J. MOYES & C. A. STEVENSON.

SIGNALING APPARATUS.

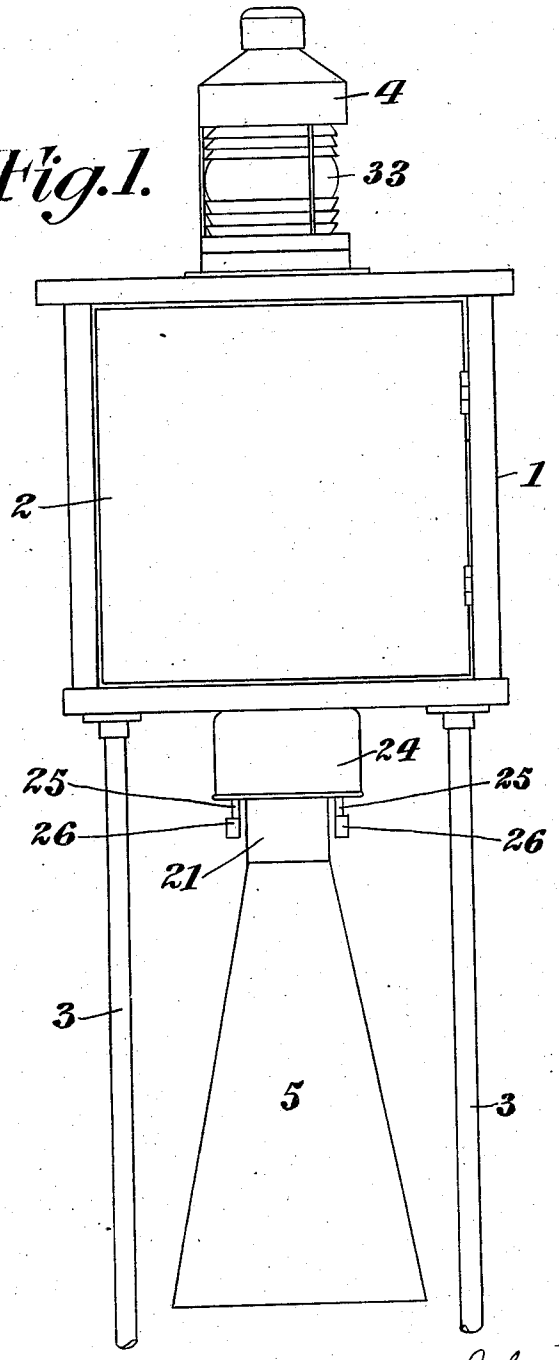
APPLICATION FILED NOV. 19, 1910.

1,028,591.

Patented June 4, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
P. F. Nagle.
L. Darville.

Inventors.
John Moyes
Charles Alexander Stevenson.
By Wiedersheim & Fairbanks.
Attorneys.

J. MOYES & C. A. STEVENSON.

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4 SHEETS—SHEET 2.

Fig. 2.

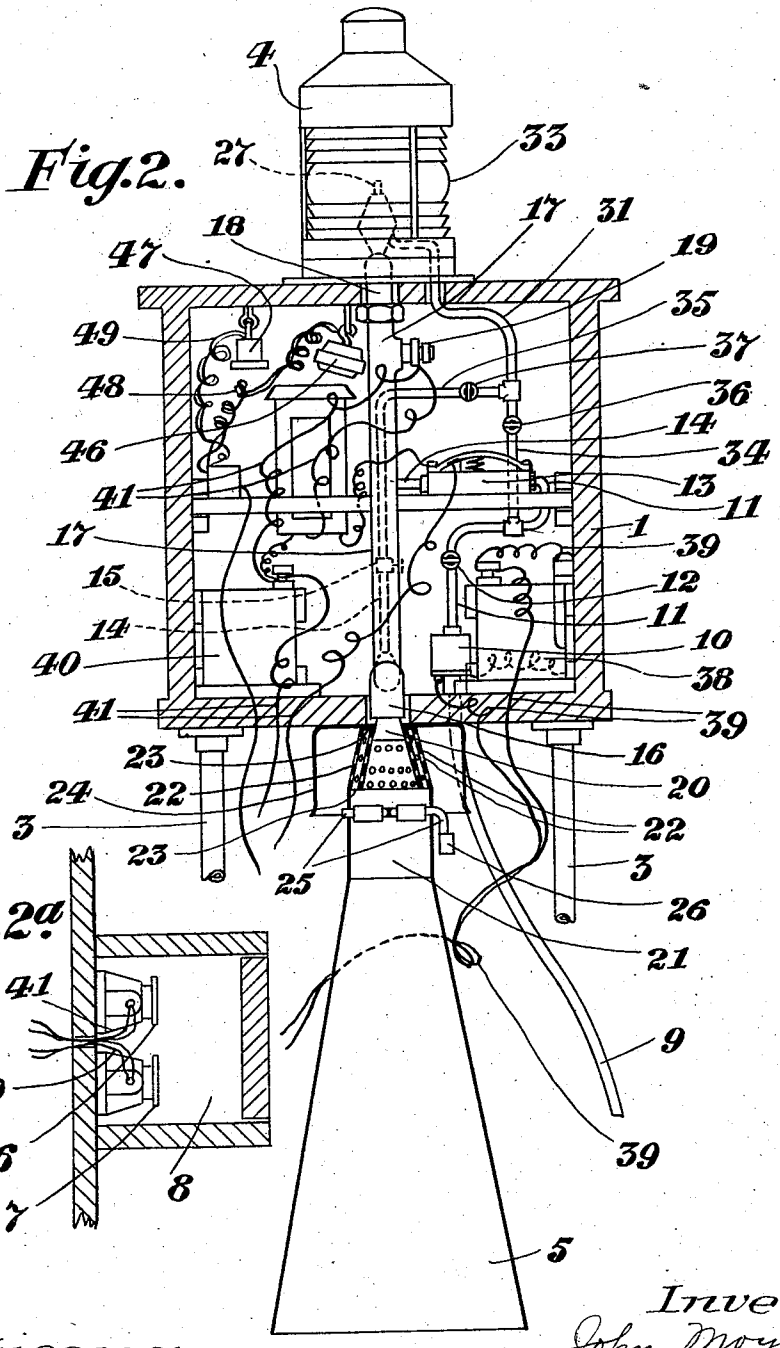

Fig. 2a.

Witnesses:
P. F. Nagle.
L. Manville

Inventors.
John Moyes.
Charles Alexander Stevenson.
By Wiedersheim & Fairbanks.
Attorneys.

J. MOYES & C. A. STEVENSON.

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4 SHEETS—SHEET 3.

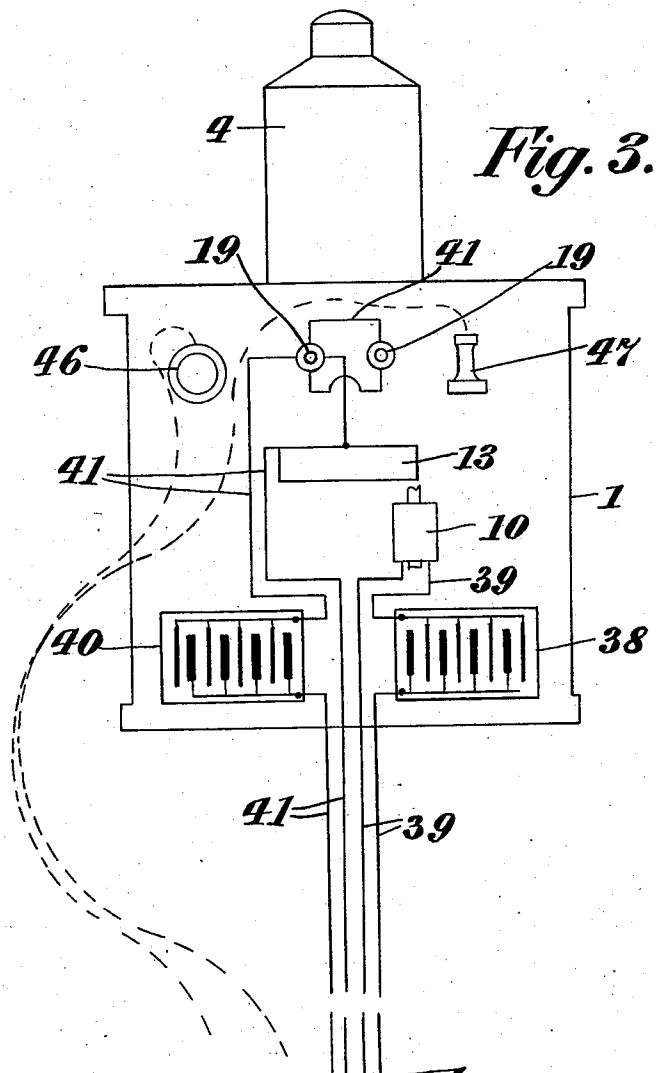

Fig. 3.

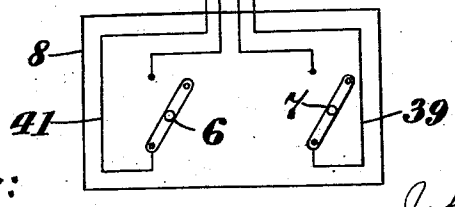

Fig. 3a.

Witnesses:
P. F. Nagle.
L. Donville.

By

Inventors:
John Moyes.
Charles Alexander Stevenson.
Wiedersheim & Fairbanks,
Attorneys.

J. MOYES & C. A. STEVENSON.

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4 SHEETS—SHEET 4.

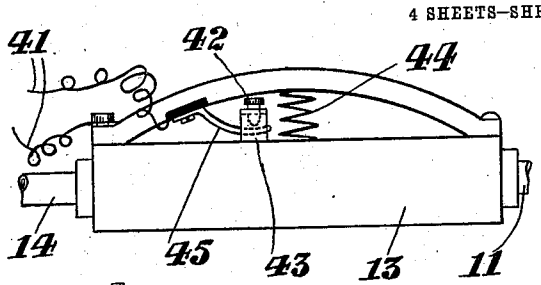

Fig. 6.

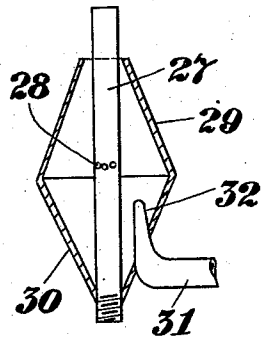

Fig. 5.

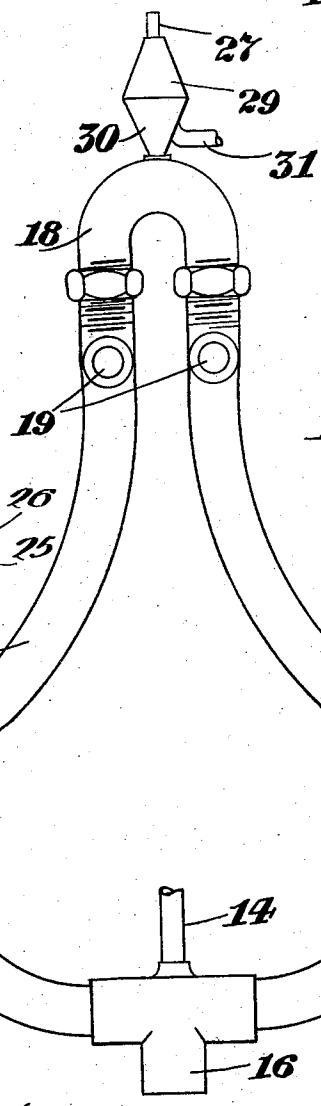

Fig. 4.

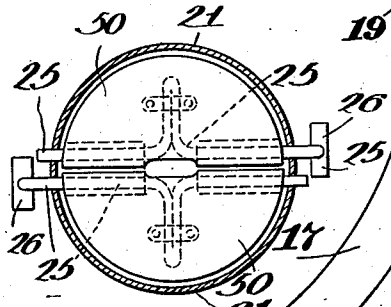

Fig. 7.

Witnesses:
P. F. Nagle.
L. Louville.

Inventors.
John Moyes.
Charles Alexander Stevenson.
By Wiedersheim & Fairbanks.
Attorneys.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN MOYES, OF GLASGOW, AND CHARLES ALEXANDER STEVENSON, OF EDINBURGH, SCOTLAND.

SIGNALING APPARATUS.

1,028,591. Specification of Letters Patent. Patented June 4, 1912.

Application filed November 19, 1910. Serial No. 593,182.

To all whom it may concern:

Be it known that we, JOHN MOYES, residing at Glasgow, Scotland, and CHARLES ALEXANDER STEVENSON, residing at Edinburgh, Scotland, both subjects of the King of Great Britain, have invented certain new and useful Improvements in and Relating to Signaling Apparatus, of which the following is a specification.

This invention relates to signaling apparatus for marine, railway, and other signaling, of the type wherein the signal is produced either by the detonations caused by intermittent explosions of gas or by striking a bell, gong, or the like, the striker being actuated by the force of the intermittent explosions. In such signaling apparatus, as heretofore constructed, it is usual to fire the gases by means of a jet of gas or a highly heated body near a touch hole, while the gas, which is passed through a gas-pressure regulator, is delivered intermittently to the explosion chamber by the action of a pulsating apparatus having a pulsating diaphragm. In connection with such signaling apparatus, in which the gas is supplied to the explosion chamber by means of a pump it has been heretofore proposed to provide, for igniting the gas automatically, clockwork mechanism adapted to automatically control an electric ignition device.

Under our invention the ignition of the gases in the explosion chamber of the apparatus is effected by means of one or more electric sparking devices, the action of which is controlled automatically from the pulsating apparatus so that the mechanism which regulates the supply of gas periodically to the explosion chamber also regulates the explosions. The supply of gas to the pulsating apparatus may also, if desired, be controlled electrically and the explosion chamber may, if desired, have fitted, in connection therewith, means for producing luminous as well as audible signals.

In order that our invention may be clearly understood, we have hereunto appended explanatory drawings which show, by way of illustration or example, one method of constructing and arranging the apparatus.

On the said drawings:—Figure 1 is an outside view of the signaling apparatus. Fig. 2 is a similar view but with the containing case 1 and part of the apparatus in section. Fig. 2^a is a section of the switch box 8. Fig. 3 is a diagrammatic view corresponding to Fig. 2. Fig. 3^a is a diagrammatic view corresponding to Fig. 2^a. Fig. 4 is a view of the explosion device with its sparking plugs 19. Fig. 5 is a section of the burner or flash nozzle. Fig. 6 is a view of the pulsating apparatus 13, showing the electrical connections thereon. Fig. 7 is a section through the cylindrical portion above the megaphone. Figs. 4 to 7 are drawn to a larger scale than the preceding figures.

Referring to the drawings, the apparatus shown, which is adapted for railway, marine or other like signaling, is inclosed within a case or box 1 having a hinged door or front 2 and mounted on four uprights or legs 3, and, mounted on the top of this case or box 1, is a flash lamp 4, while, depending therefrom, is a sound horn or megaphone 5. The hand switches 6, 7, by means of which the operation of the apparatus is controlled, are inclosed within a box or casing 8 (see Figs. 2^a and 3^a) which may be located at a distance from the apparatus.

The gas pipe 9, (see Fig. 2) which is led into the case 1, is supplied with acetylene, or other suitable gas from a cylinder, buoy or other suitable gas holder (not shown) through a gas-pressure regulator of any suitable or well known form. Within the case 1 the gas pipe 9 is led to a valve or cock 10 which is operated so as to control the gas supply by means of an electric current in the well known manner, an electromagnet, within the valve casing, being excited by means of a current controlled by the switch 7 in such manner that the gas supply can be controlled from the switch box 8. From the valve 10 a pipe 11, provided with a hand cock 12, is led to an automatically acting pulsating apparatus 13 for the periodic supply of gas. The gas supplied by the pipe 11 to the apparatus 13 is collected in the apparatus until a predetermined volume is reached and the apparatus 13 then automatically closes the supply thereto and discharges therefrom, in the known manner, the gas collected, the apparatus 13 thus alternately receiving and discharging gas in measured quantities auto-

matically. From the apparatus 13 the gas discharged is led, by means of a pipe 14, provided with a hand cock 15, and leading to a hollow T-piece 16, whose vertical portion leads to the sound box and megaphone or horn 5 while the horizontal portion thereof leads into a pair of tubular extensions or pipes 17, 17, which are extended upward and are connected together at their upper ends by means of an inverted U piece 18 (see Fig. 4) which extends through the top of the case 1, while the vertical portion of the T piece 16 depends through an opening in the bottom of the case 1 and the horizontal portion of said T piece rests on the said case bottom. In each of said tubular extensions 17, near the top thereof, is fitted a sparking plug 19 by means of which the gas supplied by the pipe 14 may be ignited, the ignition taking place automatically, as will be hereinafter described. The vertical portion of the T piece 16 is screw-threaded internally for the reception of a hollow plug piece 20 by means of which the megaphone 5 is suspended, the conical megaphone 5 being made with a parallel or cylindrical portion 21 having projecting from its upper end a double-walled frustum of a hollow cone, the outer and inner walls 22, 22, (Fig. 2) being connected together at their top and bottom by means of annular plates or pieces 23, and each wall, or cone, having a series of holes therein and the holes in the one wall being arranged in staggered relation to the holes in the other wall. Fitted over the said double cone 22, 22, is a hood 24 of cylindrical form and having an uppper end or rim which is gripped between the cones 22 and the bottom of the box 1. Mounted in the cylindrical portion 21 is a pair of rods 25, each of which is loosely fitted in a pair of holes or bearings in the cylinder 21 and has one of its ends turned down at right angles and provided with a weight 26 at the outside of the cylinder, and fitted on each rod 25 within the cylinder 21 is a semi-circular plate 50 which normally projects out horizontally from the rod. The pair of semi-circular plates are adapted to completely close up the cylinder 21 and prevent any up-draft of air from the megaphone and such is the arrangement, that, on an explosion taking place, the semi-circular plates 50 are opened or turned downward, by the action of the exploded gases, against the action of the weights 26, the valve automatically closing again, after the explosion, by the action of the weights. When the semi-circular plates are shut, the air necessary for combustion is supplied to the explosion chamber 17 through the holes in the double-walled cone 22.

The inverted U piece 18 on the tubular extensions 17 is fitted, outside of the case 1, with a burner or flash nozzzle (see Fig. 5) constituted by a central tube 27 having an open upper end and made near its center with a series of small openings 28, and surrounding this tube 27 is a casing consisting of an upper cone 29 and a lower inverted cone 30, the apex of the latter cone having the tube 27 secured therein and the apex of the upper cone 29 having an annular space between it and the tube 27. Leading into this casing 29, 30, is a gas pipe 31 having a restricted mouth 32 located slightly below the level of the aforesaid openings 28 in the tube 27, the arrangement being such that pure gas, supplied by the pipe 31, is ignited above the casing 29, 30, by means of the flame from the explosions which travels through the U piece 18 and pipe 27. Fitted around the burner or flash nozzle is the lamp 4 which is, preferably, provided with the usual cylindrical glass 33 so as to show the flash all around. The gas for the flash light is supplied to the pipe 31 by means of the branch pipe 34 from the pipe 11, or by means of the branch pipe 35 from the pipe 14, these branch pipes 34, 35, being provided with hand cocks, 36, 37, so that the gas supplied for the flash lamp may come direct, without interruption, from the supply, or may be delivered intermittently from the apparatus 13.

For electrically operating the gas supply and cut-off valve 10 the case 1 has fitted therein a storage cell 38 connected up, by means of the leads 39, to the hand switch 7 in the box 8, and for the sparking plugs 19, 19, the case 1 is provided with a storage cell 40 connected up, by means of the leads 41 with the apparatus 13 and the hand switch 6 in the box 8, the contacts on the apparatus 13 being so arranged that as long as the switch 6 is closed the circuit is completed momentarily and automatically each time the apparatus 13 completes its discharging operation, that is to say, ignition takes place, as soon as a new charge of gas has been supplied to the explosion chambers. The contacts on the apparatus 13 consist of a set screw 42 (Fig. 6) which is screwed into a bridge piece 43 mounted on the pulsating diaphragm of the apparatus and in electrical connection with the body of the apparatus by means of the spring 44 and this screw 42 is adapted, when in its lowest position, to make contact with the piece 45 insulated from the body of the apparatus, thus closing the circuit as required. The case 1 is, or may be, also provided with a telephone transmitter 46 which is connected up by means of the leads 48 with a receiver located in a signal cabin, or station, or elsewhere, and, by means of which, the signalman can readily ascertain by hearing the detonations whether the apparatus is properly working or not. The transmitter 46 is so hung in the case 1 that it lies against

the walls of the explosion chambers thereby facilitating the transmission of the sound caused by the explosions. The case 1 is, or may also be provided with a telephone receiver 47 connected up by means of the leads 49 with a transmitter in the said signal cabin, or station, or elsewhere, and by means of which a repairer or inspector, at the apparatus, can be placed in communication with the signalman.

In operation, on the switch 6 having been closed and on the switch 7 having been closed momentarily in such manner as to open the supply valve 10, gas is supplied, through the pipes 9 and 11, to the apparatus 13 which receives and stores the gas until a predetermined volume has been reached whereupon the gas admission to the apparatus 13 is automatically closed and the gas therein discharged through the pipe 14 and T piece 16 to the explosion chambers 17, 17. On the completion of this discharge from the apparatus 13 the ignition circuit is automatically completed by means of the contacts 42 and 45 and the explosions take place in the extensions 17, the exploded gases escaping through the valve in the cylindrical portion 21 of the sound box, and through the megaphone 5, to the atmosphere, and part of the flame from the explosions passing up the tube 27 and igniting through the holes 28 the gas supplied to the cones 29, 30, by means of the pipes 31 and 34 or by means of the pipes 31 and 35. Atmospheric air for combustion in the explosion chambers is supplied thereto through the holes in the double cone 22, 22. This cycle of operations is automatically repeated, as long as gas is supplied through the valve 10 or until the apparatus is stopped by means of the switches 6, 7, which are operated in such manner as to break the ignition circuit and close the gas valve 10.

Having now fully described our invention what we claim and desire to secure by Letters Patent is:—

1. A signaling apparatus, comprising, in combination a sound intensifier, an explosion chamber communicating with said sound intensifier, a pulsating apparatus for automatically supplying gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, and means operated from the said pulsating periodic gas supply apparatus for controlling said sparking device.

2. A signaling apparatus, comprising, in combination a sound intensifier, an explosion chamber communicating with said sound intensifier, a pulsating apparatus for automatically supplying gas periodically to the explosion chamber, an electric sparking device for effecting the explosion in the explosion chamber, and means operated from the said pulsating periodic gas supply apparatus for automatically making and breaking the circuit of the sparking device.

3. A signaling apparatus comprising, in combination a sound intensifier, an explosion chamber communicating with said sound intensifier, a pulsating apparatus for automatically supplying gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, and contacts on and operated from the said pulsating periodic gas supply apparatus for automatically making and breaking the circuit of the sparking device.

4. A signaling apparatus comprising, in combination, a sound intensifier, an explosion chamber communicating with said sound intensifier, a pulsating gas supply apparatus for automatically controlling the supply of gas periodically to the explosion chamber, means for controlling electrically the supply of gas to said pulsating periodic gas supply apparatus, an electric sparking device for effecting the explosions in the explosion chamber and means operated from the pulsating periodic gas supply apparatus for controlling said sparking device.

5. A signaling apparatus comprising, in combination a sound intensifier, a plurality of explosion chambers communicating with the sound intensifier, a pulsating periodic gas supply apparatus for automatically supplying gas to the explosion chambers, electric sparking devices for effecting the explosions in the explosion chambers, and means operated from the pulsating periodic gas supply apparatus for controlling said sparking devices.

6. A signaling apparatus comprising, in combination a sound intensifier, two tubular explosion chambers communicating with the said sound intensifier, a pulsating periodic gas supply apparatus for automatically regulating the supply of gas to the explosion chambers, electric sparking devices for effecting the explosions in the explosion chambers and means operated from the pulsating periodic gas supply apparatus for controlling said sparking devices.

7. A signaling apparatus comprising, in combination, explosion chambers consisting of two bent tubes connected together at their upper and lower ends, a periodic gas supply apparatus for automatically regulating the supply of gas to the explosion chambers, electric sparking devices for effecting the explosions in the explosion chambers and means operated from the periodic gas supply apparatus for controlling said sparking devices.

8. A signaling apparatus comprising, in combination a sound intensifier, a plurality of explosion chambers communicating with the said sound intensifier, a pulsating peri-

odic gas supply apparatus for automatically supplying gas to the explosion chambers, electric sparking devices for effecting the explosions in the explosion chambers, means operated from the pulsating periodic gas supply apparatus for controlling said sparking devices and a valve operated electrically for controlling the supply of gas to the pulsating periodic gas supply apparatus.

9. A signaling apparatus comprising, in combination, an explosion chamber, a periodic gas supply apparatus for automatically regulating the supply of gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, means operated from the periodic gas supply apparatus for controlling said sparking device and means for producing a luminous signal at each explosion in the explosion chamber.

10. A signaling apparatus, comprising, in combination, an explosion chamber, a periodic gas supply apparatus for automatically regulating the supply of gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, means operated from the periodic gas supply apparatus for controlling said sparking device and means whereby either a luminous signal can be given at each explosion or a continuous light can be shown.

11. A signaling apparatus, comprising, in combination, an explosion chamber, a periodic gas supply apparatus for automatically regulating the supply of gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, means operated from the periodic gas supply apparatus for controlling said sparking device, a tubular flash nozzle on the explosion chamber provided with a series of openings near its center, and a casing consisting of an upper frustum of a cone and a lower inverted cone secured on the tubular nozzle.

12. A signaling apparatus comprising, in combination, explosion chambers consisting of two bent tubes connected together at their upper ends by means of an inverted U piece, a periodic gas supply apparatus for automatically regulating the supply of gas to the explosion chambers, an electric sparking device in each chamber for effecting the explosions, means for producing a luminous signal at each explosion consisting of a tubular flash nozzle mounted on the top of the said inverted U piece and provided with a series of openings near its center, a casing surrounding said flash nozzle consisting of an upper frustum of a cone and a lower inverted cone and a pipe extending into the said casings for automatically and periodically supplying gas from the periodic gas supply apparatus.

13. A signaling apparatus comprising, in combination, explosion chambers, a periodic gas supply apparatus for automatically regulating the supply of gas to the explosion chambers, an electric sparking device in each chamber for effecting the explosions, and means whereby either a luminous signal can be given at each explosion or a continuous light can be shown, said means consisting of a main gas pipe which leads to the periodic gas supply apparatus, a valve on said gas pipe, means for electrically operating said valve, a gas pipe provided with a hand cock which supplies gas from the periodic gas supply apparatus to the explosion chambers, a branch gas pipe which leads from said gas pipe and provided with a hand cock, a hollow junction piece into which the said branch gas pipe leads, a second branch pipe which leads from the main gas pipe direct to the said hollow junction piece and provided with a hand cock, a pipe leading from the said hollow junction piece, a tubular flash nozzle, provided with a series of openings near its center, and arranged in connection with the said explosion chambers, and a casing surrounding said flash nozzle and into which the last mentioned pipe leads.

14. A signaling apparatus, comprising, in combination, an explosion chamber, a pulsating periodic gas supply apparatus for automatically supplying gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, means operated from the pulsating periodic gas supply apparatus for controlling said sparking device and a megaphone for directing and intensifying the sound of the explosions.

15. A signaling apparatus comprising, in combination, explosion chambers connected together at their upper ends, a sparking device in each chamber, means for operating the sparking devices, a periodic gas supply apparatus, a tubular flash nozzle at the top of said chamber, a casing surrounding said flash nozzle, a hollow T-piece by means of which the lower ends of the said chambers are connected together, a pipe by means of which gas is supplied to the T-piece from the periodic gas supply apparatus, a hollow plug piece screwed into the vertical portion of the said T-piece and a megaphone depending from said hollow plug.

16. A signaling apparatus, comprising, in combination, an explosion chamber, a periodic gas supply apparatus for automatically regulating the supply of gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, means operated from the periodic gas supply apparatus for controlling said sparking device, a megaphone for directing and intensifying the

sound of the explosions, a perforated double walled frustum of a hollow cone at the upper end of the said megaphone through which the air necessary for combustion in the explosion chamber is supplied.

17. A signaling apparatus, comprising, in combination, an explosion chamber, an apparatus for automatically regulating the supply of gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, means operated from the periodic gas supply apparatus for controlling said sparking device, a megaphone for directing and intensifying the sound of the explosion, a perforated double walled frustum of a hollow cone at the upper end of the said megaphone through which the air necessary for combustion in the explosion chamber is supplied, and an automatic valve fitted in the megaphone and below the hollow cone, adapted to allow the exploded gas to rush out and to prevent any updraft of air.

18. A signaling apparatus, comprising, in combination, an explosion chamber, an apparatus for automatically regulating the supply of gas periodically to the explosion chamber, an electric sparking device for effecting the explosions in the explosion chamber, means operated from the periodic gas supply apparatus for controlling said sparking device, a megaphone for directing and intensifying the sound of the explosions, a perforated double walled frustum of a hollow cone at the upper end of the said megaphone through which the air necessary for combustion in the explosion chamber is supplied and an automatic valve fitted in the megaphone and below the hollow cone, consisting of a pair of rods, one end of each rod being turned down at right angles outside the megaphone and provided with a weight, two semi-circular plates mounted on said rods and adapted to project out horizontally and completely close the megaphone.

19. A signaling apparatus, comprising, in combination, a case, an explosion chamber within said case, a periodic gas supply apparatus within said case for automatically regulating the supply of gas to the explosion chamber, an electric sparking device in the explosion chamber for effecting the explosions, means operated from said periodic gas supply apparatus for controlling said sparking device, a valve within said case operated electrically for controlling the supply of gas to the periodic gas supply apparatus, a flash lamp mounted on the top of said case and intermittently supplied with gas from said periodic gas supply apparatus and a megaphone depending from the bottom of said case and connected with the explosion chamber.

20. A signaling apparatus comprising, in combination, a rectangular case having a hinged door and mounted on uprights, explosion chambers within said case, a tubular flash nozzle extending outside said case and connected with the explosion chambers, a casing consisting of an upper cone and a lower inverted cone surrounding said tubular flash nozzle, a globe around said casing and mounted on the top of said case, a periodic gas supply apparatus within said case for automatically regulating the supply of gas to the explosion chambers, an electric sparking device in each explosion chamber for effecting the explosions, an electric battery in said case, contacts on and operated from the periodic gas supply apparatus for automatically making and breaking the circuit of the said sparking devices, a valve for controlling the supply of gas to the periodic gas supply apparatus, a storage cell connected therewith, a switch for operating said valve, means in communication with said flash nozzle whereby either a luminous signal can be given at each explosion or a continuous light can be shown, a megaphone depending from and communicating with the said explosion chambers, an automatic valve fitted in the megaphone and a perforated double walled frustum of a hollow cone at the upper end of the said megaphone.

In testimony whereof we affix our signatures in presence of two witnesses.

JOHN MOYES.
CHARLES ALEXANDER STEVENSON.

Witnesses:
DAVID SCRIMGEARS.
JAMES WHITELAW.