

(No Model.)

2 Sheets—Sheet 1.

H. McL. ABERNETHY.

AUTOMATIC SEMAPHORE SIGNAL FOR RAILWAYS.

No. 561,931.

Patented June 9, 1896.

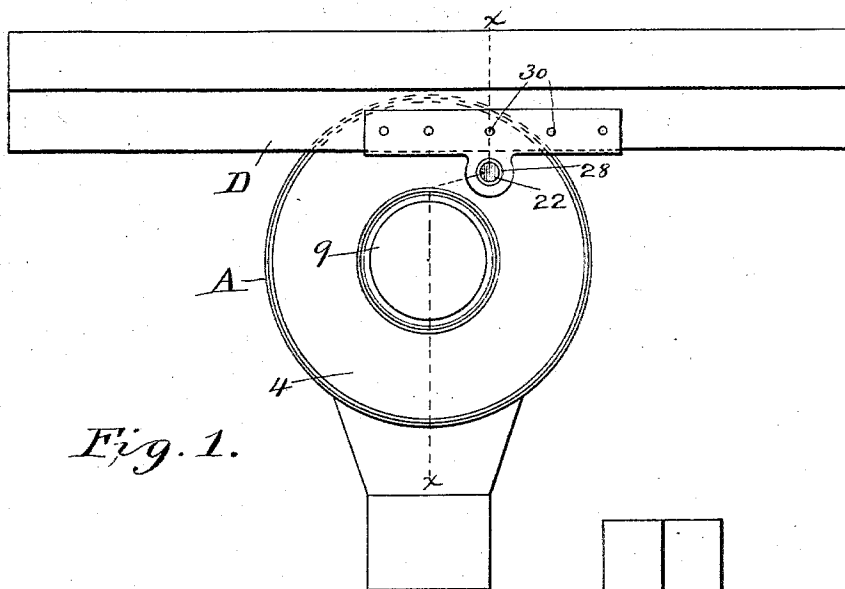
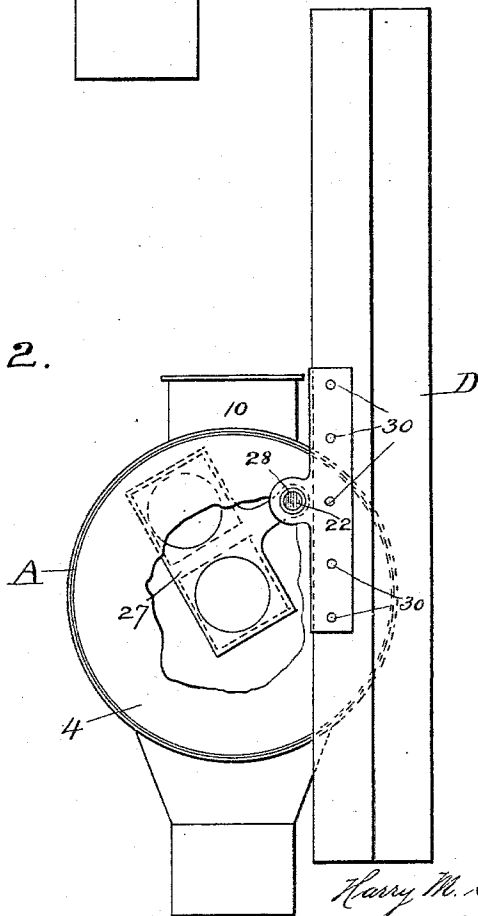


Fig. 1.

Fig. 2.



Witnesses:

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Inventor.

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Fig. 3.

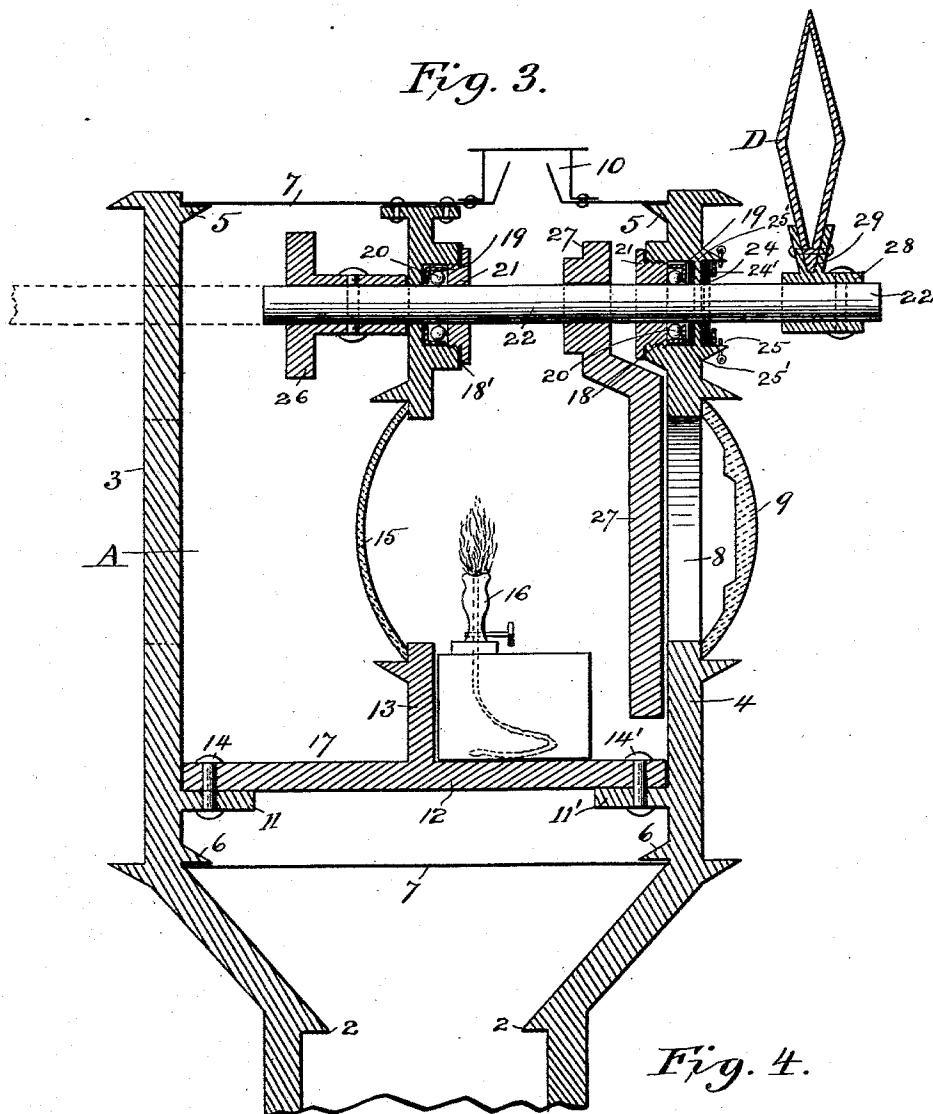
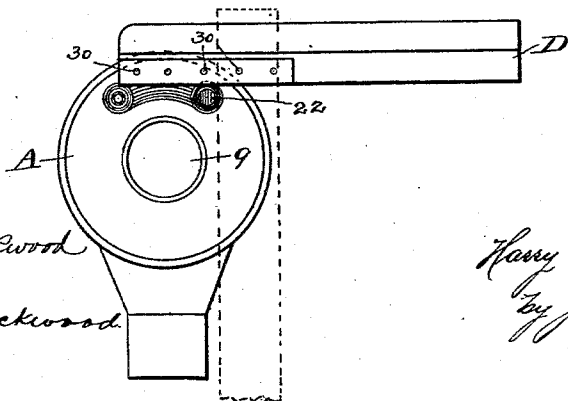


Fig. 4.



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UNITED STATES PATENT OFFICE.

HARRY MCLEAN ABERNETHY, OF BEAVER FALLS, PENNSYLVANIA, AS-
SIGNOR OF ONE-HALF TO H. H. FULTON, OF SAME PLACE.

AUTOMATIC SEMAPHORE-SIGNAL FOR RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 561,931, dated June 9, 1896.

Application filed May 9, 1895. Serial No. 548,633. (No model.)

To all whom it may concern:

Be it known that I, HARRY MCLEAN ABERNETHY, a citizen of the United States, residing at Beaver Falls, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Automatic Semaphore-Signals for Railways; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates to improvements in automatic semaphore signaling apparatus for railways.

The primary object of my invention is to provide improved means for sustaining, controlling, and operating the semaphore and the lens-signal and at the same time reduce the liability of the freezing up of the semaphore to a minimum.

A further object is to provide simplified, durable, economical, and novel constructions of elements in the apparatus, as hereinafter specified.

Another object is to prevent the access of moisture or dust to the operating parts of the semaphore or lens signaling devices by certain improved and novel means.

The above-named objects, and such others as may occur from the ensuing description, are accomplished by the improvements illustrated in the accompanying drawings, in which—

Figure 1 is a front view in elevation of the signal-box or casing with the "bull's-eye" lens mounted therein and showing the semaphore resting in horizontal or "danger" position. Fig. 2 is a similar view showing the semaphore in "safety" or vertical position and illustrating the face of the signal-box or casing partly broken away to show the position of the lens-signal frame in the interior of the signal-box when the same is at "safety." Fig. 3 is a section taken on the line xx of Fig. 1, and Fig. 4 is a front view of a signal-box carrying a modified construction of semaphore.

A designates the signal-box or casing, made

of any suitable construction, to contain the elements requisite to make the apparatus operative and reliable. The preferred construction shown in the drawings consists of a substantial casting or other suitable material, comprising a hollow base part having interior flanges or shoulders 2, which rest upon the top of the signal-pole and sustain the casing thereon, the walls of the hollow base being additionally secured to the signal-pole by any suitable fastening means, such as screw-bolts, &c. Above the part which fits over the signal-pole the base flares and widens, substantially as shown, and from the sides of the base, rising integral therewith, are two plates or disks 3 4, constituting the ends of the signal-box or casing and formed with interior flanges 5 6, over which a sheet-metal casing 7 is fitted and to which it is suitably secured, substantially as shown in the drawings. In the disk or plate 4 is a circular opening 8, in which is fitted a bull's-eye lens 9, through which the night-signals are published and indicated. To the top of the casing is connected a suitable flue or chimney 10, affording draft for the lamp and escape for the fumes and smoke when the said lamp is utilized for displaying the night-signals.

While I have illustrated the contour of the casing or signal-box as cylindrical, other shapes may be given to it, if desired, the object being to provide a casing so constructed that the objects of my invention will be accomplished, it being, however, essential that the construction of the casing, whether round or square, shall be adapted to contain and sustain the inclosed mechanism.

On the inner faces of the lower portion of the end disks or plates 3 4 are formed lateral flanges 11 11', on which is seated and secured a bottom or base plate 12, from about the central portion of which is vertically projected a plate or disk 13 and integral therewith or attached thereto and secured against displacement by means of bolts 14 14', projected through flanges on the disks or plates and extending through the covering of the casing, as shown in Fig. 3 of the drawings. In the center of the plate 13 is an opening in which is fitted a deflector 15 to throw the rays of the lamp through the bull's-eye lens at the front.

It will be observed that the reflector may

be dispensed with and a bull's-eye lens inserted in an opening in the disk 3, so that the light may be seen from that direction, and a semaphore mounted and used at that side of the casing by extending the semaphore-shaft, as indicated in dotted lines of Fig. 3 of the drawings. The base-plate 12 serves as a support for the signal-lamp 16, and also at the part 17 as a seat for a motor to be utilized for operating the signals. In the disk or plate 4 and the disk or partition 13 are formed bearing boxes or seats 18 18', in which are disposed case-hardened steel shells or casings 19, in which are placed ball-bearings 20, held in the casings or shells by means of caps 21 closing the boxes and excluding all dust or foreign matter. Projected through the disks or plates 4 and 13 and having its bearings in the bearings 20 is the semaphore and signal shaft 22, the end of which projects a suitable distance from the casing in order to prevent the semaphore-blade from freezing to the face of the signal-box or casing, as at 23, and carries both the lens-frame and the semaphore. To provide means for excluding dust and other foreign substances from entering the shaft-opening, a packing-ring 24, constituting a dust and water proof washer, is fitted closely to the shaft and is made of felt and asbestos, and over the outer face of said washer is placed a second washer of steel, which does not come in contact or fit up close to the shaft, both washers being arranged in an annular seat 25 and suitably secured therein by any desirable means. A felt and asbestos packing-ring or washer 25' is fitted closely to the semaphore-shaft and located on the interior face of the box-seat in the disk or plate 4, said washer serving to exclude foreign substances and also as a cushion for the case-hardened shell. The retaining-caps or covers for the bearing-boxes may be screw-threaded, as indicated, to hold them in the boxes. On the inner end or portion of the shaft 22 is secured a gear or sprocket wheel 26, which is intended to have operative connection with a proper electrical motor, to be located in the signal-box or casing or at any convenient or proper place. The motor mentioned may be of any of those approved types adapted to be actuated by electricity and suited to actuate or impart motion to a shaft or wheel mounted thereon, either by giving a rotary reciprocating motion or complete revolution. This electrical mechanism is not illustrated or shown in the drawings, for the reason that any proper and efficient connection of the kind may be utilized for the purpose. On the shaft 22 is secured a lens-frame 27, the hub being fixed to the shaft by any suitable means, and the frame depending down into the casing and carrying either one or two lenses, indicating such signals as the colors thereof may be the purport of, the hub or central support of the lens-frame 27 and the relation of the frame thereto being such that when the semaphore stands

at "danger" the lens in the lens-frame is also in a position indicative of danger and will stand in front of the lamp to be published, and so that when the semaphore stands at "safety" the safety-lens of the frame will be properly designated and seen through the bull's-eye lens.

On the semaphore-shaft is mounted a sleeve 28, formed with a seat 29, projected vertically or radially thereupon and of such length as may be required to provide a certain and secure seat or support for the semaphore, as shown in Figs. 1 and 2 of the drawings.

D designates the semaphore, consisting of a sheet-metal shell formed, preferably, diamond-shaped in vertical cross-section, substantially as shown in Fig. 3 of the drawings. The lower edge portion of this diamond-shaped semaphore is seated in the V-shaped seat 29 and secured therein by bolts or rivets 30, projected through the parts, as indicated in the drawings. The semaphore instead of being of an angular or diamond-shaped conformation in cross-section may be of elliptical or of equivalent construction and may be thickened at or near the center or central portion of the same or at the point where the blade is secured to the V-shaped seat 29, in order to insure greater strength of the blade.

It will be understood that the exterior conformation is such as to direct the strong air-currents away from the blade, and thus cause the same to offer less resistance during high winds than the ordinary semaphore having a flat face or surface, as ordinarily employed in railway signaling devices.

In Fig. 4 of the drawings I have illustrated a modified form of semaphore wherein the semaphore-arm is shortened and is suitably attached to the semaphore-shaft 22. When it is desired to utilize this modified form of semaphore for a "train-order signal," I simply add another semaphore blade, shaft, journal, lens-frame, &c., on the opposite side of the signal-box or casing. In order to do this, a boss is provided on the inner face of the disk or plate 3 to receive and support the end of the journal, thereby avoiding the necessity of providing additional means of protecting the signal mechanism from water and dust, and in making this two-position or double-blade "train-order or block signal" the motor and sprocket-wheel are added in connection with the second semaphore-shaft and the sprocket-wheel placed near the lens-frame instead of on the end of the journal, as shown in Fig. 3 of the drawings. In connection with this modified form it is proposed to operate the signal mechanism by running the electrical connections into the operator's office in any desirable manner, from whence the said mechanism is duly operated through the medium of an electrical button or key. When this modified form is utilized, the reflector shown in the drawings is removed and a bull's-eye lens is inserted in the disk or plate 3, directly opposite the bull's-eye lens in the disk

or plate 4, so that the night-signal will readily be displayed from both directions.

It will be of course understood that when my improved mechanism is used on a double-track system as an "automatic block" it is only necessary to display the signals from one side or direction.

The semaphore-shaft 22 may be extended, if desired, as shown in dotted lines, Fig. 3, of the drawings, and at its passage through the casing be provided with bearings and dust-excluding devices similar to those shown in connection with the disk or plate 4, Fig. 3.

I have, as heretofore stated, not shown the connection of a motor to the shaft of the semaphore and lens-frame; but it will be readily perceived that any ordinary motor possessing comparatively light power may be used for operating the semaphore-shaft, since the minimum power only is required to drive the said shaft, owing to the use of my improved bearings hereinbefore described. Nor have I shown the usual mechanical appliances utilized to manipulate and operate the respective signaling devices, because either or both of these may be of the usual approved and well-known constructions and the application of which are known for the purposes intended.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a semaphore signaling device, a signal-box or casing for the semaphore mechanism, comprising a base-piece formed with vertical end plates or disks, said end plates or disks having annular flanges, a base-plate secured within the casing to inwardly-projecting flanges on the said end plates, and a sheet-metal casing fitted over and secured to the said annular flanges, substantially as described.

2. In a semaphore signaling device, a signal-box or casing for the semaphore mechanism, comprising a base-piece formed with vertical end plates or disks, a base-plate secured within the casing to flanges on the end plates or disks, said base-plate being formed with a vertical plate or disk constituting a partition between the said end plates, and a sheet-metal casing fitted over and secured to annular flanges on the end plates, and also secured to the partition-plate, substantially as described.

3. In a semaphore signaling device, a signal-box or casing for the semaphore mechanism, comprising the end plates or disks, a base-plate secured to the end plates or disks, and formed with a vertical plate or disk, an opening arranged in the central portion of said plate or disk, a reflector fitted in said opening, and a casing fitted over and secured to the end plates and the vertical plate or disk, substantially as described.

4. In a semaphore signaling apparatus, a signal-box or casing for the semaphore mechanism, comprising the end plates or disks, a base-plate secured to the end plates or disks, and formed with a vertical plate or disk, an

opening in the said vertical plate to which is fitted a reflector, a bearing-box also arranged in the vertical plate, and a casing fitted over and secured to the end plate and the vertical plate or disk, substantially as described.

5. The signal-box or casing for the semaphore mechanism, comprising a base-piece formed to connect with a support and having end plates or disks, one of which has an opening therein, and a bull's-eye lens secured therein, and formed with interior annular flanges, a sheet-metal casing fitted over and secured to the annular flanges, and having base-flanges, a base-plate adapted to rest on and be secured to the base-flanges, and formed with a vertical plate, having an opening, and a reflector secured in the opening, substantially as shown and described.

6. In combination with the signal-box or casing, a shaft suitably journaled therein and projecting outside of the casing, a sleeve on the projecting portion of the shaft, and formed with a V-shaped semaphore-support, and a semaphore secured to the V-shaped support, substantially as described.

7. The semaphore consisting of a sheet-metal shell diamond-shaped in cross-section, substantially as shown and described.

8. The signal-box or casing provided with a bull's-eye lens, a shaft mounted in bearings in the casing arranged eccentric to the axis of the bull's-eye, a lens-frame on the shaft and depending therefrom to move to and fro before the bull's-eye, and a semaphore mounted on a projecting portion of the shaft, the lens-frame and the semaphore being so arranged in their relation to each other as to impart identical signals, substantially as described.

9. The combination with the signal-box or casing, of suitable bearing-supports, adapted to have a semaphore-shaft projected through them, ball-bearings in the bearing-supports, dust-excluding and bearing-retaining caps in the bearing-supports, a shaft in the bearing, a lens-frame supported on the shaft within the casing, and a sheet-metal semaphore diamond-shaped in cross-section on the shaft outside of the casing, substantially as described.

10. In a railway signaling device, a signal-box or casing having a bull's-eye mounted therein, a shaft mounted eccentrically to the axis of the bull's-eye and located above the same, a lens-frame on the shaft to move to and fro before the bull's-eye, and a semaphore on the shaft outside of the casing, substantially as shown and described.

11. The combination with the casing or signal-box formed with an exterior annular flange, and a shaft having bearings in the casing, of a packing-ring on the shaft adapted to rest within the annular flange, a metal ring or washer resting against the outer face of the said packing-ring, and means to hold the rings in place, substantially as and for the purpose specified.

12. In combination, the end pieces or disks

of the casing, the intermediate plate or disk, ball-bearings in the front and intermediate plate, a semaphore-shaft mounted in the bearings, a lens-frame on the shaft, within the casing, and a semaphore on the shaft outside of the casing, substantially as specified.

13. In combination with a semaphore-supporting shaft, a sleeve fitted and secured on the shaft, substantially V-shaped semaphore-support on the sleeve, and a semaphore-blade having its lower edge secured in the support, substantially as described.

14. A semaphore-blade composed of a sheet-metal shell, of greater diameter at its central longitudinal line and tapering in opposite directions, substantially as shown and described.

15. A semaphore-blade composed of a sheet-metal shell, thicker at or near its lower portion, or at the point of its connection with the V-shaped support of the same, substantially as described.

16. In a semaphore signaling apparatus, a signal-box or casing comprising end plates or disks, a semaphore-shaft for supporting the semaphore-blade and lens-frame, a bearing-box or seat formed in one of said end plates or disks and ball-bearings upon which the shaft rests arranged in said box or seat, thus providing for the free and easy operation of the said shaft and signal mechanism carried thereby, substantially as shown and described.

17. The semaphore consisting of a shell diamond-shaped in cross-section, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

HARRY McLEAN ABERNETHY.

Witnesses:

J. A. ABERNETHY,
C. F. COX.