Aug. 9, 1949. B. R. TOWNLEY 2,478,514

AUTOMATIC FIRE DETECTING DEVICE

Filed June 14, 1947 3 Sheets-Sheet 1

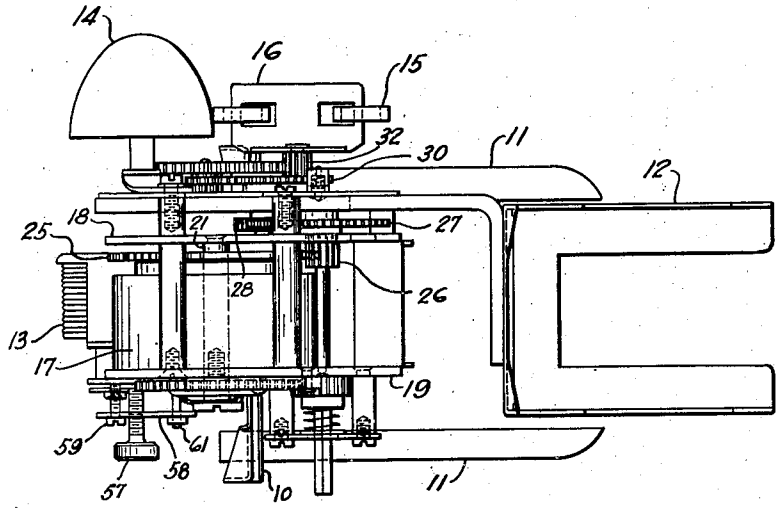


Fig. 1

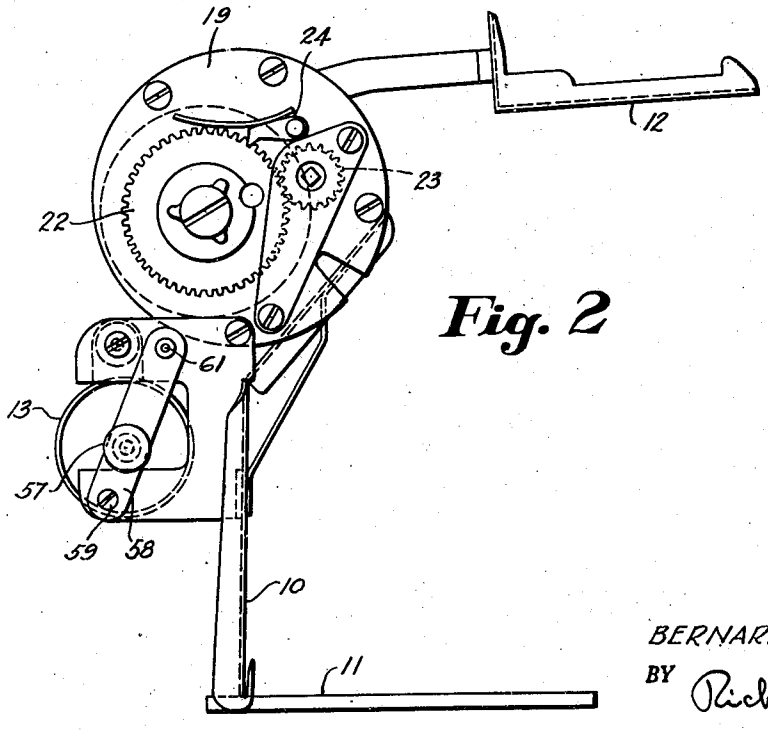


Fig. 2

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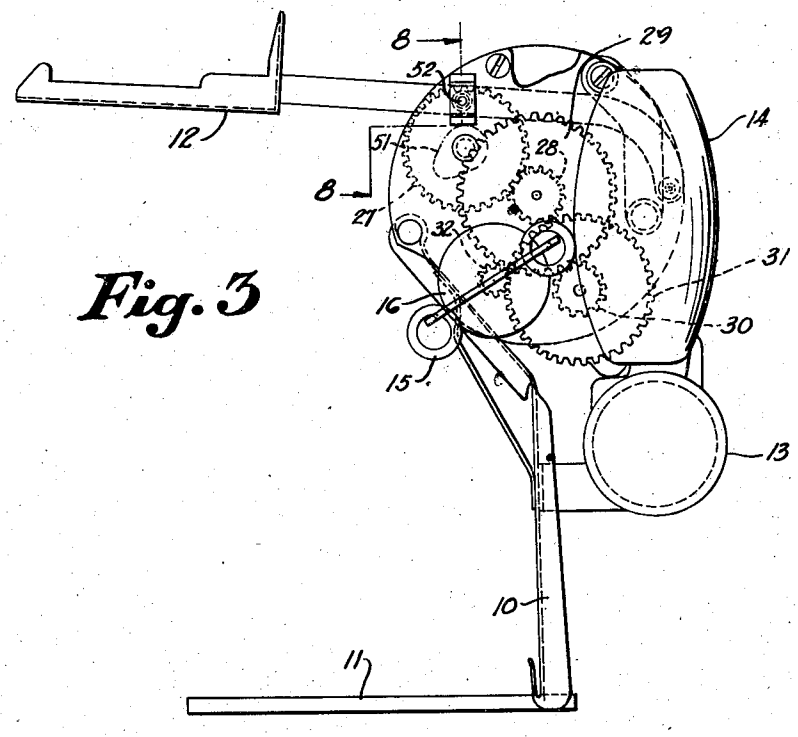


Fig. 3

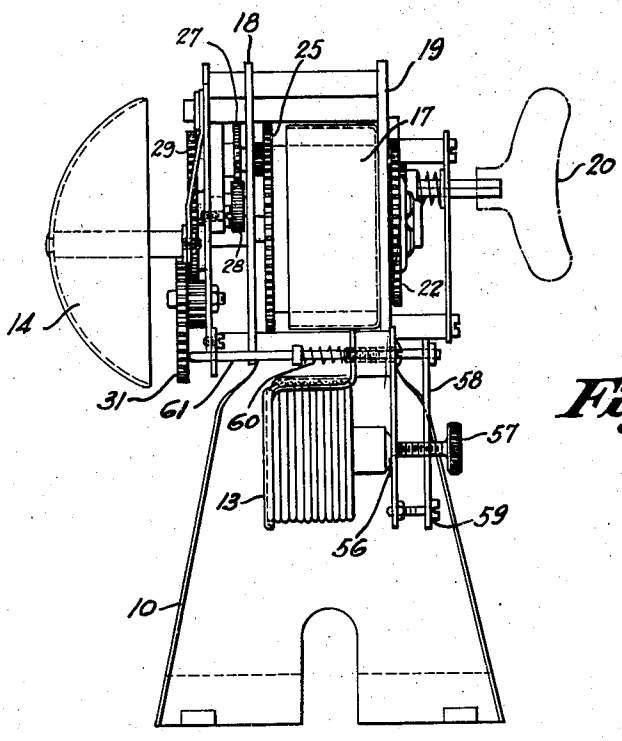
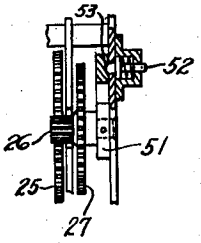


Fig. 4

Fig. 8



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AUTOMATIC FIRE DETECTING DEVICE

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Fig. 5

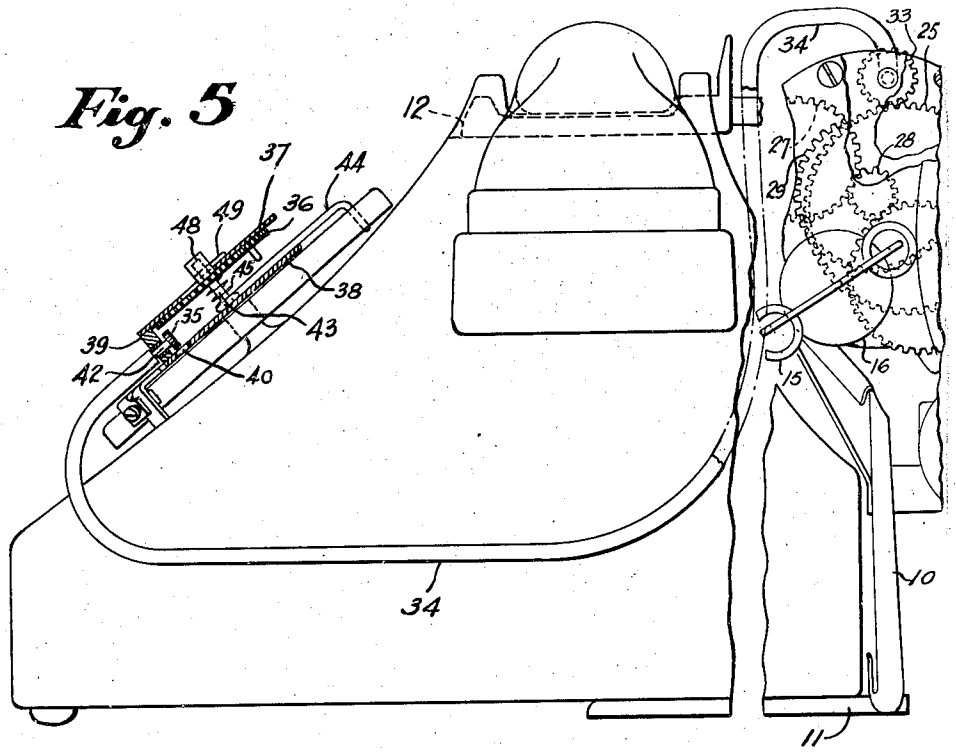
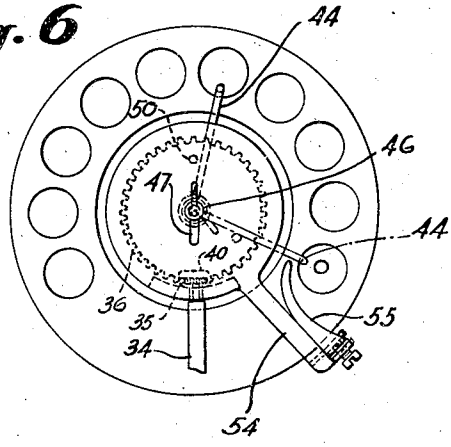


Fig. 6



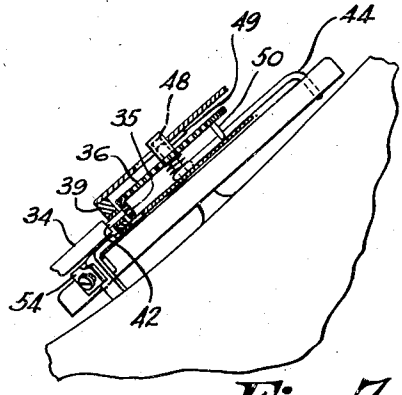


Fig. 7

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UNITED STATES PATENT OFFICE

2,478,514

AUTOMATIC FIRE DETECTING DEVICE

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Application June 14, 1947, Serial No. 754,703

8 Claims. (Cl. 179—5)

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This invention relates to an automatic fire detecting device, and more particularly to a device for flashing a signal over a telephone circuit whenever a telephone transmitter equipped with the device is subjected to hazardous temperatures.

Irrespective of the time and money expended in fire prevention activities, loss of life and property damage from fire still remains a major problem.

It is an object of the present invention to provide an automatic fire detecting device adapted for attachment to telephones which will flash the fire signal to a central operator over the telephone circuit.

A further object is to make unattended telephone stations automatic fire detectors.

Still another object is to increase the utility of present telephone facilities.

Other objects of the present invention will become apparent in the course of the following specification.

In the accomplishment of these objectives a device that automatically lifts a connected hand telephone from the cradle, dials the operator, and sounds an alarm is provided to operate whenever the surrounding temperature rises to predetermined value. The rise in the temperature is detected by the means of gauging temperature changes based upon the expansion of metals. The magnitude of the expansion of metals under rising temperatures being slight, the variation is used herein to set in motion the mechanism for conveying the fire signal otherwise free to operate.

The apparatus of the present invention comprises two co-acting units, one for lifting the hand telephone from the cradle and sounding the alarm which may be removably attached to the back of the telephone stand, and another unit for signalling the operator removably attached to the telephone dial stop over the dialing mechanism on the front of the telephone stand.

The device is operated by a main spring which supplies the energy through a gear train for lifting the telephone from the cradle, sounding the alarm, and dialing the operator with the temperature control mechanism acting as a brake releasing means. Obviously, other means for energizing the device could be provided. The alarm means illustrated is the usual gong sounded by hammers actuated by the main spring through a part of the gear train. Other types of alarms could be adopted. The dial operating attachment is intended for attachment to the ordinary telephone dial, and moves the operator's signal position in the same manner as the finger of a hand and is actuated by a flexible shaft as part of the gear train. With but very slight variation in design, the same equipment may be used with manually operated telephones. While the mechanism illustrated is adapted for attachment to the outside of a telephone, it could be incorporated within the telephone base and set for action whenever desired. Furthermore, radio channels, telegraph and power lines could likewise be adapted for use with this mechanism.

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The invention will appear more clearly from the following detailed description when taken in connection with the accompanying drawings showing by way of example preferred embodiments of the inventive idea.

In the drawings:

Figure 1 is a plan view of the fire detecting device constructed in accordance with the principles of the inventive idea.

Figure 2 is a left side view of the device shown in Figure 1.

Figure 3 is a right side view of the device shown in Figure 1.

Figure 4 is a rear view of the device shown in Figure 1.

Figure 5 is a side view of the dial operating attachment with spool shown in section.

Figure 6 is a top view of the spool with dialing arm inserted in telephone dial.

Figure 7 is a sectional view of dial operating attachment in operating position.

Figure 8 is a fragmentary view showing cam and locking means adapted to raise the telephone lifting arm and secure the same, and part of gear train operating cam.

In the drawings where like reference numerals indicate like parts, reference numeral **10** indicates the frame, **11** the base of the frame, **12** the telephone lifting arm, **13** the temperature control, **14** the alarm gong, **17** the main spring, and **44** the dial operating arm.

The main spring **17** is mounted between the supporting plates **18** and **19** and is of the usual type with one end secured to a rotatable shaft and the other to a casing. The teeth of the winding wheel **22**, prevented from moving in any but one direction by the spring catch **24**, co-act with the teeth of the smaller gear **23** attached to the shaft for the removable winding key **20**.

The spring driving gear **25** is keyed to the spring shaft on the opposite side of the winding mechanism and is adapted to move therewith as the spring unwinds. So mounted, the driving

gear 25 is the first in a gear train comprising the following members in the order named: gears 25, 26, 27, 28, 29, 30, 31, 32, 33, flexible shaft 34, and gears 35 and 36.

Energy from the main spring 17 for raising the telephone from the cradle is taken off the shaft of the gear 25 through the cam 51 which forces the telephone lifting arm 12 and supported telephone upward, the prongs of the arm, Figure 1, being inserted between the telephone and cradle from the back of the instrument with the base 11 of the frame under the base of the telephone stand. Of course, different type telephones will require different types of lifting and mounting means.

With the telephone lifting arm 12 at its highest point the ball peen catch 52 enters an aligned recess 53 in the arm 12 securing both the arm and supported telephone in the elevated position until manually released. The shaft of cam 51 is then free to rotate in the assigned manner, and the circuit between the telephone and receiver at another location established in the usual way by lifting a hand telephone from the cradle.

Energy from the main spring 17 for sounding the alarm gong 14 is taken off the shaft of the gear 32 which carries the supporting means 16 for bringing the hammers 15 in contact with the rim of the gong 14.

The dial operating attachment, Figure 5, is adapted for removable mounting in the center of the dial of the usual telephone dialing device by the support 54 connected to the base of the attachment at one end and removably attached to the dial stop 55 at the other. The dialing attachment, of spool like formation, consists of the upper rim 37, lower rim 38, held in parallel alignment by the support 39 (Fig. 5) along the circumferences of the rims. In the lower rim near the support 39 is an aperture 40 through which the gear 35 is disposed on the shaft 42 inserted in a sleeve through the lower rim and terminating in the aperture 40. At the opposite end of the shaft 42, the flexible shaft 34 is attached deriving its rotary motion from the gear 25 (Fig. 5). At the center of the lower rim 38 is the stud 43 over which the dialing arm 44 is rotatably inserted. The spring 45 is then placed over the stud 43 on top of the arm 44.

In the upper rim 37 is the circular aperture 46 with the key aperture 47 disposed along its circumference. The hollow axis 48 with the key 49 adapted to co-act with the aforesaid key aperture 47 is then inserted through the circular aperture 46 and the gear 36 keyed on the axis under the upper rim as shown in Figure 5. The stud 50 is disposed on the base of the gear 36. Normally held under the upper rim 37 by the spring 45, the gear 36 may be pushed toward the lower rim 38 by inserting the key 49 through the key aperture 47 and pushing down on the hollow axis to engage the teeth of the gear 35 as shown in Figure 7. At the same time the stud 50 will engage or move to engage the dialing arm 44 and rotate it around to the desired position whereupon it will be released by the key 49 on the hollow axis 48 coming in contact with the key aperture 47 which permits the wheel 36 to be carried to the top of the device and releasing the dialing arm 44 and dial to register the proper number of impulses in the telephone circuit to attract the attention of the operator.

The temperature control mechanism 13 consists of the member 56 adapted to expand and contract under variations in temperature. The thumb screw 57 is threaded through a lever arm 58 for adjustable contact with the member 56. With fulcrum 59 at the bottom, the top of the lever co-acts with the brake bar 61 to release the end normally in contact with the rim of the gear 31 therefrom. At normal temperatures the spring 60 maintains the brake-bar 61 against the rim in which position the mechanism is in a non-operating condition.

The operation is as follows:

The alarm device is attached to any telephone, in Figure 5 installation is from the back with the base supports 11 under the telephone stand and the telephone lifting arm 12 inserted between the telephone and the cradle. The main spring 17 is then wound by key 20 in the usual manner. The dial operating attachment is then mounted on top of the telephone dial and secured to the telephone dial stop 55 by the bracket 54. The dialing arm 44 is inserted in the dial aperture marked "Operator", the hollow shaft 48 with key 49 depressed until the key is under the upper rim 37 so that the stud 50 will engage the arm 44 and gear 36 will engage the gear 35 on the flexible shaft 34.

When the temperature in the vicinity of the temperature control 13 reaches any predetermined value the temperature member 56 pushes out against the lever 58 which co-acts with the brake bar 61 to release wheel 31 therefrom and set the mechanism in motion. Whereupon the telephone lifting arm 12 raises the telephone from the cradle, sounds the alarm gong 14, and dials the operator. The mechanism will continue to sound the alarm to the extent of its spring power until manually stopped giving the while the exact location of the danger point.

Obviously with the ball peen catch 52 removed, the device is adapted for use with manually operated telephones. It would be quite possible, to connect the mechanism with a phonograph adapted to give verbally the exact location of the point of danger, or the gong designed to give a coded signal.

Of course, the equipment could be adapted for use with any type telephone as, for example, those resting on buttons in the cradle where the lifting arms would need only to pass under the telephone as shown. In other types of telephones, the slightly upturned ends of the arms could be elongated into fingers adapted to pass through apertures in the cradle and push upward the bar supporting the telephone and operating the switching mechanism. In the type of telephone suitable for mounting on the side of a desk or on a wall, the alarm device may be attached to the desk or wall in the vicinity of the telephone and adapted to actuate the same by raising the telephone hook. In the case of the old type telephone having separate receiver and transmitter, the alarm device may be attached to the standard and arranged to raise the hook supporting the receiver.

It is apparent that the specific example shown above has been given by way of illustration and not by way of limitation and that the structures above described are subject to wide variation and modification without departing from the scope or intent of the invention, all of which variations and modifications are to be included within the scope of the present invention.

What is claimed is:

1. In combination with a telephone circuit, receiver, at least one hand type telephone, audible alarm means, means for establishing circuit between said hand telephone and receiver, tempera-

ture control means of said audible alarm and circuit making means, said audible alarm means comprising gong, hammer adapted to co-act therewith, said means for establishing circuit comprising pivotally mounted arm, prongs disposed on end of said arm adapted to close telephone circuit, spring catch disposed above said arm adapted to support said arm when raised thereunder, clock work means for raising said arm and sounding said alarm, temperature control means for said clock work means, said temperature control means comprising support for said metal member adapted to permit one end to pass therethrough when expanded by heat, brake arm, spring, said brake arm slidably disposed under spring tension against wheel in said clock work, and means for releasing said brake by expanding action of said metal member when subjected to heat, and supporting means for said audible alarm means, circuit making means, temperature control means, clock work means, and brake arm.

2. In combination with a telephone circuit comprising at least one receiver, at least one hand type telephone, audible alarm means, means for establishing circuit between said hand telephone and receiver, temperature control means of said audible alarm and circuit making means, said audible alarm means comprising gong, hammer adapted to co-act with said gong, said means for establishing circuit comprising pivotally mounted arm, prongs disposed on end of said arm adapted to be inserted between said hand telephone and cradle, spring catch disposed above said arm adapted to support said arm when raised thereunder, dialing means between said hand telephone and receiver, clock work means for raising said arm, sounding said alarm, dialing said receiver, temperature control means, said clock work means, supports for said audible alarm means, means for establishing said circuit, temperature control means, clock work means dialing said receiver, said temperature control means comprising metal member susceptible of expansion under rising temperature, support for said metal member adapted to permit one end to pass therethrough when expanded by heat, brake arm, spring, said brake arm slidably disposed under tension of said spring against wheel rim in said clock work, lever, fulcrum, one end of said lever hingedly disposed substantially at base of said metal member adapted to co-act therewith when expanded, opposite end of said lever hingedly attached at an acute angle to opposite end of said brake arm.

3. In combination with a telehone circuit according to claim 2 in which said dialing means comprises spool adapted for attachment to central portion of any telephone dial, said spool comprising upper and lower rims supported along circumferences thereof, stud disposed on said lower rim substantially at center thereof, aperture formed in said lower rim substantially at points of support of said upper and lower rims, aperture formed in said support substantially at base connecting with said aperture formed in said lower rim rotatable shaft disposed through said aperture in said support, gear disposed in said aperture in said lower rim adapted to rotate with said shaft, dialing arm adapted to be inserted in "operator's" dialing position rotatably attached to said stud, keyed circular aperture in said upper rim substantially at center, spring inserted over said stud on lower rim, rotatable and slidable axis keyed with said keyed circular aperture in said upper rim inserted therethrough co-acting with said spring, gear keyed on said axis under top rim of spool, stud disposed on under surface of said gear adapted to engage said dialing arm when said axis is pushed down with key under said upper rim, said gears keyed in said axis adapted to engage said gear disposed in lower rim, and means for energizing said gears.

4. In combination with a telephone circuit according to claim 3 in which said means for energizing said gears comprises flexible shaft, means for attaching one end of said flexible shaft to rotatable shaft disposed through lower rim support, and means for actuating said flexible shaft.

5. In combination with a telephone circuit comprising at least one receiver, one hand telephone, audible alarm means, means for establishing circuit between said hand telephone and receiver, means for indicating at receiver end said circuit is so established, flexible shaft, primary power source, said primary power source comprising main spring adapted to be wound, winding means for said main spring, driving gear keyed on main spring shaft, gear train starting with said driving gear adapted to transmit power thereof to said means for establishing circuit between said hand telephone and receiver, audible alarm means, means at receiver end indicating established circuit temperature control means of said gear train, supports for shafts of said main spring, means for winding, gear train, means for establishing circuit, audible alarm means, means for indicating established circuit, said means for establishing circuit comprising pivotally mounted arm above shaft of one of said gears, prongs disposed on end of said arm adapted for insertion between said hand telephone and cradle, cam disposed on said gear shaft under said arm adapted to move the same upward, spring catch disposed above said arm adapted to hold the same when passed thereunder, said audible alarm means comprising gong, hammer, said hammer movably disposed on rim of wheel connected in said gear train adapted to come in contact with rim of said gong when rotated, flexible shaft comprising gear disposed at end thereof adapted to co-act with one gear in said train, support for said shaft, said means for indicating at receiver end that said circuit is so established comprising spool adapted for attachment to central portion of dial on said hand telephone, said spool comprising upper and lower rims supported along circumferences thereof, stud disposed on said lower rim substantially at center thereof, aperture formed in said lower rim substantially at points of support of said upper and lower rims, aperture formed in said support substantially at base connecting with said aperture formed in said lower rim, rotable shaft disposed through said aperture in said support, gear disposed in said aperture in said lower rim adapted to rotate with said shaft, free end of said flexible shaft attached to free end of said shaft, dialing arm adapted to be inserted in "Operator's" dialing position rotatably attached to said stud, keyed circular aperture in said upper rim substantially at center, spring inserted over said stud on lower rim, rotatable and slidable axis keyed with said keyed circular aperture in said upper rim inserted therethrough co-acting with said spring, gear keyed in said axis under top rim of wheel adapted to engage feet of said gear disposed in said lower rim when brought thereagainst, stud disposed in said gear keyed to said slidable and rotatable axis adapted

to engage said dialing arm when said axis is pushed down with key under upper rim.

6. In combination with a telephone circuit according to claim 5 in which said winding means for said main spring comprises gear keyed to main spring shaft, spring catch for said gear disposed thereabove co-acting therewith in permitting turning in one direction only, winding gear co-acting with said gear, shaft for said winding gear, front and back supports for said shaft, said shaft extending through said front support adapted to receive winding key, and winding key.

7. In a signalling apparatus having a telephone dial, dialing means connected to said dial; said dialing means comprising a lower rim mounted over said dial, means connecting said lower rim to said dial, an upper rim, a support interconnecting said rims and maintaining the same in spaced apart relation, a gear intermediate said rims and rotatably mounted in said support, a second gear mounted over said first mentioned gear and adapted to engage the same, said second gear being mounted intermediate said rims and axially movable and rotatably mounted on said lower rim, a dialing arm rotatably mounted on said lower rim below said second gear, means on said second gear engaging said dialing arm when said gear is in engagement with the first mentioned gear, resilient means intermediate said lower rim and said second gear urging said gears out of engagement, means co-acting with said upper rim for maintaining said gears in engagement during a predetermined rotation of said dial, and means connected to said first mentioned gear for rotating the same,

8. In a signalling apparatus having a telephone dial, a dial stop, a spool mounted over said dial, means connecting said spool to the dial stop and including a support, a drive gear rotatably connected to said support, a driven gear over said drive gear and adapted to mesh therewith, means rotatably mounted in said spool and operatively connecting said driven gear to said dial when said gears are in mesh, resilient means in said spool below said driven gear urging the same upwardly out of mesh with said drive gear, and means above said driven gear for maintaining said gears in mesh during a predetermined rotation of said dial.

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