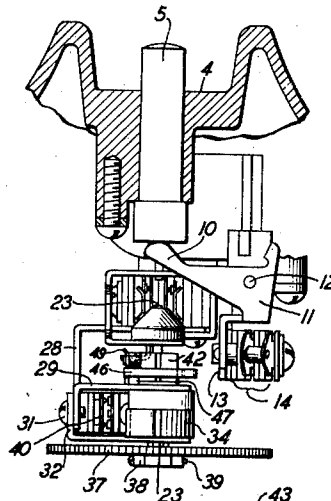


FIG. 5

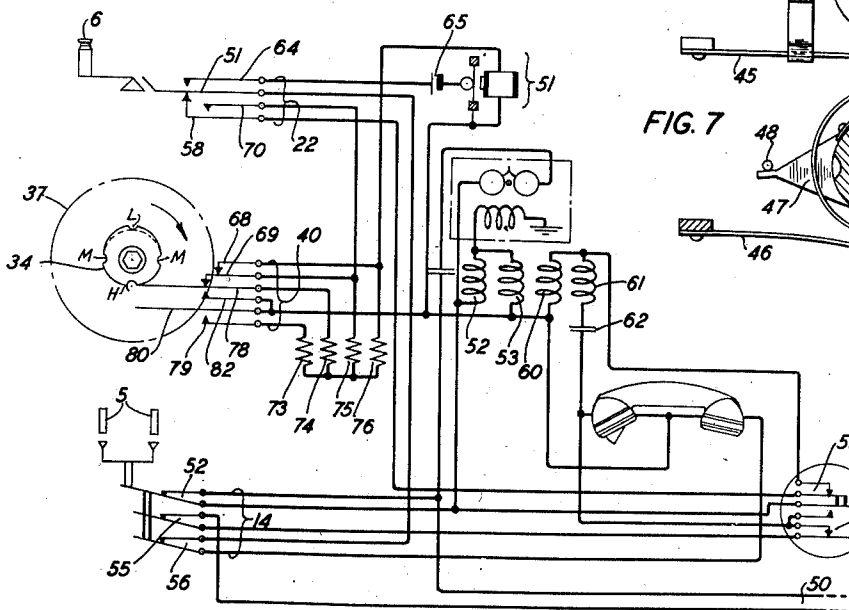


FIG. 6

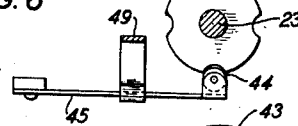
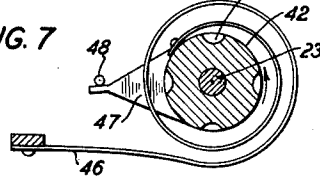


FIG. 7



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TELEPHONE SET

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Application October 20, 1942, Serial No. 462,712

11 Claims. (Cl. 179—100)

This invention relates to telephone apparatus and particularly to improvements in subscribers' telephone sets.

An object is to extend the usefulness of subscribers' telephone stations to those hard of hearing and to simplify the construction and manipulation of telephone sets for this use.

Heretofore telephone sets have been employed in which a mechanism was provided for amplifying and adjusting the acoustic output of the receiver. An arrangement of this kind is disclosed in the Patent No. 2,337,900, Dec. 28, 1943, to Douglas H. King, in which the instrumentalities for this purpose consisted of a plunger and mechanism in the cradle for a handset whereby when the handset is removed from the cradle the manual lifting of the plunger controls a spring contact arrangement to cut off or cut in an amplifying device in the telephone circuit and whereby the rotation of this plunger to different positions controls the spring contact arrangement for different contact closing and opening positions to adjust to corresponding degrees a volume control device to control the effect of the amplifier device in the receiving circuit. This plunger and a companion plunger were also employed for controlling the usual line switching contacts for connecting the telephone set to the line when the handset was removed from the cradle.

It is a feature of the present invention to provide a control mechanism consisting of a plunger, independent of the regular line switching contact operating plungers, which is operable when the handset is removed from the cradle and a disc in the side of the telephone set and mechanism controlled jointly by said plunger when actuated and said disc when rotated for controlling amplifying and volume control devices in a manner disclosed in the above-mentioned patent to Douglas H. King.

Another feature is an arrangement whereby when the handset is replaced in the cradle the restoring of the plunger not only removes the amplifier from the telephone circuit but also restores the disc to normal position so that on a subsequent use of the amplifier the volume control may be regulated from a normal position as indicated by the normal position of the disc.

By this amplifier controlling arrangement the user of the set may include an amplifier in the telephone circuit and adjust its volume manually without danger of disturbing the line switching contact operations controlled by the ordinary plungers in the cradle and at the same time re-

taining the protective value of the simultaneous cut-off of the amplifier and restoring of the volume control means to normal when the handset is replaced on the cradle to open the telephone circuit. Furthermore, the ordinary plungers are available for the usual manipulation of the line switching contacts for flashing the central office without danger of interference with the setting of the amplifier and volume control means.

The invention has been illustrated in the accompanying drawings, in which:

Fig. 1 shows a perspective of a telephone stand in which the applicant's invention is incorporated;

Fig. 2 shows some of the details inside the telephone stand sufficient to disclose the applicant's invention;

Fig. 3 shows a fragmentary cross section across the telephone set approximately through the center of the cradle looking from the front of the set;

Fig. 4 is a fragmentary right-hand side view, partly in section, of the portion of the telephone set shown in Fig. 3; and

Fig. 5 is a circuit diagram of a telephone circuit including an amplifier, a volume control device and contact mechanisms for controlling these devices.

Referring now to the drawings, and particularly to Figs. 1 to 4, the telephone set consists of the usual housing 1 with a dial mechanism 2, a handset 3 shown lifted from a cradle 4 in which the usual switch operating plungers 5 protrude and which control the usual switching contacts to establish connections to a central office. In the center of this cradle 4 is also shown protruding a plunger 6 which forms part of the applicant's invention. This housing 1 is mounted on a base plate 7. The usual plungers 5 normally are pressed down by the handset when replaced on the cradle to a position where they operate on projections 10 on a lever 11 pivoted on shaft 12 to hold this lever in a position so that the projection 13 thereon will maintain the usual switching contacts 14 in an open condition to have the telephone set normally disconnected from the telephone line. When the handset 3 is removed from the cradle, these plungers 5 are released and permit the lever 11 to rotate so that projection 13 will permit the contacts 14 to close a connection between the subscriber's telephone circuit and the line to the central office. The tension in the springs 14 causes these operations to take place. This arrangement, therefore, may

be constructed in accordance with the usual practice in telephone sets of this type.

A description will now be made of the mechanism in accordance with the applicant's invention for controlling the amplifier and volume control devices which are usually located in the compartment formed by the base 7 and shown in detail in the above-mentioned patent to Douglas H. King. This mechanism consists of the above-mentioned plunger 6 which is seated for vertical movement in bearings at 15 and 16. This plunger 6 is provided with a lateral projection 17 which extends toward the right as shown in Fig. 3 and which is then bent downwardly and further towards the right as at 18 ending in the lateral extension 19. To this extension 19 is attached a button 20 which is cone-shaped at the top and extends between a set of contacts 22 for control thereof when the plunger 6 is lifted by hand after the handset 3 is removed from the cradle 4. The button 20 is mounted to slide on a shaft 23 and to maintain steady the member 17 during its travel. The pin 24 is connected to the housing and projects through a hole in the member 17 to further guide this member. The springs 22 are mounted at 25 on a projection 26 extending downwardly from the housing 1. On this projection 26 is also mounted a bracket 28 which extends towards the right, looking at Fig. 3 (partially broken away) and ends in a right-angle projection 29 as shown in Figs. 3 and 4. To this projection 29 is also connected by means of screws 31 a bracket member 32 to lie parallel with and below projection 29. Between the projection 29 and the bracket member 32 is mounted a cam member 34 on the shaft 23. This shaft 23 is journaled in the bracket 32 and projection 29 and extends downwardly below the bracket 32 where it is attached to a disc 37 or other suitable operating member by means of a washer 38 and a cotter pin 39. The cam member 34 controls the group of springs 40 which are mounted on the bracket 28 at 41. These springs are for the purpose of regulating a volume control mechanism for an amplifier when the disc 37 is rotated to different angular positions. The amplifier, on the other hand, may be cut into the telephone circuit when the handset 3 is removed from the cradle 4 by lifting the plunger 6 and button 20 which controls contacts 22 for this purpose. The disc 37 which, as shown in Figs. 1 and 2, extends through an opening 44 in the housing 1, may be rotated by hand from the outside of the set. The disc 37 and cam 34 are always returned to their usual normal positions when the button 6 is restored to normal either by hand or by the replacing of the handset by means of the following mechanism. It should be observed that below the extension 19 and on the shaft 23 is mounted a disc 42 having notches 43 each corresponding to a position to which disc 37 and cam 34 may be rotated to regulate the contacts 40. Engaging one of these notches is a roller 44 on a spring 45 mounted on the bracket 29 to yieldingly maintain the disc 42 in any angular position to which it has been moved. To the disc 42 is also connected at its under end a spiral spring 46 which has its outer end connected to the bracket 29. This spiral spring 46 is under tension so that when the roller 44 is lifted from a notch in disc 41 this disc will be rotated back to a normal position. This normal position is determined by a stop member 47 attached to the under-side of disc 41 and which in this position engages the stop pin 48 attached to the bracket 29. To lift

the roller 44 in this manner a cam extension 49 is projecting downwardly from the bracket extension 18 and this cam engages the spring 45 when the plunger 6 is in normal position to lift or shift the roller 44 away from the notch in which it rests in disc 42. When the plunger 6 is raised, the extension 49 leaves spring 45 to release the roller 44 to engage a notch 43 in disc 42 with the cam 34 and disc 37 in normal position so that the disc 4 may now be rotated to any desired advanced position and held in this position by the roller 44 and spring 45 while the plunger 6 is raised.

With this mechanism the amplifier and volume control mechanisms may be controlled in a circuit as shown in Fig. 5, which is practically identical with the circuit disclosed in the above-mentioned patent to Douglas H. King. A short description of the operations will now be made.

If the handset 3 is removed from the cradle 4 the plungers 5 will be moved upwardly through the lever 11 by contact 14. The contacts 14 now establish a connection between the telephone line 50 and the subscriber's telephone set. As the contacts 22 are normally arranged to have the amplifier 51 disconnected from the line, the transmitter circuit will extend from the tip conductor of line 50, contacts 52 of the switching contacts 14, windings 53 of the usual induction coil, the transmitter, contacts 54 of the dial 2, contacts 55 to the ring conductor. The receiver circuit will extend through the receiver contacts 56, contacts 57 and 58 of the contacts 22, contacts 59, winding 60, back to the receiver and an inductive path through the coils 60 and 61 and condenser 62. If it is now desired to include the amplifier 51 in the receiver circuit, the subscriber would lift the plunger 6 to operate the contact springs 22 and if the disc 37 and cam 34 are in the position shown in Fig. 5 the amplifier 51 would amplify the talking current to the full capacity of the amplifier. A circuit for the receiver and amplifier would then be traced from the receiver, contacts 56, 57 and 64, battery 65, carbon button on the diaphragm of the amplifier 51, back to the receiver and another circuit through the winding of the amplifier 51, contacts 68 and 69 of springs 40, contacts 70, 58 and 59, winding 60, back through the winding of the amplifier 51. Thus the speech current as induced in winding 60 from the line 50 would energize the coil of the amplifier 51 accordingly and affect the circuit through the receiver through the button and diaphragm of the amplifier 51 over the circuit described to amplify the sound output of the receiver accordingly. As none of the resistances 73 to 76 were included in the circuit for the coil of the amplifier 47 it would operate at full capacity.

If it is desired to have the amplifier included but with a medium amplification, the disc 37 is rotated at an angle of 45 degrees from the position shown in Fig. 5 to cause cam 34 to operate springs 40 into the position where this medium amplification would be effected. In this case the amplifier circuit will extend from the coil of the amplifier 51, winding 60, contacts 59, 58 and 70, resistances 75 and 76 in series, back through the coil of amplifier 51 with resistance 74 in parallel with resistance 75, through contacts 69 and 78 and resistance 74 in parallel with the coil of amplifier 51 and resistance 76 through contacts 79 and 80. This would cause the coil of the amplifier 51 to be affected by speech current at a medium rate and consequently the receiver circuit

will be correspondingly affected to amplify the current at the corresponding medium rate.

On the other hand, if it is desired to have the amplifier included but with a lower application, the disc 37 and cam 34 may now be rotated another 45 degrees to operate the springs 40 to secure this effect. In this case the amplifier circuit will extend through the winding of the amplifier 51, winding 60, contacts 59, 58 and 70, resistances 75 and 76 in series, back through the winding of amplifier 51 and with the resistances 73 and 74 in parallel through contacts 69 and 78 and resistance 73 in parallel with the winding of amplifier 51 and resistance 76. Thus in this position the amplifier will be affected by speech currents at a low rate and the receiver circuits will be similarly affected.

If the disc 37 and cam 34 are rotated another 45 degrees the amplification will be returned to the medium condition and another 45 degrees will return it to the normal condition or high amplification.

The amplifier 51 may be included in the circuit to amplify the current for the receiver in these various manners as required by listeners and when the handset is returned on the cradle the plunger 6 will be returned to normal position to eliminate the amplifier 51 and to open the telephone circuit to the line 50 through the plungers 5 and switching contacts 14. It should be understood that the contacts 22 may be arranged differently so that normally the amplifier would be included in the circuit without lifting the plunger 6 and the lifting of the plunger would cut out the amplifier from the circuit to suit various subscribers using the telephone set and without departing from the spirit of the invention.

What is claimed is:

1. In combination, a telephone handset including a receiver, a stand having a cradle member in which the handset normally rests, sound amplifying means for the receiver in said stand, a plunger accessible for operation when the handset is removed from the cradle, a rotatable disc in said stand extending partially through an opening in said stand to the outside thereof, and means inside said stand controlled jointly by said plunger if actuated and said disc if rotated for controlling said amplifying means to regulate the sound output of the receiver to various values.

2. In combination, a handset, a stand therefor having a cradle in which the handset normally rests, sound amplifying means in said stand, contacting and circuit means in said stand, a plunger means in said cradle accessible for operation when the handset is removed from the cradle through a manual movement of said plunger means for operating said contacting and circuit means to associate said sound amplifying means or disconnecting it from said handset, and means including a disc in said stand protruding partially through an opening in said stand to the outside thereof, operative through a manual movement of the disc for operating said contacting and circuit means to regulate the effectiveness of said sound amplifying means.

3. In combination, a handset, a stand therefor having a cradle in which said handset normally rests, a mechanism in said stand comprising a shaft, a cam connected thereto, a loose collar on said shaft, a set of contacts controlled by said cam in different combinations corresponding to different rotary movements of said shaft, a set of contacts controlled by said collar in response

to the longitudinal movement thereof on said shaft, a plunger mechanism in said cradle operative only after the handset is removed from the cradle for moving said loose collar longitudinally on said shaft to control the associated contacts, and a disc mounted on said shaft partially projecting through an aperture in said stand to the outside thereof, said disc being associated with said cam so that when said disc is rotated the cam will rotate to the different corresponding positions to control the associated set of contacts.

4. In combination, a telephone handset including a receiver, a stand therefor having a cradle in which the handset normally rests, sound amplifying means in said stand, a plunger in said stand protruding on the outside thereof in said cradle so that said plunger can only be manipulated when the handset is removed from the cradle and so arranged that it will be restored to a normal position when the handset is replaced on the cradle, a set of contacts operative in response to the longitudinal movement of the plunger, means responsive to the actuation of said contacts for connecting said amplifying device in circuit with the receiver, a shaft in said stand, a disc mounted on said shaft for rotation and extending partially through an aperture in said stand to the outside thereof to enable said disc to be manually rotated from the outside of the stand, a second set of contacts, a cam member on said shaft and associated with said disc so as to be controlled by the rotary movement of said disc for actuating said second set of contacts in different combinations depending on the extent of the rotary movement of the disc, and means responsive to the actuation of said second set of contacts in said different combinations for operating said amplifying device to amplify the sound output of the receiver to different volumes corresponding to the different combinations of operations of said second set of contacts.

5. In combination, a telephone handset including a receiver, a stand having a cradle member in which the handset normally rests, sound amplifying means for the receiver in said stand, contacts and circuit means in said stand for connecting said amplifying means to said receiver, contacts and circuit means in said stand for controlling the amplifying means to regulate the sound output of the receiver, a disc in said stand partially protruding through an opening in said stand to the outside thereof for the manual operation of the disc, a plunger mechanism in said stand accessible for operation when the handset is removed from the cradle for actuating said first-mentioned contacts and circuit means to connect or disconnect said amplifier means from the receiver and for releasing said disc for manual rotary movement thereof, a cam member controlled by said disc for actuating said second-mentioned contacts and circuit means to control the amplifier means to regulate the sound output of the receiver in response to the rotary movement of the disc if the sound amplifying means is connected to said receiver by said plunger mechanism.

6. In a telephone system, a line, a handset including a transmitter and receiver, a stand having a cradle in which the handset normally rests, a telephone circuit including said receiver and transmitter, switching means in said stand for connecting said telephone circuit to the line, plungers in said cradle operated by the removal of the handset from the cradle for actuating said

switching means to connect said telephone set to the line, sound amplifying means for the receiver in said stand, volume control means for said sound amplifying means in said stand, a special plunger in said cradle accessible for operation when the handset is removed from the cradle, a rotatable disc in said stand extending partially through an opening in said stand to the outside thereof, means inside said stand controlled jointly by said special plunger if manually actuated after the handset has been removed from the cradle and by said disc if rotated manually from a normal position for cutting in the amplifying means in the telephone circuit for the receiver and regulating the sound output of the receiver to various values and for cutting out the sound amplifying means from the receiver circuit and restoring the disc to the normal position when said special plunger is restored by the replacing of the handset in the cradle.

7. In combination, a line, a telephone handset including a receiver, a stand having a cradle member in which the handset normally rests, a sound amplifying means for the receiver in said stand, circuit means in said stand including a set of contacts for connecting the handset to the line, a second set of contacts for connecting the sound amplifying means to the receiver, and a third set of contacts for controlling said sound amplifying means to regulate the sound output of the receiver to various values, a plunger mechanism operated when the handset is removed from the cradle for actuating said first set of contacts, another plunger mechanism operable manually after the handset has been removed from the cradle for actuating said second set of contacts and a disc in said stand operable manually for actuating said third set of contacts.

8. In combination, a line, a telephone set including a receiver, a stand having a cradle member in which the handset normally rests, a sound amplifying means for the receiver in said stand, including a set of contacts for connecting the handset to the line, a second set of contacts for connecting the sound amplifying means to the receiver and a third set of contacts for controlling said sound amplifying means to regulate the sound output of the receiver to various values, a plunger mechanism operated when the handset is removed from the cradle for actuating said first set of contacts, another plunger mechanism operable manually from a normal position when the handset has been removed from the cradle for actuating said second set of contacts, a disc in said stand operable manually to various positions from a normal position for actuating said third set of contacts accordingly and a mechanism associable with said second plunger mechanism and said disc for restoring said disc to nor-

mal position on the restoring of said second plunger mechanism to normal in response to the replacing of the handset in the cradle.

9. In combination, a line, a telephone handset including a receiver, a stand having a cradle member in which the handset normally rests, a sound amplifying means for the receiver in said stand, circuit means in said stand including a set of contacts for connecting the handset to the line, a second set of contacts for connecting the sound amplifying means to the receiver, and a third set of contacts for controlling said sound amplifying means to regulate the sound output of the receiver to various values, a plunger mechanism operated when the handset is removed from the cradle for actuating said first set of contacts, another plunger mechanism operable manually after the handset has been removed from the cradle for actuating said second set of contacts, a disc in said stand operable manually after said other plunger mechanism has operated for actuating said third set of contacts.

10. In combination, a line, a telephone handset including a receiver, a stand having a cradle member in which the handset normally rests, a sound amplifying means for the receiver in said stand, circuit means in said stand including a set of contacts for connecting the handset to the line, a second set of contacts for connecting the sound amplifying means to the receiver, and a third set of contacts for controlling said sound amplifying means to regulate the sound output of the receiver to various values, a plunger mechanism operated when the handset is removed from the cradle for actuating said first set of contacts, another plunger mechanism operable manually after the handset has been removed from the cradle for actuating said second set of contacts, a disc in said stand operable manually for actuating said third set of contacts, and means for restoring said disc to a non-operated position, operated in response to the restoring of said other plunger mechanism when the handset is returned in the cradle.

11. In combination, a telephone handset including a receiver, a stand having a cradle member in which the handset normally rests, a sound amplifying means for the receiver in said stand, a plunger accessible for operation when the handset is removed from the cradle, an operating member in said stand which projects through an opening in said stand to the outside thereof and is accessible for operation at all times, and means inside said stand controlled jointly by said plunger if actuated and said operating member if operated for controlling said amplifying means to regulate the sound output of the receiver to various volumes.

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