

Aug. 30, 1927.

1,640,892

H. C. GAMMETER

PYROTECHNIC SIGNAL

Filed April 8, 1926

3 Sheets-Sheet 1

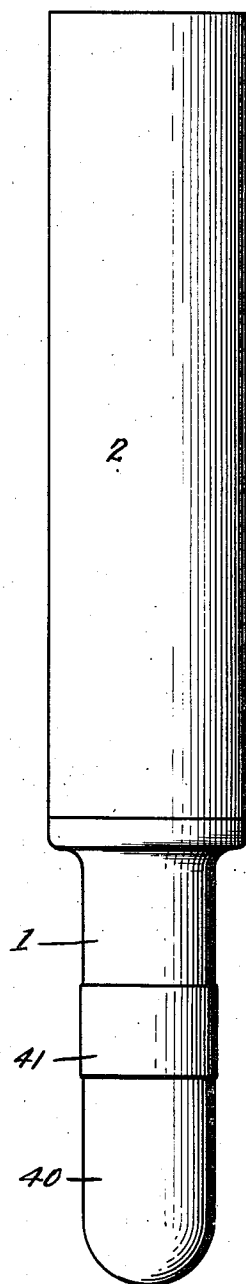


Fig. 1

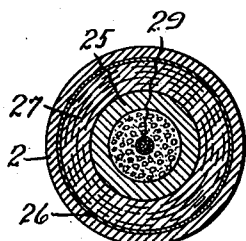


Fig: 3

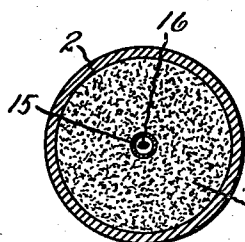


Fig. 4

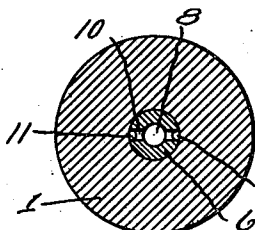


Fig. 5

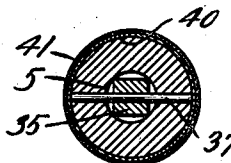


Fig. 6

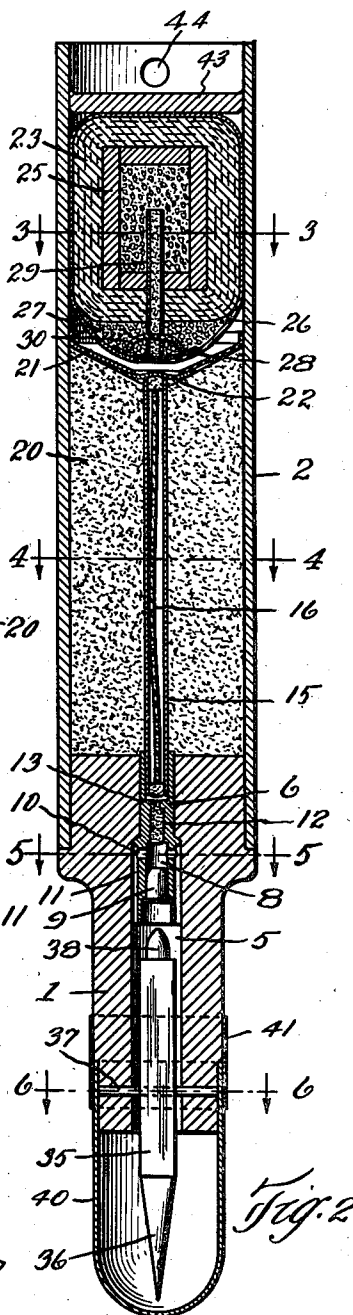


Fig. 2

INVENTOR

Harry E. Gammeter
By Hull, Brock & West
Atty's.

Aug. 30, 1927.

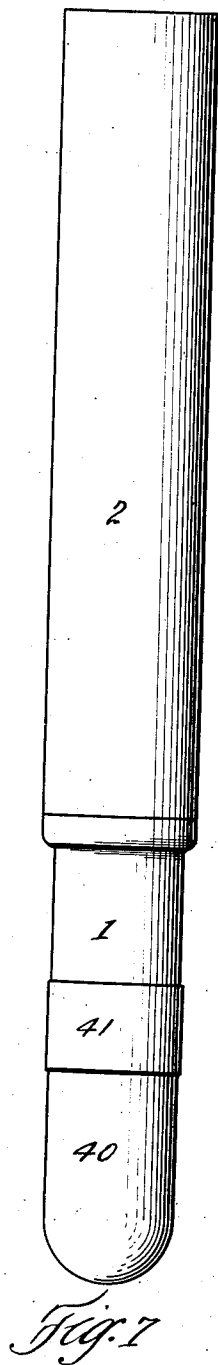
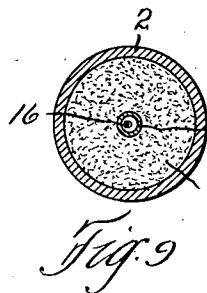
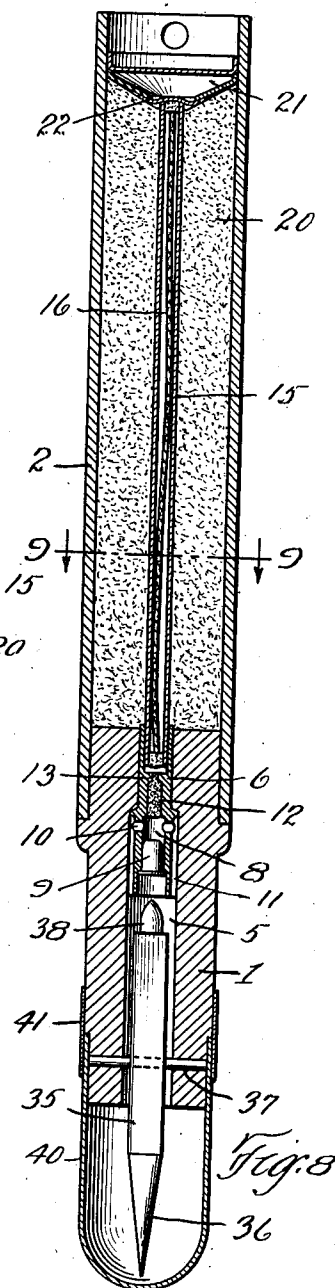
H. C. GAMMETER

1,640,892

PYROTECHNIC SIGNAL

Filed April 8, 1926

3 Sheets-Sheet 2



INVENTOR

Harry C. Gammeter
By Hull, Brock & West
Attys.

UNITED STATES PATENT OFFICE.

HARRY C. GAMMETER, OF CLEVELAND HEIGHTS, OHIO.

PYROTECHNIC SIGNAL.

Application filed April 8, 1926. Serial No. 100,750.

This invention relates to a pyrotechnic signal or alarm that is especially suitable for use by the occupants of dwellings, store or shop keepers, attendants of gasoline filling stations, and other persons, for giving an alarm—and in some instances an appropriate specific signal—in case of fire, theft, burglary, or other emergencies.

The general objects of the invention are to provide a thoroughly safe and highly efficient device of the aforesaid character that is particularly convenient of use; that is so simple of operation as to require no practice, and full instructions as to its use may be briefly inscribed on the device and read at a glance; and that incorporates an ignition means that is positive, certain and automatic of operation, making unnecessary the use of a match or the like in setting off the signal.

Other objects are the production of a device of the aforesaid character that is comparatively simple of construction, economical of manufacture, strong, and immune from disorder and, therefore, thoroughly dependable.

To the attainment of the foregoing and other objects which will hereinafter appear the invention may be defined as consisting of the combination and arrangement of elements set out in the claims annexed hereto and illustrated in certain embodiments in the accompanying drawings wherein Fig. 1 is an elevational view, and Fig. 2 a central longitudinal section through a pyrotechnic signal constructed in accordance with my invention and involving an aerial projectile or detonator, and a flare; Figs. 3, 4, 5 and 6 are transverse sections through the device on the respective lines 3—3 to 6—6 of Fig. 2; Fig. 7 is an elevational view, and Fig. 8 a central longitudinal section through a form of the invention which is distinguished from the former embodiment principally by the omission of the aerial projectile or detonator; Fig. 9 is a transverse section through the device on the line 9—9 of Fig. 8; Fig. 10 is a central vertical section through a form of the invention that is adapted to be supported in a stationary manner on the side of a building, post or other suitable support; Fig. 11

is a similar view showing the manner in which the device of Fig. 10 is operated; and Fig. 12 is a section on the correspondingly numbered line of Fig. 10.

The embodiment of the invention illustrated in Figs. 1 to 6 involves a stock 1 that is preferably turned from wood to a diameter throughout its lower portion that renders it suitable as a handle, while its upper end is turned to a somewhat larger diameter. Fitting about a reduced portion of the upper end of the stock is the inner end of what I shall term a barrel 2 which is preferably composed of a relatively heavy paper or cardboard tube. The barrel is secured to the stock in any suitable manner.

A bore 5 extends centrally through the stock 1 and is reduced in diameter at its upper end, and a thimble 6 is fitted within the upper portion of said bore. The thimble is provided with a chamber 8 which receives a percussion cap 9, and, above the plane of the percussion cap, ports 10 lead from the chamber 8 to grooves or passages 11 that are formed along the opposite sides of the thimble for a purpose which will presently be explained. Forwardly of the chamber 8 the thimble 6 is provided with a compartment 12 that is adapted to be filled with an inflammable substance, such as a suitable grade of powder, and the compartment 12 communicates through an aperture 13 with a tube 15 which has its inner end fitted within the upper end of the thimble 6. A fuse 16 extends through the tube 15 and at each of its ends carries a deposit of suitable inflammable material.

Occupying the space between the tube 15 and the barrel 2 is a quantity of relatively slow burning composition or flare material designated 20. This material is covered at its upper end by an annular, dished washer 21 which is pressed into the barrel and held in place by friction, and interposed between the central portion of the washer 21 and the adjacent end of the fuse 16 is a patch 22 of suitable material, such as cloth, that is impregnated with powder or other highly inflammable substance.

Occupying the upper end of the barrel 2

above the washer 21 is an aerial projectile or detonator 23 shown as comprised of a hollow core 25 that is filled with a suitable explosive and that is enveloped in a body of suitable material, the whole being encased within a sack 26 which also sustains, immediately below the projectile or detonator, an impelling or firing charge 27 of powder of a suitable grade. Across the lower end of the sack is a patch 28, similar to that previously referred to and designated 22, and rising from the patch 28 into the core of the detonator 23 is a tube 29 which contains a quantity of powder of suitable quality, and a fuse 30 is inserted through apertures in the lower end of said tube to communicate the ignition of the patch 28 and firing charge 27 directly to the powder within the tube 29 and finally to that within the core 25.

A firing pin 35, that is preferably square in cross section throughout the greater portion of its length, occupies the bore 5 of the stock 1, and the same protrudes from the lower end of said bore a material distance and terminates at its lower end in a sharpened portion 36. The pin may be held in place by a peg 37 of wood or other breakable material which is inserted through aligned holes in the stock and pin. The upper end of the firing pin is formed with a protuberance 38 which is arranged to strike the percussion cap 9 and set it off when the pin is forcibly projected upwardly within the bore. The protruding end of the pin is ordinarily concealed and protected by a cap 40 which is designed to be engaged over the reduced lower end of the stock 1, and the joint between the cap and stock is adapted to be covered by a band 41 of paper or other suitable material on which may be printed the instructions as to how to use the device.

The upper end of the barrel 2, above the projectile or detonator 23, may be closed by a plug 43 of cardboard or the like which is forced into the end of the barrel, and above the plane of said plug the barrel is preferably provided with an aperture 44 for a purpose which will hereinafter appear.

The form of the invention illustrated in Figs. 7 to 9 is quite similar to that just described. The essential difference is that, in the present case, the aerial projectile or detonator is omitted. The present device is intended for use purely as a flare signal, and may be employed alone, or in conjunction with the one above described as I shall presently explain. In structural respects it is almost identical with the former construction and for that reason a detailed description of it is deemed unnecessary. The same reference numerals are used to designate the corresponding parts in the two modifications.

When the device is not in use it may be hung in a convenient place by engaging the

aperture 44 over a nail, hook or the like.

When an emergency arises which makes the use of the device necessary, it is grasped by the stock 1, removed from its support, and the cap 40 is turned with respect to the stock with sufficient force to rupture the band 41 whereupon the cap may be withdrawn from the stock and the spikelike sharpened end of the firing pin 35 jabbed into a window sill, wall, or other object at such an angle as will sustain the device in a position with the barrel pointed straight up or as nearly so as is practical. The thrust of the stock downwardly over the firing pin breaks the peg 37 and projects the pin into contact with the percussion cap 9 setting off said cap so that its fulminate ignites the powder or other compound within the compartment 12 of the thimble 6, the fire whereof is communicated through the aperture 13 to the lower end of the fuse 16. The fuse is thus ignited and it communicates the fire, through the patches 22 and 28, to the impelling or firing charge 27. This charge explodes and throws the aerial projectile or detonator 23 to a great height and during its ascent the fire is communicated through the fuse 30 and the powder within the tube 29 to the explosive charge within the core 25 with the result that the detonator bursts, making a loud report and a brilliant pyrotechnic display at night and a dense cloud in daylight.

In the meantime the burning composition or flare material 20 has become ignited and is producing a flare which designates the specific location of the trouble after attention has been attracted to the general locality by the bursting of the aerial detonator.

The lapse of time between the setting off of the percussion cap 9 by the jabbing of the firing pin into a support and the communication of the fire to the impelling charge 27 is ample to permit the user to get a considerable distance away from the device before the impelling charge explodes in case a sense of security or timidity prompts such action. However, this precaution is really unnecessary. The device may be held in the hand with safety, in which case the firing pin is simply struck against an object to set off the signal and the device held in a substantially upright position while discharging the aerial projectile. While the flare is burning it may be swung to and fro in the execution of a signal in accordance with a generally understood code.

In cases where the aerial projectile or detonator is regarded as unnecessary; or in cases where the alarm and signal given by the foregoing device when supported in a stationary position is thought to be not sufficiently specific, the form of the invention illustrated in Figs. 7 to 9 may be employed.

While it is susceptible to being used in precisely the same way as the previous form in

a stationary position, it may, on the other hand, be held in the hand after the firing pin has been struck against some object to set off the percussion cap, and swung to and fro for the purpose of signaling the nature of the trouble. In fact, as above intimated, it is the intention to provide a code of signals by which the exact nature of the emergency may be communicated to the residents of a community throughout which such code is understood.

The form of the invention illustrated in Figs. 10 to 12 is intended for use by the public. Signals, enclosed in suitable casings, are placed on the sides of buildings, posts or poles at convenient locations throughout a community and are employed to attract aid to a given locality in case of need.

The casing, as illustrated in Figs. 10 to 12, is made up of a stationary section and a swinging section, the former being comprised of a back 50, bottom wall 51 and side walls 52, while the swinging section is comprised of a front wall 55, side walls 56 and a top 57. The swinging section is connected to the stationary section by a hinge 58 that is preferably located between the lower edge of the front wall 55 and the forward edge of the bottom wall 51. In accordance with the present form of the invention, the swinging section is normally held closed by the engagement of a depressed portion 59 of the top 57 over the upper edge of the back 50. The back is adapted to be attached to a vertical wall or support in a position slightly inclined from the vertical by a bracket 60 that is applied to the back 50 adjacent its upper end and by a lug 61 which depends from the back, the bracket and lug having apertures for the accommodation of suitable fastening means.

A signal 62, similar to the one first described, is supported within the casing by a loop 63 and a spring clamp 64, the former being attached to the back 50 near its upper end, while the latter is secured to and projects forwardly from the back a suitable distance above the bottom wall 51. The clamp is adapted to engage within a groove 65 that extends about the stock 66 of the signal, and the firing pin 67 of the signal protrudes a suitable distance beyond the lower end of said stock.

A rod 70 is supported adjacent and parallel to the back 50 as by having its upper end engaged through an aperture in an angle 71 that is attached to the back, and its lower end engaged through an aperture in the bottom wall, the rod being held against longitudinal displacement by cotter pins 72. Guided on the lower end of the rod 70 is a sleeve 73 which carries a hammer 74; and a tension spring 75, coiled about the rod 70, has its upper and lower ends connected, respectively, to the angle 71 and to the sleeve

73. The hammer 74 is held depressed in opposition to the spring 75 by a latch 76 that is pivotally supported by the bottom wall 51, and the free end of said latch is adapted to be engaged by a gravity hook 77 that is pivotally connected to the front wall 55. A handle 78 is secured to said front wall adjacent its upper end.

The normal condition of the device is illustrated in Fig. 10. When it is desired to give an alarm, the handle 78 is grasped and the swinging section of the casing is pulled forwardly and dropped. The initial forward movement of the swinging section causes the hook 77 to disengage the latch 76 from the hammer 74, allowing the spring 75 to jerk the hammer 74 upwardly into contact with the firing pin 67, elevating said pin and setting off the signal as hereinbefore described.

To reload the device and place it in condition for subsequent use, it is only necessary to retract the hammer 74 and engage the latch 76 over its outer end, and to remove the discharged signal by grasping the stock 66 and withdrawing it from the spring clamp 64 and lowering the signal sufficiently to disengage its upper end from the loop 63 and place within the casing a fresh signal by a reverse operation. The swinging section of the casing is then returned to normal position wherein it is held by the engagement of the depressed portion 59 of the top over the upper edge of the back 50. During the closing of the casing the hook 77 automatically re-engages the latch 76.

Having thus described my invention, what I claim is:—

1. A pyrotechnic signal comprising a container, an aerial projectile and its impelling charge sustained within the outer end of said container, a body of flare producing material occupying the container inwardly of said charge, a fuse extending through and insulated from said body and having its outer end in igniting relation to both the impelling charge and said body of flare producing material, a percussion cap supported in position to ignite said fuse, and a firing pin arranged in operative relation to the percussion cap.

2. A pyrotechnic signal comprising a container, an aerial projectile and its impelling charge sustained within said container, a percussion cap supported in position to ignite said charge, and a firing pin arranged in operative relation to the percussion cap and protruding from the container, the protruding end of the pin being sharpened for the purpose specified.

3. A pyrotechnic signal comprising a container, an aerial projectile and its impelling charge sustained within said container, a percussion cap supported in position to ignite said charge, a firing pin arranged in

operative relation to the percussion cap and protruding from the container, the protruding end of the pin being sharpened for the purpose specified, and a protecting cap applied to the container and enclosing the protruding end of the pin.

4. A pyrotechnic signal comprising a container, a quantity of flare producing material therein, an aerial projectile and its impelling charge sustained within said container above the flare producing material, a fuse common to the charge and said material and from which both are adapted to be ignited substantially simultaneously, a percussion cap supported in position to ignite said fuse, and a firing pin arranged in operative relation to the percussion cap.

5. A pyrotechnic signal comprising a container, a quantity of flare producing material therein, an aerial projectile and its impelling charge sustained within said container above said quantity of material, a percussion cap, a fuse for communicating ignition therefrom to the material and said charge, and a firing pin arranged in operative relation to the percussion cap.

6. A pyrotechnic signal comprising a stock, a barrel applied to and extending from the stock, the stock having a bore, a tube extending from the bore of the stock a material distance into the barrel, a quantity of flare producing material within the barrel and surrounding said tube, a fuse occupying the tube, a percussion cap supported within the bore of the stock in igniting relation to the fuse, and a firing pin slidable within the bore of the stock.

7. A pyrotechnic signal comprising a stock, a barrel applied to and extending from the stock, the stock having a bore, a tube extending from the bore of the stock a material distance into the barrel, a quantity of flare producing material within the barrel and surrounding said tube, a fuse occupying the tube, a percussion cap supported within the bore of the stock in igniting relation to the fuse, a firing pin slidable within the bore of the stock and protruding therefrom, and means tending to hold the firing pin against movement longitudinally of the stock and which is adapted to be rendered ineffective by the striking of the protruding end of the pin forcibly against an object.

8. A pyrotechnic signal comprising a stock, a barrel applied to and extending from the stock, the stock having a bore, a tube extending from the bore of the stock a material distance into the barrel, a quantity of flare producing material within the barrel and surrounding said tube, a fuse occupying the tube, a percussion cap supported within the bore of the stock in igniting relation to the fuse, a firing pin slidable within the bore of the stock and protruding

therefrom, the protruding end of the pin being sharpened, and a protecting cap applied to the end of the stock and concealing the protruding portion of the pin.

9. A pyrotechnic signal comprising a stock, a barrel applied to and extending from the stock, the stock having a bore, a tube extending from the bore of the stock a material distance into the barrel, a quantity of flare producing material within the barrel and surrounding said tube, a fuse occupying the tube, a percussion cap supported within the bore of the stock in igniting relation to the fuse, a firing pin slidable within the bore of the stock and protruding therefrom, the protruding end of the pin being sharpened, a breakable peg extending through holes in the stock and firing pin and tending to hold said pin against movement longitudinally of the stock, and a protecting cap applied to the end of the stock, said cap concealing the protruding portion of the pin and serving to prevent dislodgement of the aforesaid peg from the hole in the stock.

10. A pyrotechnic signal comprising a stock, a barrel applied to and extending from the stock, the stock having a bore, a tube extending from the bore of the stock, a material distance into the barrel, a quantity of flare producing material within the barrel and surrounding said tube, a fuse occupying the tube, a percussion cap supported within the bore of the stock in igniting relation to the fuse, a firing pin slidable within the bore of the stock and protruding therefrom, and a member removably supported within and closing the end of the barrel remote from the stock.

11. A pyrotechnic signal comprising a stock having a bore, a barrel applied to and extending from the stock and into which the bore of the stock opens, a tube extending from the bore of the stock a distance into the barrel, a quantity of flare producing material within the barrel and about said tube, a member disposed over said quantity of material and the adjacent end of the tube, a fuse extending through said tube, means for supporting a percussion cap in igniting relation to the inner end of the fuse, a firing pin sustained within the bore of the stock in operative relation to the percussion cap and protruding beyond the end of the stock remote from the barrel, an aerial projectile within the barrel beyond the aforesaid member, and an impelling charge interposed between the projectile and said member.

12. A pyrotechnic signal comprising a stock having a bore, a barrel applied to and extending from the stock and into which the bore of the stock opens, a tube extending from the bore of the stock a distance into the barrel, a quantity of flare producing material within the barrel and about said

tube, a member disposed over said quantity of material and the adjacent end of the tube, a fuse extending through said tube, means for supporting a percussion cap in igniting relation to the inner end of the fuse, a firing pin sustained within the bore of the stock in operative relation to the percussion cap and protruding beyond the end of the stock remote from the barrel, an aerial projectile within the barrel beyond the aforesaid member, an impelling charge interposed between the projectile and said member, and a plug frictionally held within the outer end of the barrel beyond the projectile.

13. A pyrotechnic signal comprising a stock having a bore, a barrel applied to and extending from the stock and into which the bore of the stock opens, a tube extending from the bore of the stock a distance into the barrel, a quantity of flare producing material within the barrel and about said tube, a member disposed over said quantity of material and the adjacent end of the tube, a fuse extending through said tube, means for supporting a percussion cap in igniting relation to the inner end of the fuse, a firing pin sustained within the bore of the stock in operative relation to the percussion cap, an aerial detonator within the barrel outwardly beyond the aforesaid member, an impelling charge interposed between said detonator and said member, and means through which the fire of the impelling charge is communicated to the explosive contents of the detonator.

14. A pyrotechnic signal comprising a stock having a bore, a barrel applied to and extending from said stock and into which the bore of the stock opens, a thimble fitted within the bore of the stock adjacent the barrel and containing a chamber for a percussion cap, a signal element within the barrel which is rendered effective by ignition through a setting off of the percussion cap, and a firing pin sustained within the bore of the stock in operative relation to the percussion cap.

15. A pyrotechnic signal comprising a stock having a bore, a barrel applied to and extending from said stock and into which the bore of the stock opens, a thimble fitted within the bore of the stock adjacent the barrel and containing a chamber for a percussion cap, a signal element within the barrel which is rendered effective by ignition through a setting off of the percussion cap, a firing pin sustained within the bore of the stock in operative relation to said cap, the bore of the stock and the firing pin being one cylindrical and the other polygonal thereby to produce voids about the firing pin through which gas generated by the setting off of the percussion cap is adapted to escape.

16. A pyrotechnic signal comprising a stock having a bore, a barrel applied to and extending from said stock and into which the bore of the stock opens, a thimble fitted within the bore of the stock adjacent the barrel and containing a chamber for a percussion cap, a signal element within the barrel which is rendered effective by ignition through a setting off of the percussion cap, a firing pin sustained within the bore of the stock in operative relation to said cap, the bore of the stock and the firing pin being one cylindrical and the other polygonal thereby to produce voids about the firing pin through which gas generated by the setting off of the percussion cap is adapted to escape, the thimble having ports through which communication is established between the cap receiving chamber thereof and the portion of the bore of the stock occupied by the firing pin.

17. In combination, a casing having a movable section, a pyrotechnic signal supported within the casing, mechanism within the casing for setting off the signal, and operative connections between said movable section and said mechanism, whereby said mechanism is rendered effective by movement of said section.

18. In combination, a casing having a movable section, a pyrotechnic signal supported within the casing and involving a firing pin, mechanism within the casing for striking said firing pin, a latch for holding said mechanism in ineffective condition, and operative connections between the movable member of the casing and said latch for releasing the same when said member is moved to open the casing.

19. In combination, a casing comprising a stationary section that is adapted to be attached to a support, a swinging section hingedly connected to the stationary section, a pyrotechnic signal sustained within the casing and involving a firing pin, a hammer movably supported within the casing in operative relation to the firing pin, a spring tending to project the hammer into contact with said pin, a latch for holding the hammer retracted, and operative connections between the swinging section of the casing and said latch whereby the latch is withdrawn from effective condition and the hammer released when the swinging member is swung in a direction away from the stationary member.

20. In combination, a casing open at top and front, means for attaching said casing to a support, a loop adjacent the top of the casing and a spring clamp spaced a suitable distance below said loop and by means of which loop and clamp a pyrotechnic signal is adapted to be supported, said signal involving a firing pin, a rod supported within the casing, a hammer slidable upon the rod

in operative relation to the firing pin, a spring surrounding the rod and tending to impel the hammer toward said pin, a latch for holding the hammer retracted, a closure 5 for the open front and top of the casing and hingedly connected at its lower end to the corresponding end of the casing, and a member carried by the closure for engagement with the latch and by means of which the latch is disengaged from the hammer when 10 the closure is swung to open position.

In testimony whereof, I hereunto affix my signature.

HARRY C. GAMMETER.