

Sept. 28, 1926.

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H. R. CLARKE  
TELEPHONE HAND SET  
Filed Feb. 7, 1923

2 Sheets-Sheet 1

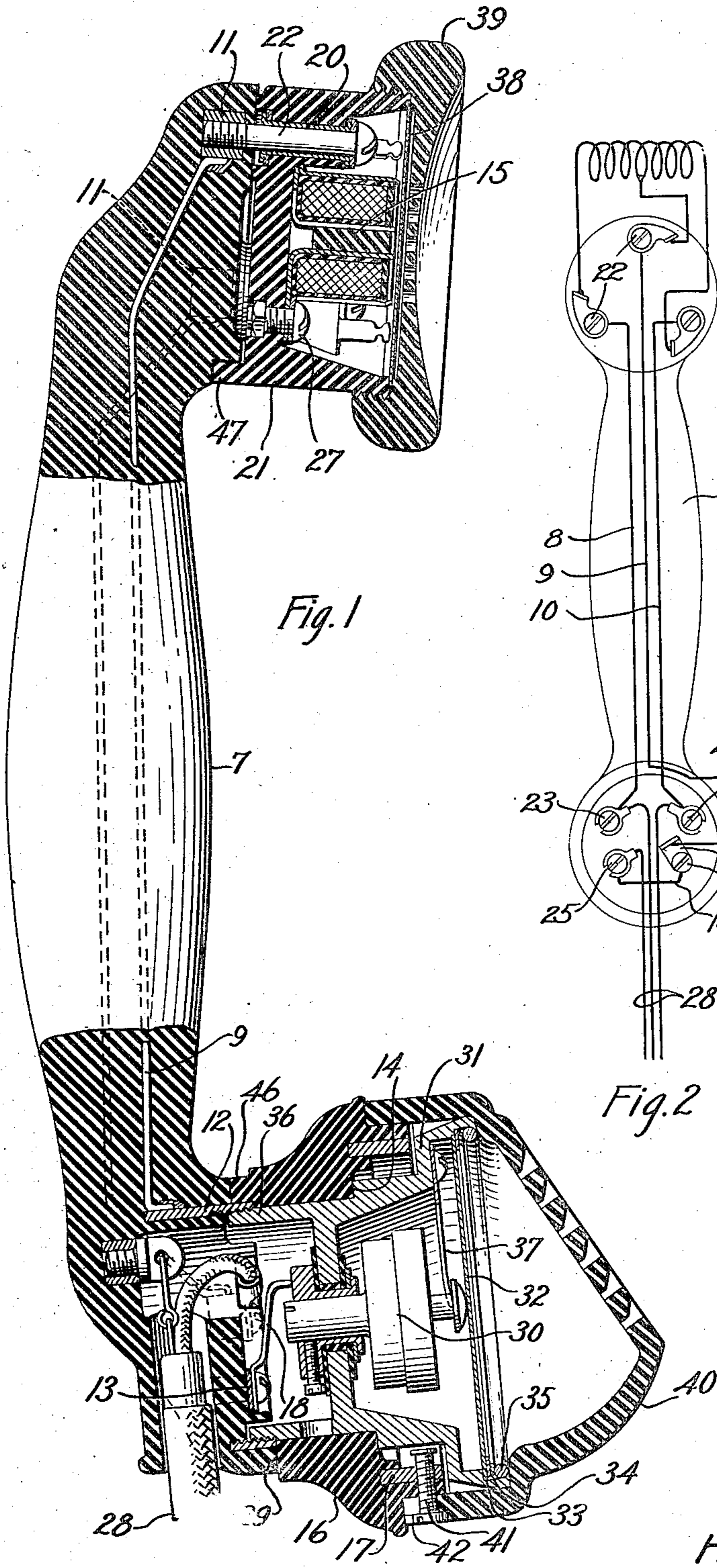


Fig. 1

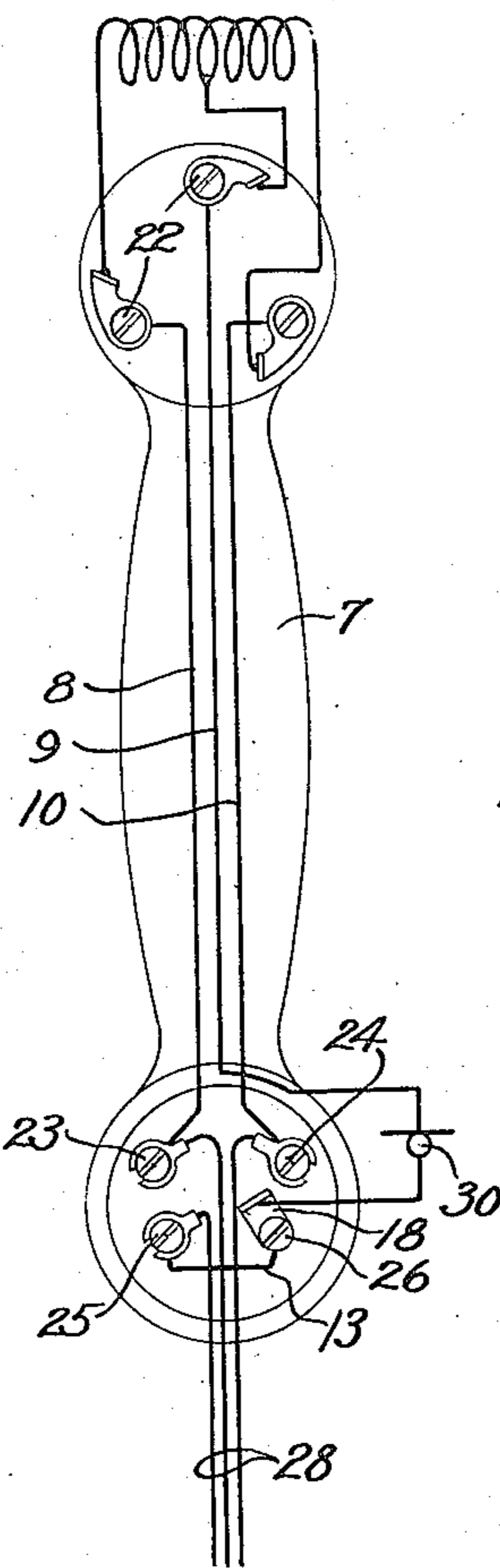


Fig. 2

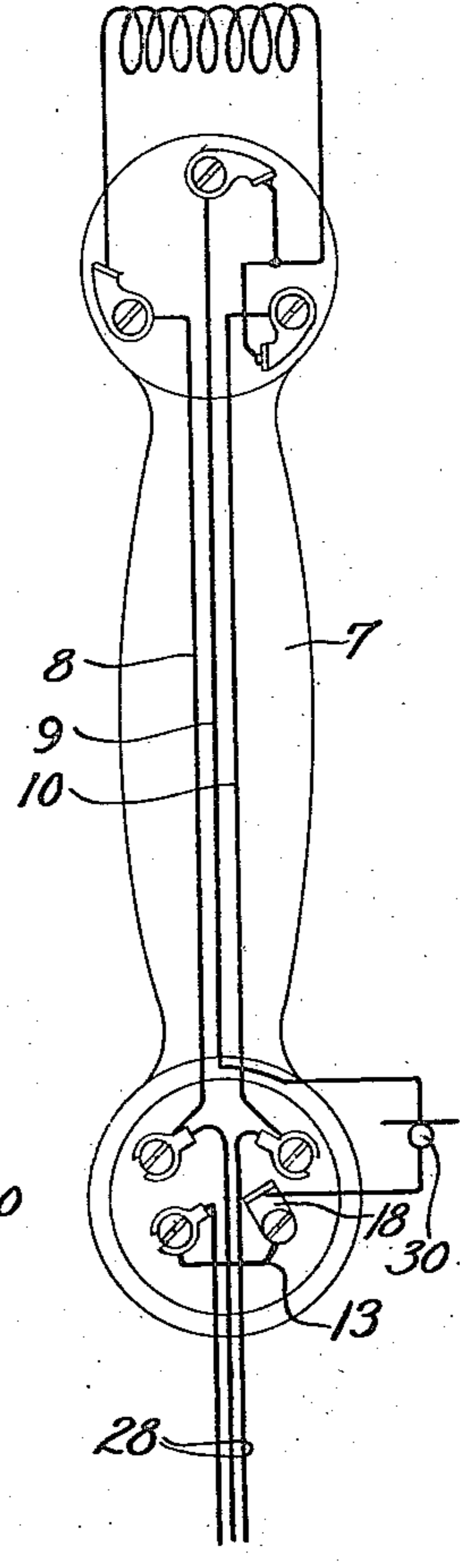
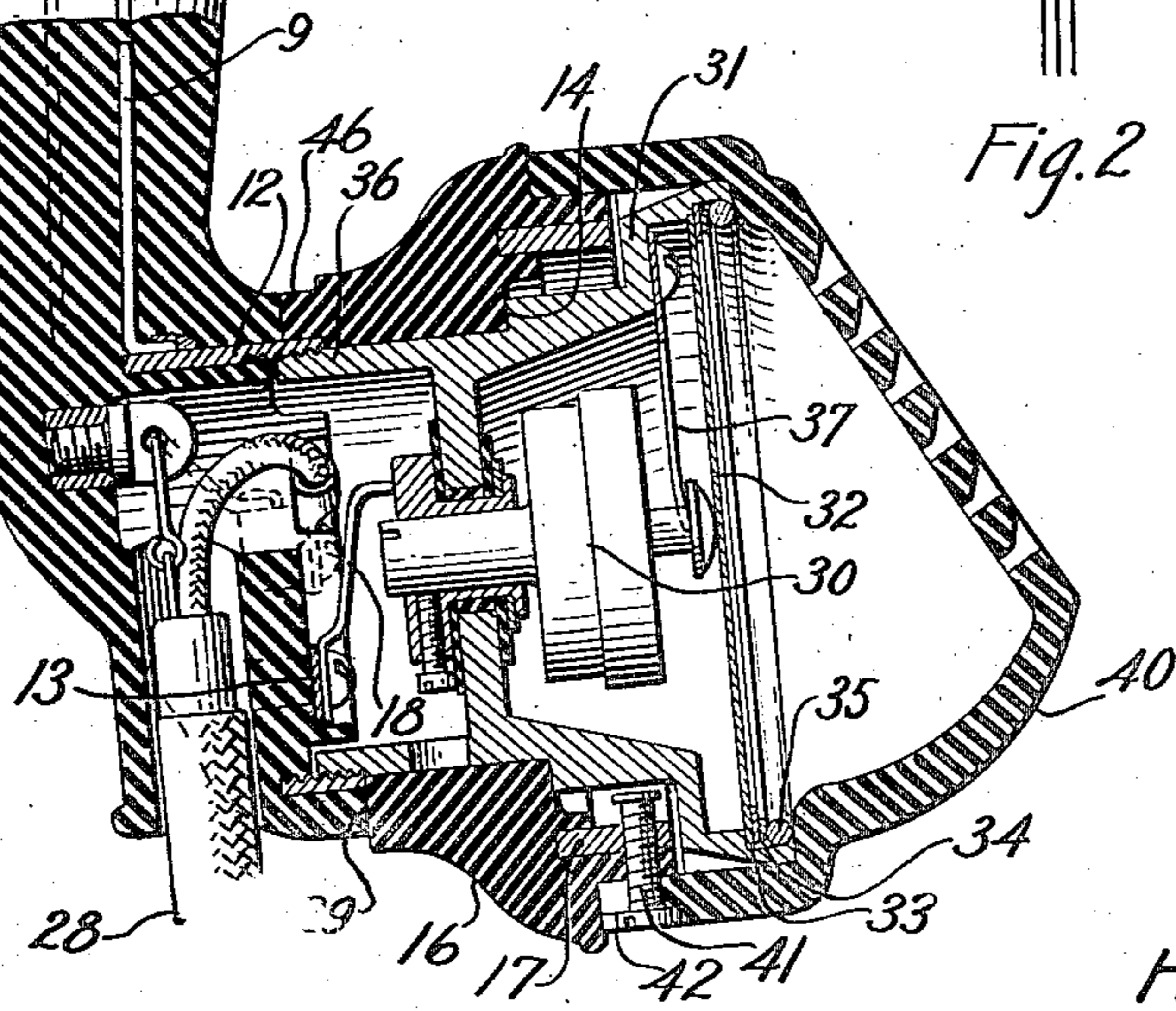


Fig. 3



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2 Sheets-Sheet 2

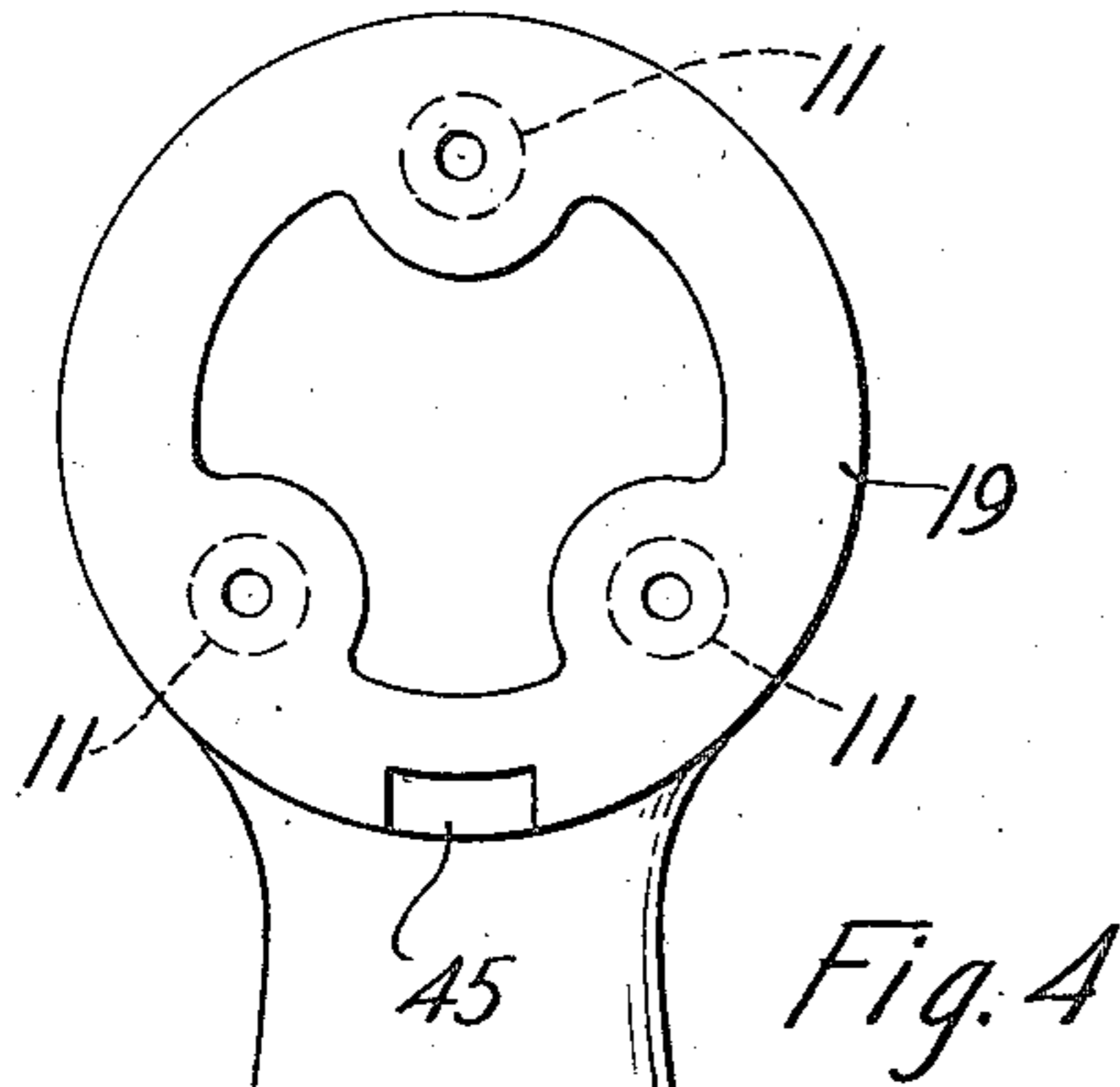


Fig. 4

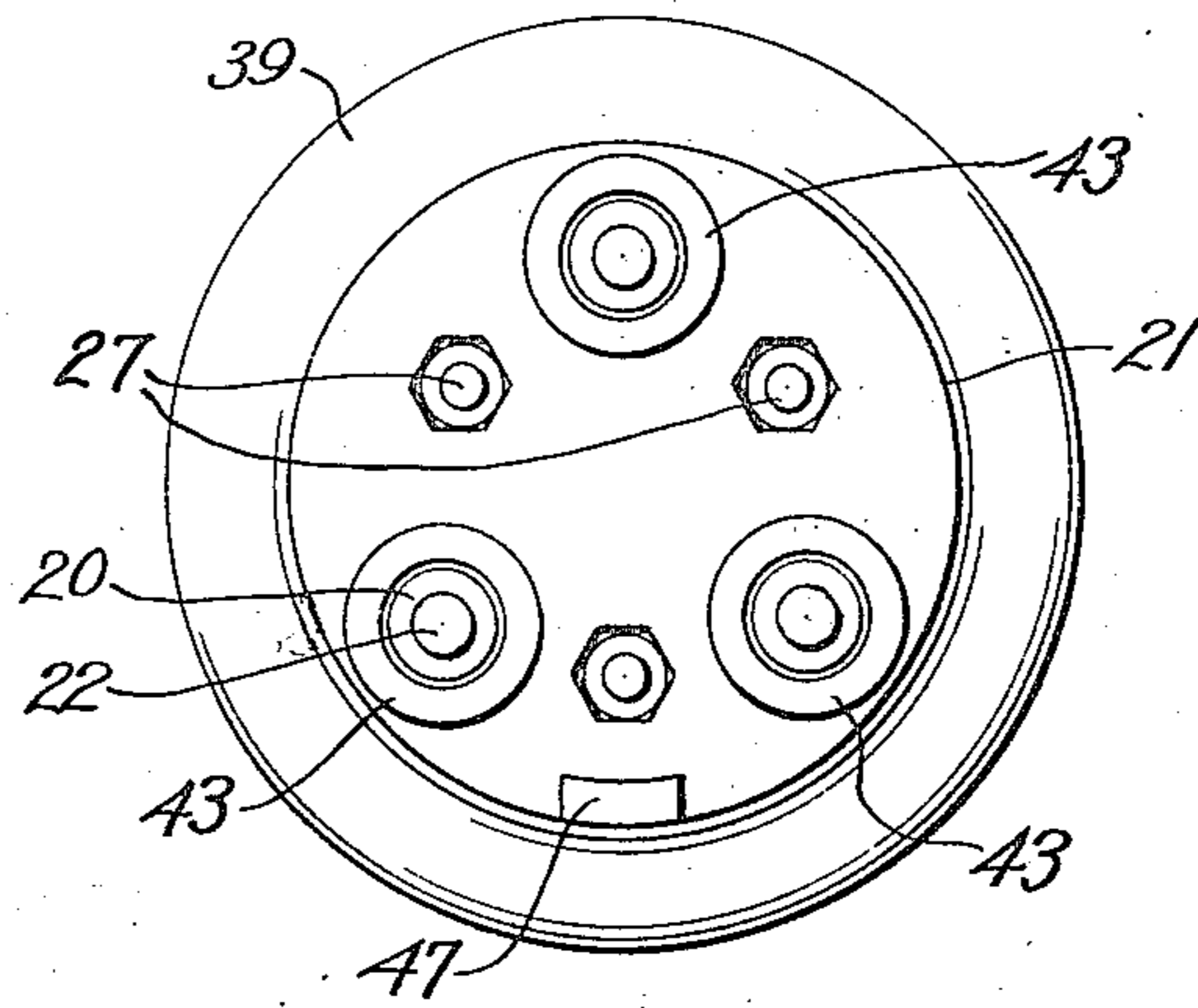


Fig. 5

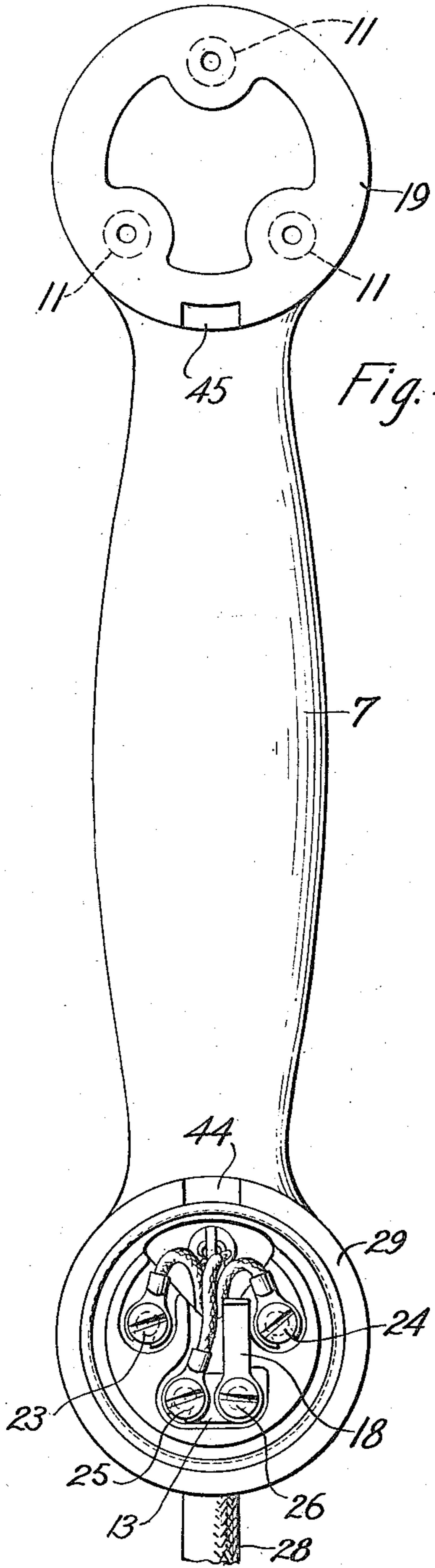
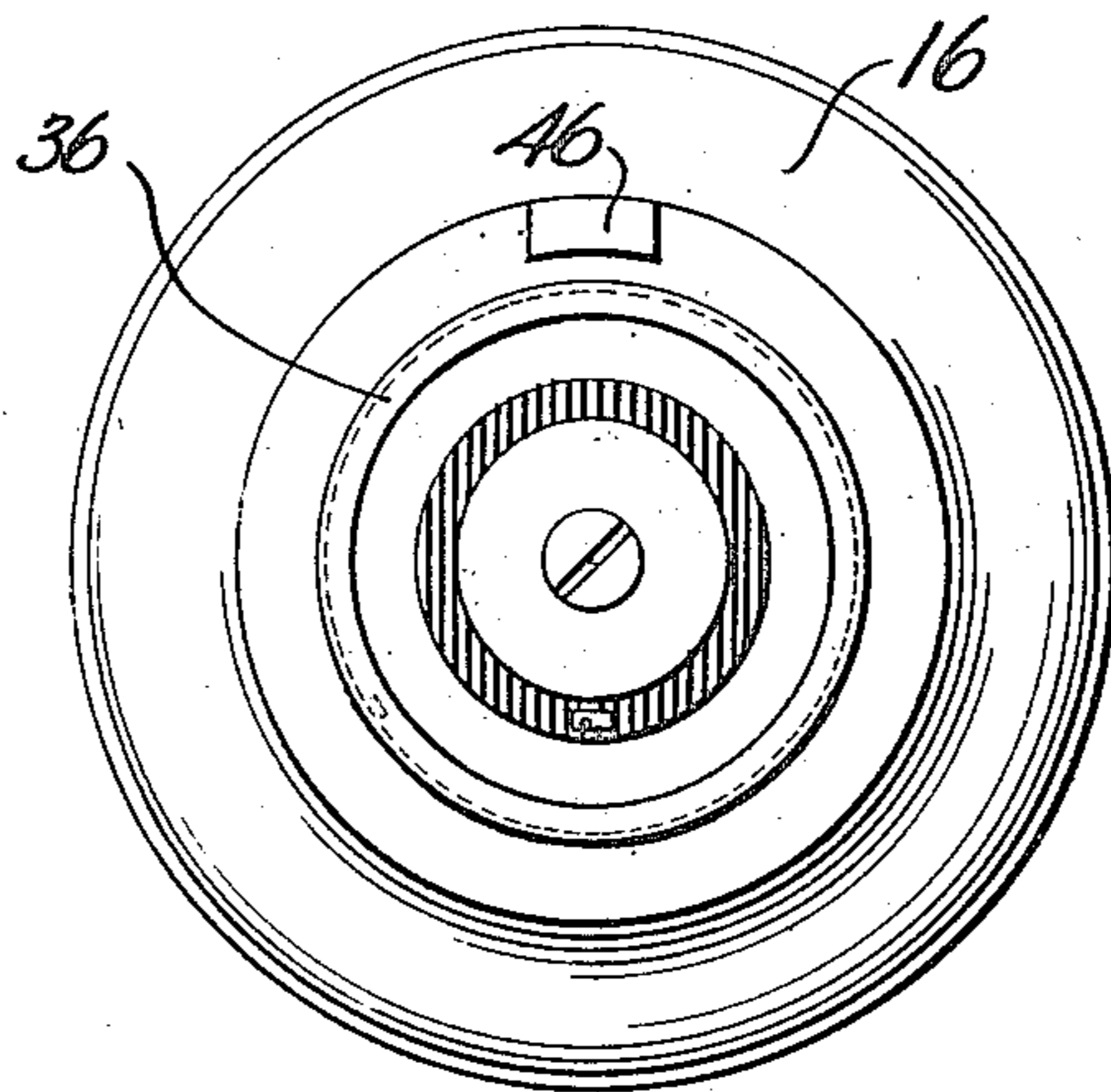


Fig. 6



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# UNITED STATES PATENT OFFICE.

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## TELEPHONE HAND SET.

Application filed February 7, 1923. Serial No. 617,532.

This invention relates to telephone hand sets, the object being to eliminate the tendency to howl which is present in sets of this type and otherwise improve the structure with respect to the convenience of mounting and the accessibility of the parts.

In accordance with the general features of this invention certain resonance effects which tend to produce howling when the set is in use are eliminated by providing couplings between the handle of the set and the instruments which will not be resonant at frequencies tending to produce howling.

In the preferred form of this invention the support for the receiver comprises three separated lugs of comparatively small area adapted to receive screws or similar attaching means for securing the receiver, and the transmitter is screwed directly into the handle thereby eliminating large and irregular contact areas and at the same time providing for the rigid attachment of the transmitter and receiver to the handle. The conductors are embedded in the handle and connection is made to the receiver through metallic lugs embedded in the supporting lugs and the screws for supporting the receiver and to the transmitter through a threaded bushing which also serves as a support for the transmitter.

In the drawing:

Fig. 1 is a side view of the hand set, part in section, showing the manner of supporting the instruments on the handle;

Figs. 2 and 3 show alternative wiring schemes for the hand set;

Fig. 4 is a front view of the hand set with the instruments removed;

Fig. 5 is a rear view of the receiver; and

Fig. 6 is a rear view of the transmitter.

On a handle 7, preferably solid and of phenol plastic compound, and having a fundamental mode of vibration exceeding 1000 cycles, there is supported at one end a receiver 5 and at the opposite end a transmitter 6. Embedded in the handle are conductors for making the required electrical connections to the receiver 5. As shown these conductors, 8, 9 and 10, terminate at the receiver end of the handle in separate threaded inserts 11. At the transmitter end the conductor 9 terminates in a large threaded bushing 12, which also serves as a support

for the transmitter 6, and conductors 8 and 10 terminate in inserts 23 and 24 which serve as terminals for making connections to a cord 28. The inserts 11 are preferably under flush or slightly below the surface 19. The bushing 12 is preferably flush but may be slightly underflush with the annular surface 29 which forms a seat for the transmitter case 16.

The receiver comprises a suitable magnetic structure 15 mounted in a case 21 by any suitable means, such as screws 27. Associated with the magnetic structure 15 is the usual diaphragm 38 clamped in the usual manner between a cap 39 and the case 21. The receiver case 21 is preferably made of phenol plastic compound and has a comparatively thick base and walls so as to provide a rigid structure which will have no resonance below 1800 cycles per second. The base of the case 21 may be provided with three bosses 43 which seat accurately against the surface 19 of the handle 7. Holes concentric with the bosses 43 are provided in the case 21 and through these holes mounting screws 22 engage the inserts 11 to secure the receiver to the handle. By limiting the surface in contact to substantially three points a rigid joint is formed which is practically perfect, and non-resonant below 1800 cycles per second. Obviously the bosses may be provided on the handle or small separate spacers may be used.

The transmitter comprises a carbon containing button 30 supported by any suitable means in a cup 31 having comparatively thick walls. A spring 37 holds the button 30 in operative relation to the diaphragm 32. Seated in an annular recess in the edge of the cup 31 and held therein by a snap ring 35, are washers 33, preferably of insulation material, and 34, preferably of metal. The washers 33 and 34 provide a seat for the diaphragm 32 which is held thereon by the pressure applied by the spring 37 through the tip of the button 30. Surrounding the cup 31 is an annular case or spacer 16 preferably of phenol plastic compound. Both the cup 31 and the case 16 are preferably quite massive and non-resonant at frequencies below 1800 cycles per second. Continuous with the cup 31 is a threaded flange 36 which engages the bushing 12 to secure the

transmitter to the handle 7 and clamp the case or spacer 16 securely between the surfaces 29 and 14. Large flat contacting surfaces are thereby eliminated and a joint non-resonant at frequencies below 1800 cycles per second is provided. A transmitter mouthpiece 40 is supported on the case 16 by means of radial screws 41 which engage a tapped metal insert 17 in the case 16. The mouthpiece 40 is provided with longitudinal slots 42 countersunk to receive the heads of the mounting screws 41, so that it may be removed without withdrawing the screws. Connections are made to the transmitter through the bushing 12 and a spring 18 attached to a terminal 13.

Recesses 44 and 45 are provided in the handle for receiving the lugs 46 and 47 which extend laterally from the transmitter and receiver respectively, to facilitate in positioning the instruments on their supporting handle. Lug 46 is particularly well adapted for preventing the case 16 and mouthpiece 40 carried thereby from moving out of alignment with respect to the supporting handle.

The invention claimed is:

1. In a telephone hand set having a bearing portion, a receiver, means for rigidly supporting said receiver at a number of small areas on said bearing portion, and securing means extending through said casing and into said bearing portion at said points of support.
2. In a telephone hand set, a solid handle of insulating material having a bearing portion, a receiver case of the same material having comparatively thick walls, raised bearing portions of small area on said receiver case for engaging the bearing portion of said handle and means passing through said case and said raised portions for rigidly securing the case to the handle.
3. In a telephone hand set, a handle having a depression in one end thereof, a threaded ring secured in said depression and a transmitter cup having a rearwardly projecting flange engaging said ring within said depression, a spacer between said cup and handle for holding the transmitter in spaced relation with respect to said handle.
4. In a telephone hand set, a handle, a screw threaded ring embedded in said handle and disposed substantially at right angles with respect to said handle, a transmitter cup having a threaded portion for engaging said ring and an insulating spacer ring mounted on said cup, said cup having bearing portions for clamping said ring to said handle.
5. In a telephone hand set, a solid handle of phenol plastic compound, threaded metal inserts in one end thereof, a phenol plastic receiver case having three bosses of small area on the bottom thereof, and

mounting screws through said bosses engaging said metal inserts to secure the receiver on the handle, said inserts and mounting screws forming electrical conducting paths to said receiver.

6. In a telephone hand set, a handle, the fundamental mode of vibration of which exceeds 1000 cycles per second, a transmitter case therefor having no resonance below 1800 cycles per second, a receiver case having no resonance below 1800 cycles per second, means for supporting said receiver case on said handle at three small areas, a threaded flange rearwardly projecting from said transmitter for securing said transmitter to said handle, the joints formed between said instruments and said handle having no resonance below 1800 cycles per second.

7. In a telephone hand set, a handle of phenol plastic compound, a receiver case having comparatively thick walls of the same material, said case contacting with said handle at three small areas, means through the receiver case at said areas for supporting it on the handle, a transmitter a transmitter case, and means integral with said transmitter engaging said handle and supporting said transmitter case thereon.

8. In a telephone hand set, a solid handle, an annular threaded bushing embedded in said handle at one end thereof, a transmitter cup threaded to engage said bushing and an annular ring of the same material as said handle clamped by said cup to said handle, said ring having a small contacting surface with said handle.

9. A telephone hand set comprising a handle, a transmitter cup, a casing having comparatively thick walls of phenol plastic compound, said casing having a tapered thickness and presenting a small annular contacting surface to said handle, and a threaded annular flange embedded in said handle, said cup having a threaded engagement with said flange for clamping said casing to said handle.

10. A telephone hand set comprising a solid handle, a metal annular bushing embedded in said handle and forming a depression therein, terminals within said depression, a spring connected to one of said terminals, a transmitter cup, a mouthpiece therefor, said transmitter cup having threaded engagement with said bushing and contacting with said spring, the electrical connections being made to said transmitter through said bushing and said spring, a spacer ring mounted on said transmitter cup having a key portion engaging said handle for holding said mouthpiece against rotary movement on said handle.

11. A telephone hand set, a solid handle, conductors embedded therein, threaded bushings in each end of said handle forming

terminals for said conductors, a receiver supported at three small areas on one end of said handle screws through said supports for securing said receiver to said handle, 5 said screws forming a continuation of said conductors, a transmitter at the opposite end of said handle having threaded engagement with one of said bushings, a casing supported between said transmitter and said 10 handle and a cap secured to said casing.

12. In a telephone hand set, a handle, a receiver case having a plurality of angularly disposed raised portions engaging said handle, and means for securing said case to 15 said handle.

13. In a telephone hand set, a solid handle having a bearing portion, a receiver case therefor having angularly disposed raised bearing portions cooperating with the bearing 20 portion of the handle for holding said receiver in spaced relation with reference to said handle, and securing means extending through said case and into said handle.

14. In a telephone hand set, a solid handle 25 having a bearing portion, conductors therein, threaded metal bushings in one end of said handle connected to said conductors, a receiver case having raised portions for engaging said bearing portion, said case 30 having openings through said portions, and screws passing through said openings and

into engagement with said threaded bushings.

15. A telephone hand set comprising a handle of moulded insulating material, 35 metal inserts embedded therein, conductors embedded in said handle and connected to said inserts, and screws engaging said inserts for securing the instrument casing to said handle, said screws also serving to 40 make conductive connection from said inserts to said instrument.

16. A telephone hand set comprising a moulded handle, a threaded ring embedded in one end thereof, and a threaded telephone 45 instrument cup screwed onto said ring and arranged to form with said ring a part of the electrical conducting path to the instrument.

17. A telephone hand set comprising a 50 moulded handle, a screw threaded ring embedded in one end of said handle and disposed substantially at right angles with respect to said handle, a telephone instrument cup having a threaded portion cooperating 55 with the thread on said ring, said ring and cup forming an electrical conducting path to said instrument.

In witness whereof, I hereunto subscribe my name this 2nd day of February A. D., 60 1923.

HARRY R. CLARKE.