

Jan. 15, 1929.

1,698,737

J. M. ROBERTS
SIGNALING APPARATUS

Filed June 1, 1922

2 Sheets-Sheet 1

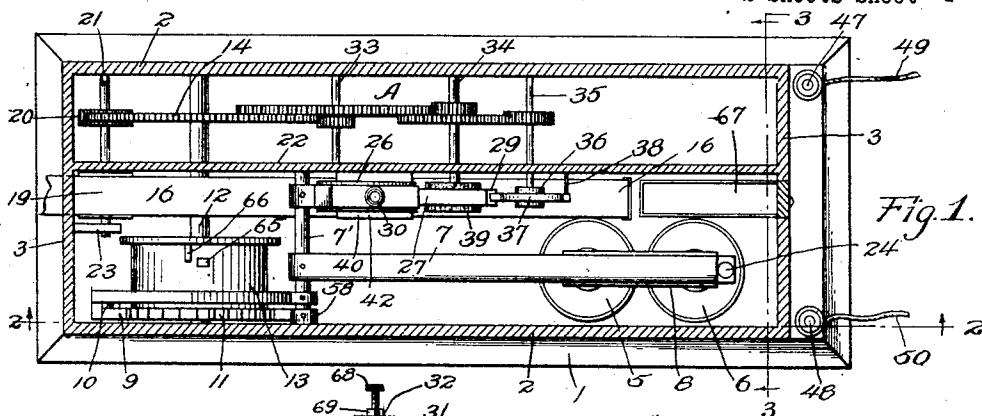


Fig. 1.

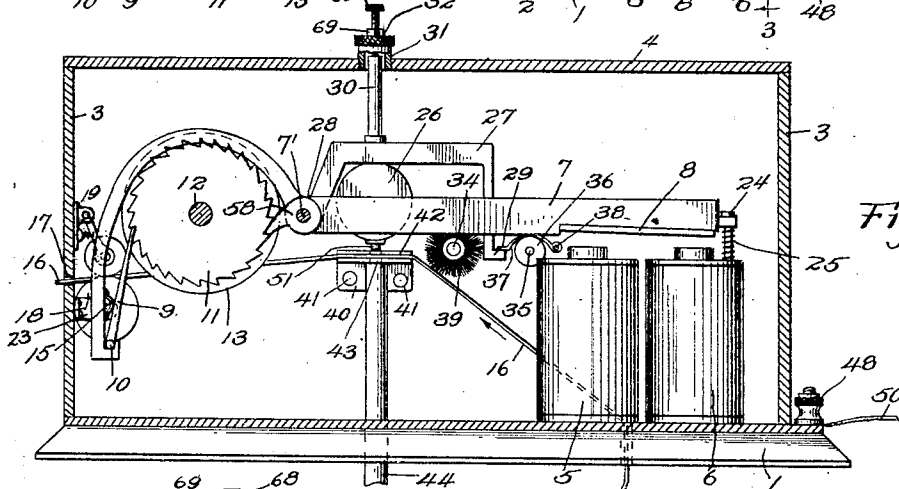


Fig. 2.

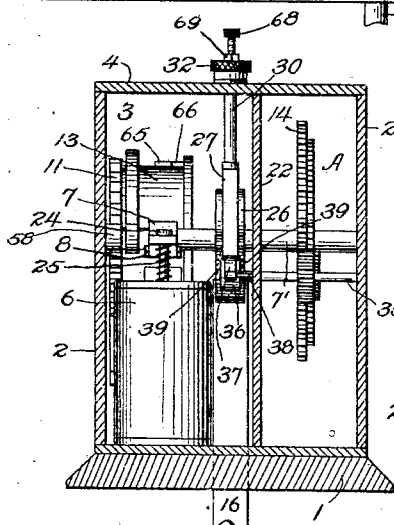
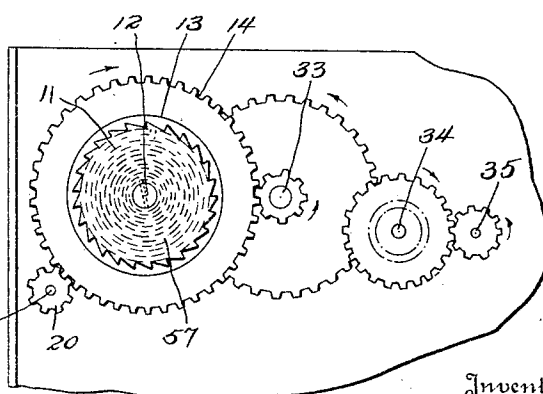


Fig. 3.



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2 Sheets-Sheet 2

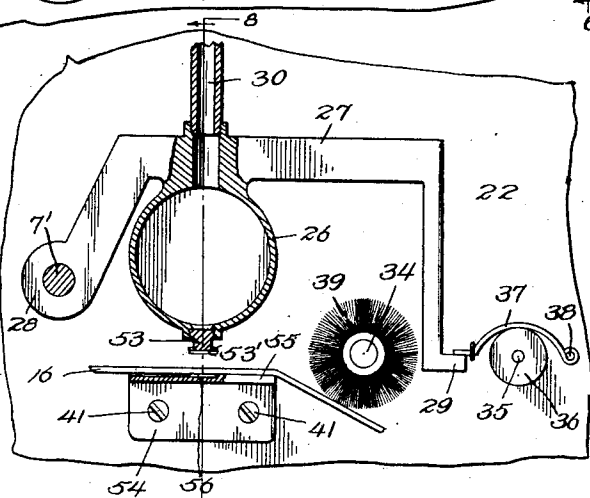
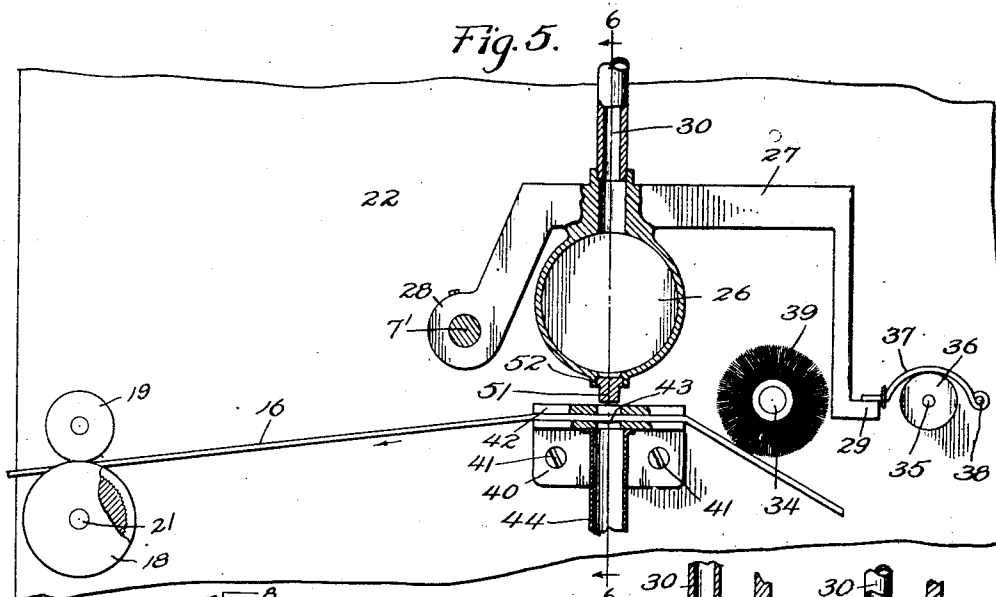


Fig. 7.

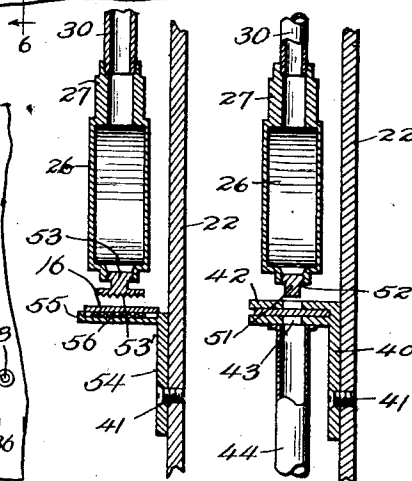


Fig. 8.

Fig. 6

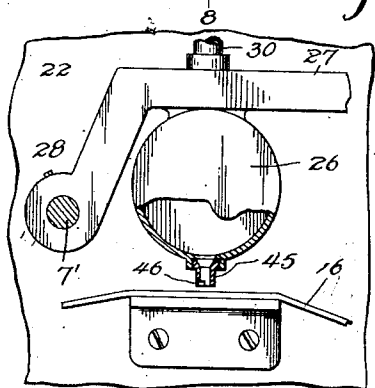


Fig. 9.

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UNITED STATES PATENT OFFICE.

JACOB M. ROBERTS, OF NORFOLK, VIRGINIA.

SIGNALING APPARATUS.

Application filed June 1, 1922. Serial No. 565,206.

This invention relates to signaling apparatus and has particular reference to that class of signaling apparatus in which a visible record is made on the intermittently fed tape, which recorded signals may be impressed by various means and if desired may be stored for future reference.

The invention is designed to present several distinct improvements and advantages over the construction presented by my earlier Patent No. 1,420,618, issued June 20, 1922, and broadly stated the machine embodies as its principal features the features shown and described in said patent. One of the objects of the present invention is to provide a signaling recording apparatus of the character described, by which the signal-carrying means may be deformed in any suitable manner for the production of the signals; and the parts of which are few in number and compactly arranged in a suitable housing where they will be protected from possible injury or disarrangement.

A further object of the invention is to provide a signal recording mechanism which may be compactly arranged to record various types of signals in accordance with the form of record desired, and in which changes may be made quickly and without requiring the alteration of the several parts of the mechanism.

A still further object of the invention is to provide a signal recording mechanism, the parts of which are so arranged as to give better operating results than are obtained by the construction disclosed in my patent above referred to and which will afford a more efficient magnet leverage, and to protect the parts of the mechanism by enclosing the same in a register casing.

With such objects in view, as well as other advantages which may be incident to the use of the improvements, the invention consists in the parts and combinations thereof hereinafter set forth and claimed, with the understanding that the several necessary elements constituting the same may be varied in proportions and arrangement without departing from the nature and scope of the invention.

In order to make the invention more clearly understood there are shown in the accompanying drawings means for carrying the same into practical effect, without limiting the improvements, in their useful applications, to the particular constructions which, for the

purpose of explanation, have been made the subject of illustration.

In said drawings:

Fig. 1 is a plan view of the signaling apparatus taken through the enclosing housing and adapted to record the signals by means of powder dropped at intervals upon the tape.

Fig. 2 is a longitudinal sectional view on line 2—2 of Fig. 1.

Fig. 3 is a transverse section on line 3—3 of Fig. 1.

Fig. 4 is an enlarged detail view of the spring actuated gear train or motor which is designed to intermittently feed the recording tape or belt.

Fig. 5 is an enlarged detail view, partly in section showing the recording mechanism as designed to produce a punched record in the recording tape.

Fig. 6 is a vertical transverse section on line 6—6 of Fig. 5.

Fig. 7 is an enlarged detail view showing the signal recording mechanism as adapted to form the signals on the tape by crimping or corrugating the latter by suitable dies.

Fig. 8 is a vertical transverse section on line 8—8 of Fig. 7.

Fig. 9 is an enlarged detail view showing the signal recording mechanism as adapted to form the signals on the tape by depositing powder.

Referring to the drawings the machine is illustrated in its preferred form as mounted upon a base 1, and enclosed in the suitable housing comprising side walls 2, end walls 3 and a top or cover 4. 5 and 6 are a pair of electro magnets or coils, fixed upon the base 1 and at one side thereof. Suspended longitudinally of the housing by a fixed attachment to the lever rock shaft 7', and over the magnets 5 and 6, is a lever 7 having an armature bar 8 carried at one end thereof. The armature bar 8 is set into the lever 7 at an angle as best shown in Fig. 2, where it is positioned to best possible advantage with respect to the companion coils. The lever 7 at the opposite side of the shaft 7' from the armature bar 8 is curved upwardly and downwardly and at the lower extremity thereof is provided with the pawl 9 pivotally mounted at 10 on the lever. 11 is a ratchet wheel mounted for rotation upon a transverse shaft 12 supported by the side walls 2 and forming an integral part of the spring barrel or casing 13. The other end of the shaft 12 carries

the main driving gear 14 by which the gear train, best illustrated in Fig. 4, is actuated. The pawl 9 is normally pressed in engagement with the ratchet wheel 11 by a leaf spring 15. The recording belt or tape is shown at 16 and is designed to pass through the base 1 into contact with the signalling apparatus and out the end wall as shown at 17. The belt is fed through the telegraph sounding instrument by means of the opposed rollers 18 and 19 between which the belt passes and its travel through the machine is assured by the toothed or serrated surface of the feed roller 18. The feed rollers 18 and 19 are actuated by the driving gear 14 fixed on the shaft 12 and meshing with the pinion 20 on the roller shaft 21 having one end mounted in the side wall 2 of the casing and having its other end journaled in the suitable bearing portion 23 mounted on the end wall, and is further rotatably supported intermediate of its length by the wall or partition 22 extending longitudinally of the casing and to one side of the center thereof. The armature lever 7 is normally held at a predetermined position with relation to the electromagnets 5 and 6 by adjusting screws 24 and coil spring 25 and it will be observed that by regulating the screw 24, the lever may be positioned normally at any desirable angle with respect to the electromagnets and that the coil spring 25 tends to hold the lever 7 and armature 8 away from engagement with the magnet cores. 26 is the powder box or container mounted for vertical reciprocation on one side of the partition 22 and directly over the recording belt or tape 16. Extending over the top of and suitably attached to the powder box 26 is an actuating or impacting arm or member 27 fixed, as at 28, at one end of the lever shaft 7' and moving with the armature lever. One end of the member 27 extends downwardly and is provided with a foot 29. The upper end of the powder box is provided with an upwardly extending tube 30 having a screw-threaded engagement with the upper portion of the powder container and extending upwardly into a vent 31 provided with a cap 32 and by means of this arrangement the container 26 may be replenished with powder when desired. The train of gearing A illustrated in Fig. 4 is actuated by the shaft 12 and main drive gear 14 and is or may be the same as in my patent above described and will not here be enlarged upon in detail. Said train of gearing is carried on the transverse shafts 12, 33, 34 and 35 which are suitably journaled in the side wall 2 and central partition 22 as best seen in Fig. 1. Before the motor is installed the spring 37 is initially wound to the desired extent and the stops 65, 66 are in engaging relation. The power of such initial winding is always maintained. Additional power is stored for the actuation of the shaft 12 through the means of lever 7, pawl 9 and

barrel 13. The outer end of a spiral spring within the barrel is attached to the latter so that the turning of the barrel by the pawl winds up the spring, and the inner end of the spring is attached to and turns the shaft 12. The shaft 35 carries at its inner end a brake wheel 36. 37 is a friction spring element pivotally mounted by means of a pin 38 to the partition 22. The outer end of the spring element 37 is engaged by or fastened to the foot 29 of the impacting member 27 and is normally out of engagement with the brake wheel 36. The inner end of the shaft 34 is provided with an erasing or cleaning wheel 39, the periphery of which contacts with the surface of the belt or tape 16. As in the earlier companion case before referred to this cleaning wheel is shown as of brush like form and a receptacle 67 is provided to receive particles of powder removed from the belt or tape thereby.

40 is a bracket member which is suitably secured, as by screws 41, to the partition 22 and the upper end of this bracket comprises at its upper end a horizontally extending bifurcated portion 42 serving as a support and guide for the belt or tape 16. The horizontal portion 42 of the bracket 40 is further provided with an aperture 43, which aperture is in alignment with a tube or discharge pipe 44 fixed to the lower side of the said bifurcated portion and extending vertically downwardly through the base of the machine. The powder container 26 is provided with a powder discharge nozzle 45 apertured at 46 to permit the passage of the belt and deposited powder away from the same without possibility of smearing the powder on the tape.

I have shown my invention as particularly applied to a telegraph sounder, and for this purpose the base 1 is provided with the usual binding posts 47 and 48 which are connected in the usual form with the electromagnets 5 and 6 to which the wires 49 and 50 may be connected.

From the foregoing it will be observed that when the magnets 5 and 6 are energized, the armature 8 is brought sharply into engagement with the magnet cores swinging the lever 7 downwardly with its pivot 7' with the result that the pawl 9 engages the teeth of the ratchet wheel 11 and rotates same to wind the spring. This action of the lever 7 also brings the powder container sharply into contact with the belt 16, the latter being guided and supported between the bifurcations of the bracket 40 and depositing the portion of the powder on the belt. At the same time the tension spring 37 is brought into engagement with the brake wheel 36 which locks the gear train and prevents movement of the belt while the powder is being deposited. On the opening of the circuit the lever 7 carrying armature 8 is moved back to its normal position by the coil spring 25.

The foot 29 of the member 27 on the upstroke moving the tension spring 37 out of engagement with the brake wheel 36 and the pawl 9, rides freely over the teeth of the wheel 11, the releasing of the brake wheel permitting the coil spring to expand within the limits of the stop lugs 65 and 66 to advance the belt. 58 is a holding pawl engaging the ratchet 11 and preventing the barrel 13 from unwinding when the pawl 9 is riding over the teeth thereof on the upstroke of the armature and lever.

By reference to Fig. 4 it will be observed that the inner end of the coil spring 57 is fixed to the shaft 12 and its outer end is fastened to the inner surface of the barrel 13. It will therefore be observed that the shaft 12 and gear train will rotate to advance the belt 16 except when the brake wheel 36 is engaged by the tension spring 37. The spring 57 is self winding due to the action of the intermittent motion of the pawl 9 and ratchet 11. It will be understood that the tape advances periodically during signaling and thereafter the parts come to rest by reason of the stop 66 engaging with the stop 65, the latter having been advanced somewhat during the signaling operation, as more particularly set forth in my said patent.

When it is desired to deform or mark the tape 16 instead of depositing powder thereon, as by punching holes therein, the powder nozzle 45 is screwed out of engagement with the container 26 and the punch or die 51 is screwed into the threaded aperture in the container. The punching element or die 51 is provided with a shoulder 52 which is adapted to contact with the horizontal surface of the portion 42 of the bracket, thus limiting the downward movement of said punch with respect to the bracket. The portion 51 penetrates the tape or belt 16 which is of suitable material to be readily perforated and the punchings are conveyed by the tube 44 to a suitable point of discharge. The belt 16 is moved with respect to the punch after each perforation by the train of gearing above described.

In the event that it is deemed desirable to crimp the tape or belt instead of punching the same or depositing powder thereon the arrangement is best shown in Figs. 7 and 8. A crimping member or die 53, having corrugations 53' on the lower surface thereof, is screwed into the lower portion of the container 26 in place of the punch 51 and the bracket 40 is removed by the unscrewing of the screws 41 and is replaced by a bracket 54 of slightly different form on its horizontal portion. As seen in Figs. 7 and 8, the horizontal portion 55 of the bracket 54 is provided with teeth or corrugations 56 in alignment with and adapted to mesh with the teeth 53' of the crimping element or die 53 when the latter is brought into engagement there-

with. The portion 55 of the bracket 54 is further recessed as at 56 to permit the ready passage of the crimping portion of the tape out of engagement with the bracket and to further prevent transverse movement of said tape while the same is being crimped.

What I claim is:

1. In a signaling apparatus, in combination: a movable signal receiving element, means for impressing a signal on said element, a shaft for moving said signal receiving element, a spring having one end fixed relative to the said shaft, a power transmitter adapted to actuate said signal impressing element, said power transmitter being further adapted to simultaneously wind said spring to lock it against expansion, and means operated by said power transmitter to free said spring to permit it to rotate said shaft.

2. In a signaling apparatus, in combination: a movable signal impressing element, a signal receiving element movable relative to said signal impressing element, a motor spring having one end fixed relative to said signal receiving element, means connected to the other end of said spring for winding the same, a reciprocating power transmitter adapted while moving in one direction to actuate said signal impressing element to impress a signal on said signal receiving element and to simultaneously wind said spring and lock same against expansion and adapted while moving in the other direction to release said spring to permit the advancing of said signal receiving element.

3. In a signaling apparatus, in combination: a movable punching die, a movable tape below said punching die, a shaft for moving said tape, a spring having one end fixed to said shaft operatively connecting said spring with said shaft, means connected with the other end of said spring for winding same, two inter-engaging stops, one of said stops connected to the shaft and the other of said stops connected to said spring winding means, a power transmitter adapted to actuate said punch to intermittently perforate said tape and to simultaneously move one end of the spring in the winding direction, a die adapted to co-operate with said punch, and means automatically acting to prevent said spring from expanding while said punch is perforating said tape.

4. In a signaling apparatus, in combination: a movable punching die, a movable tape below said punching die, a shaft for moving said tape, a spring having one end fixed to said shaft operatively connecting said spring with said shaft, means connected with the other end of said spring for winding same, two inter-engaging stops, one of said stops connected to the shaft and the other of said stops connected to said spring winding means, a power transmitter adapted to actuate said punch to intermittently perforate

said tape and to simultaneously move one end of the spring in the winding direction, a die adapted to co-operate with said punch, a secondary shaft operatively connected to said spring and carrying a brake wheel and means operated by said power transmitter to prevent said spring from expanding while said punch is perforating said tape.

5. In a signaling apparatus, the combination of a signal impressing mechanism, said signal impressing mechanism comprising a male die, movable means for receiving said impressing signal, a power device, means actuated by said power device for imparting blows to said signal impressing mechanism, means actuated by said power device for imparting movement to the signal receiving means, and a female die adapted to cooperate with said male die and said movable means.

6. In a signaling apparatus, the combination of a signal impressing mechanism, said signal impressing mechanism comprising a male die, movable means for receiving said impressing signal, a power device, means actuated by said power device for intermittently imparting blows to said signal impressing mechanism, means actuated by said power device for imparting movement to the signal receiving means, and a female die adapted to cooperate with said male die and said movable means whereby a series of perforations are received by said movable means.

7. In a signaling apparatus in combination: a movable punching element, a die arranged below said punching element, a tape arranged between said punching element and said die, a shaft operatively connecting with said tape, a spring connected at one end to said shaft, a drum connected to the other end of said spring, a stop plug on said drum,

a second stop plug operatively connected to said shaft and adapted to operatively engage said first mentioned stop plug, and means for simultaneously winding said spring when said punching element is actuated to intermittently perforate said tape to impress a series of visible signals thereon.

8. In a signaling apparatus, in combination: a movable signal impressing punch, a die arranged below and adapted to cooperate with said punch, a tape arranged between said punch and said die, said die being provided with a longitudinal slot for a portion of its length to guide said tape after said signals have been impressed thereon, a shaft operatively connecting with said tape, a spring connected at one end to said shaft, a drum connected to the other end of said spring, a stop plug on said drum, a second stop plug operatively connected to said shaft and adapted to operatively engage said first mentioned stop plug, and means for simultaneously winding said spring when said punch is actuated to intermittently perforate said tape to impress a series of visible signals thereon.

9. In a signaling apparatus, the combination of a primary motor, a primary power transmitter, a secondary motor energized by said primary power transmitter, a secondary power transmitter, a signal receiving and carrying device which is moved by said secondary power transmitter, means actuated by said primary motor for deforming said carrying device, and means actuated by the primary motor for preventing transmission of power by said secondary motor.

In testimony whereof, I affix my signature.

JACOB M. ROBERTS.