No. 768,060. PATENTED AUG. 23, 1904.

G. L. MANSFIELD.

HIGH SEMAPHORE SWITCH STAND.

APPLICATION FILED OCT. 1, 1903.

NO MODEL. 4 SHEETS—SHEET 1.

Fig. 1.

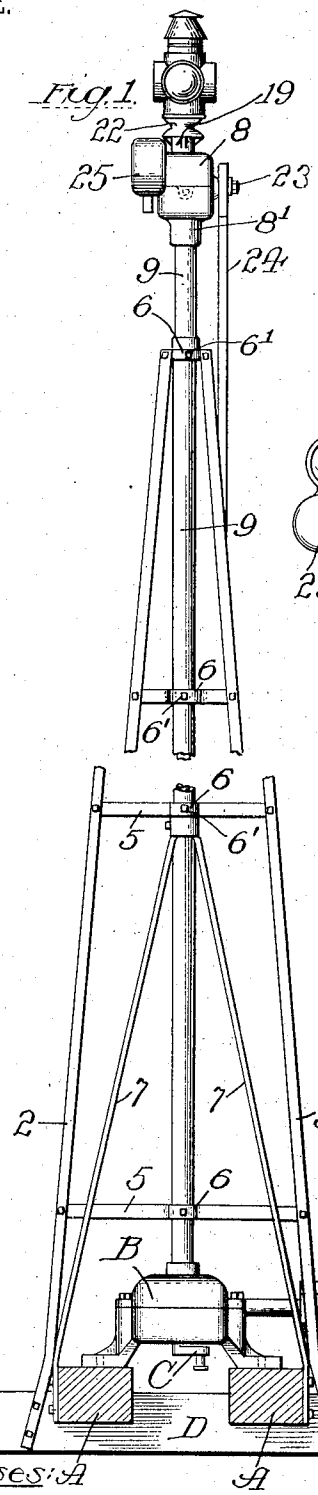


Fig. 3.

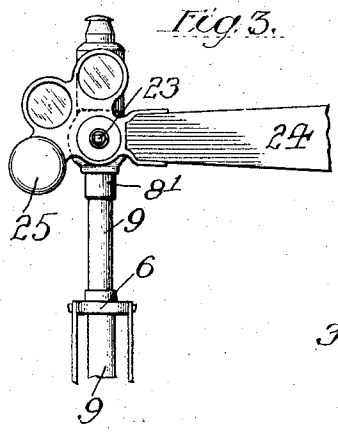
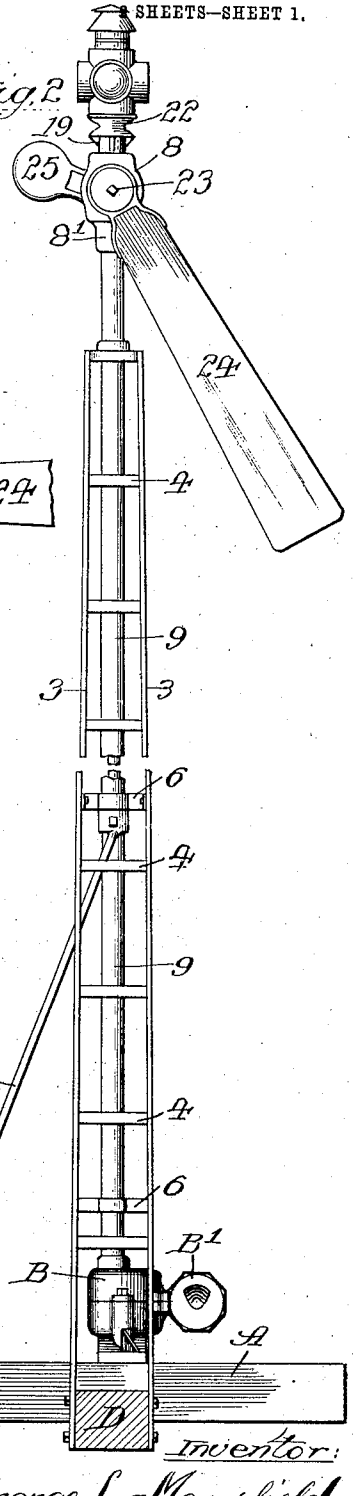


Fig. 2.



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B. K. Sefton

Inventor:
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G. L. MANSFIELD.

HIGH SEMAPHORE SWITCH STAND.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

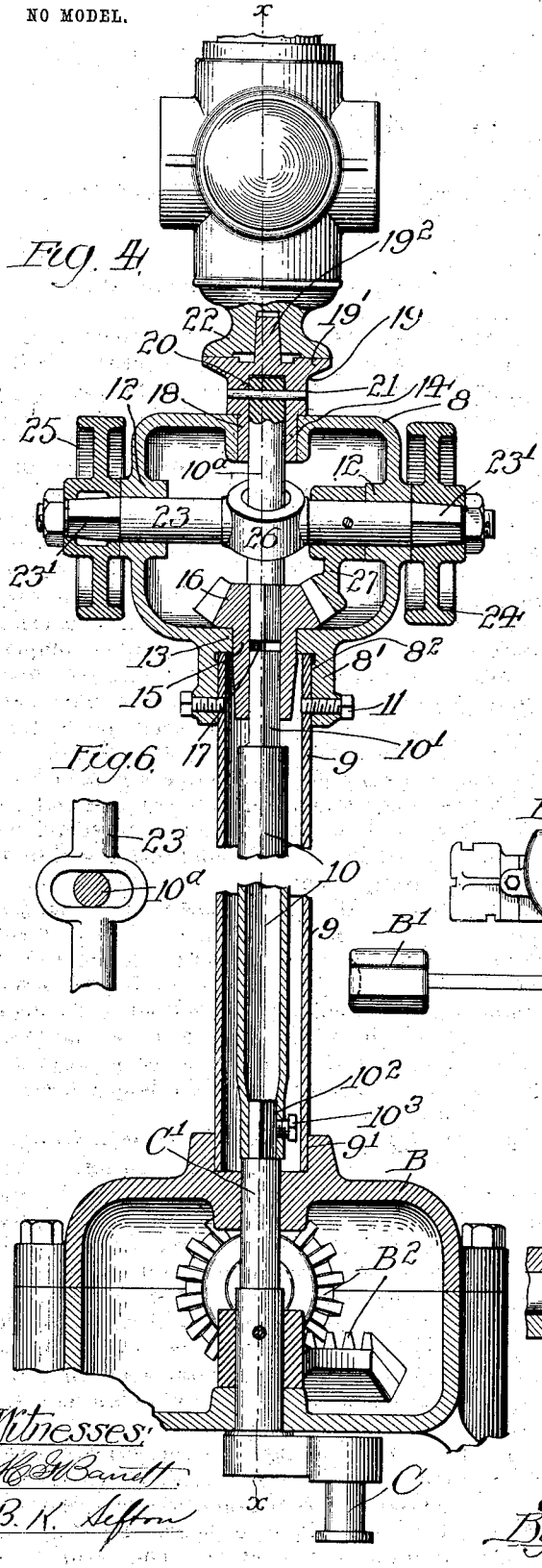

Fig. 5.

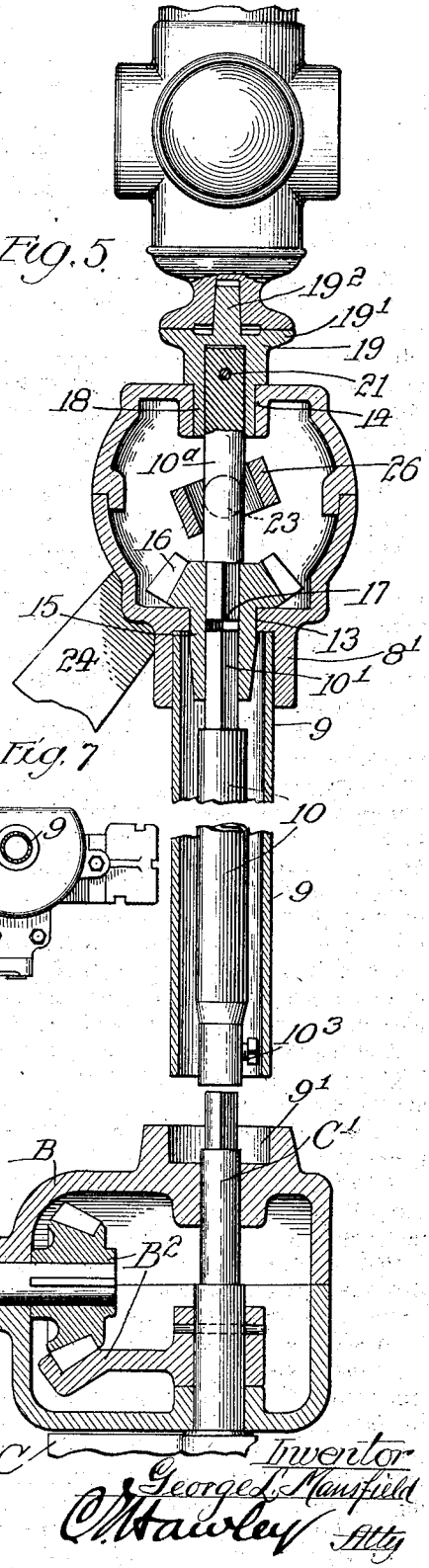

Fig. 6.

Fig. 7.

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No. 768,060. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

GEORGE L. MANSFIELD, OF CHICAGO, ILLINOIS.

HIGH-SEMAPHORE SWITCH-STAND.

SPECIFICATION forming part of Letters Patent No. 768,060, dated August 23, 1904.

Application filed October 1, 1903. Serial No. 175,345. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. MANSFIELD, a citizen of the United States, residing at the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in High-Semaphore Switch-Stands, of which the following is a specification.

My invention relates to improvements in railway-semaphores of the class wherein a semaphore-arm and a lantern exhibiting colored lights are the means of giving the signal; and the particular class to which my invention relates is that wherein the high signal is operated through the medium of the switch-stand.

The high-semaphore signals in general use are operated independently of the switches whose conditions they are supposed to indicate. These require the use of separate mechanisms in order to show the proper signals after the switch has been turned, and while numerous interlocking systems have been devised and used none are as satisfactory or as safe as a signal which is directly connected to the switch and switch-stand. Many such have been employed in the form of the well-known low "yard" switch-stand, which has vanes and a lamp on its staff; but little progress has been made toward the embodiment of the same idea in a high-semaphore-arm signal.

The object of my invention is to provide a high-semaphore signal directly connected to a switch-stand which shall be operable therewith and thereby and shall be visible at a great distance.

Another object of my invention is to provide a high-semaphore signal wherein the lamp and the arm shall operate together.

Still another object of my invention is to provide a high-semaphore signal preferably constructed entirely of metal and which shall be braced or framed by ladders.

Another and particular object of my invention is to provide a high semaphore which shall include a switch-stand as one of its component parts and from which the said switch-stand can be removed at any time without disturbing the rest of the structure.

Another particular object of my invention is to generally simplify the construction and reduce the cost of semaphores of the class mentioned.

My invention consists, primarily, in a high semaphore comprising a tower or post erected over a switch-stand and having a signal device at the top, which is connected with the operating-shaft of said switch-stand, whereby the switch and the signal may be operated simultaneously.

My invention further consists in a structure of the class described which shall permit the placing or the removal of the switch-stand without necessitating labor upon tower or post; and, further, my invention consists in a high-semaphore tower or post composed of ladders that are rigidly connected; and, further, my invention consists in a novel anchorage for semaphore towers or posts; and, further, my invention consists in the combination of a suitable post, an operating-shaft therein and carrying a lamp on its upper end, a cross-shaft at the top of the pole, a semaphore-arm thereon, and means connecting said shafts for causing the movement of said arm simultaneously with the movement of the lamp; and, further, my invention consists in many and various details of construction and in combinations of parts, all as hereinafter described, and particularly pointed out in the claims.

My invention will be more readily understood by reference to the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a side elevation of a high semaphore embodying my invention. Fig. 2 is another elevation thereof. Fig. 3 shows a modified form of the head of the signal, the usual lenses and spectacles being provided on the semaphore-arm for coöperation with a stationary lamp. Fig. 4 is an enlarged vertical section of the operating parts of my device. Fig. 5 is a section thereof on the line x x of Fig. 4. Fig. 6 is a detail view of the semaphore-arm shaft, and Fig. 7 is a reduced plan view of the switch-stand.

In the drawings, A A represent the extended track-ties, whereon the switch-stand B is placed. This switch-stand may be of any desired construction or type, either high or low, preferably the latter. The crank C of the

switch-stand is connected with the switch-points. (Not shown).

One object of my invention is to place the semaphore directly above the switch-stand and to connect the switch-stand and the semaphore mechanism by means that shall be actuated from some part of the switch-stand. To this end I place the structure above the switch-stand B. This structure preferably comprises a substantially triangular metal frame that is composed of two ladders 2 and 3, which meet at their upper ends. The ladders are made of either flat or angle bars connected by bars or steps 4, and the use of two ladders permits two men to climb the post when it is necessary to take down or put into position some heavy part of the mechanism, such as the semaphore-arm. The ladders have the same inclination, and their lower ends are bolted or spiked to opposite sides of the cross-tie D. This tie is notched into the ties A A and is bolted thereto. It serves to provide a solid foundation for the semaphore-pole and one which is separate from the foundation of the switch-stand. The ladders 2 and 3 are connected at convenient distances by horizontal braces 5 5 of any desired design, each provided with a central collar 6. To one of these collars I attach the side braces 7 7, having their lower ends spiked or bolted to the ties A A and making the tower or post very rigid.

The semaphore mechanism proper is contained in a preferably closed box 8, which, if desired, may form the top connection for the side ladders. I prefer, however, to arrange the gear-box 8 on the upper end of a tube or pipe 9, which extends down through the collars 6 and preferably rests upon the top of the switch-stand casing B. The tube is not fastened to the switch-stand, but simply rests upon a boss or in a recess 9′, surrounding the staff C′ of said switch-stand. The weight of the column 9 and of the semaphore mechanism or head is thus preferably carried upon the switch-stand; but, if desired, may be carried by the tower or post, and in any case set-screws 6′ in the brace-collars 6 or the like are used to secure said column 9 and prevent its twisting or rotating in the tower or post.

As shown in Figs. 3 and 4, the box 8 is provided with a boss 8′ on its bottom, containing an internally-shouldered recess 8^2 to receive the upper end of the column 9. The box is secured thereon by means of one or more set-screws 11. The box 8 carries and contains all of the semaphore and lamp parts, and being a part that is preferably distinct from the tower it may be raised and lowered by means of the tube or column 9. In other words, the box and its mechanism does not prevent the raising of the tube or column, and as this may be done when the set-screws 6 are loosened it is obvious that the switch-stand may be easily removed without disturbing any part of the tower or of the semaphore mechanism. The tube or column 9 not only rigidly supports the semaphore-box, but also contains and protects the semaphore-operating shaft 10, which has its lower end 10^2 coupled to the upper end of the switch-stand staff C′, while its upper end extends into and through the box 8 to operate the semaphore-arm and the signal-lamp.

As shown in Fig. 4, the shaft 10 may itself be a tube, and its lower end 10^2 is preferably squared to fit the staff C′. The shaft need not be fastened to the staff; but to avoid accidental disconnection I preferably use a set-screw 10^3 therein. Obviously the staff may be unjointed from the staff when the tube 9 has been lifted and should also be raised when it is necessary to remove the switch-stand. The box 8 is preferably made in upper and lower halves suitably joined and together completely shielding the operating-gearing that is used, whatever its kind. The box 8 is provided with bearings 12 12 in its ends and also has bearings 13 and 14 in its bottom and top. These bearings 13 and 14 are in alinement with the column 9, and the lower bearing contains the hub 15 of the beveled gear-pinion 16. Said hub has a preferably squared opening 17 to receive the squared upper portion 10′ of the shaft 10. The upper bearing 14 may be closed and not used; but it preferably is open and contains the hub 18 of the lamp-bracket 19. This contains a recess 20, and the end of the shaft 10 rises from the squared portion 10′ in the gear 16 and enters the hub 18. The shaft 10 therefore crosses the box or frame vertically. Its upper end is round, so that the lamp-bracket 19 may be properly adjusted thereon—that is, turned to the proper angle with respect to the position of the semaphore-arm—before it is secured to the shaft by means of the pin 21 or the like. The lamp-bracket, unlike the devices now in use, is provided with a wide flaring flange or a plurality of lugs 19′, on which the base 22 of the lamp will rest securely. The lamp-fastening is the usual polygonal stud 19^2, that enters the base of the lamp. The lamp therefore turns with the shaft 10 when the latter is operated by means of the switch-stand lever B′, acting through the medium of the gears or other mechanism B^2 within the switch-stand. I regard the flanged lamp-bracket as of particular value, as by the use of this device the stud is relieved of the duty of holding the lamp truly upright.

I have spoken of the shaft 10 as though it were continuous from the switch-stand to the signal-lamp, and it may be so; but I prefer to cut the shaft at the point within the hub of the gear 16, providing it with a short upper end or section 10^a, which may be lifted out of the box when it is desired to replace the revolving lamp by a stationary lamp. When such alteration is made, the semaphore-arm is always provided with spectacles and colored

lenses, as shown in Fig. 3. If my mechanism is to be employed with a stationary lamp, the upper half of the gear-box may be made with a solid top; but I prefer to adapt it for use with either stationary or revolving lamps.

Attempts have been made heretofore to provide a semaphore in which a vertical shaft should operate the signal-lamp directly; but in every such case it has proven difficult to secure a proper pivot or pivotal support for the semaphore-arm, it having been thought necessary to arrange the latter on an extremely short stud-shaft. Such a shaft and its bearings are subject to excessive wear, and the semaphores heretofore constructed have been unpopular for this reason. I avoid this difficulty by employing a long semaphore-arm shaft 23, which extends across the gear-box and is held at both ends by the bearings 12 therein. The semaphore-arm 24 and the counterweight-lever 25 are secured to the preferably squared ends 23′ of the shaft 23. The parts 24 and 25 are of considerable weight; but as their weight is carried by the shaft close to the bearings 12 such devices are rendered reliable and the wear thereon is minimized. The shaft 23 is preferably, though not necessarily, so arranged that its axis will intersect the axis of the vertical shaft 10, and as the shafts cannot occupy the same place one of them is provided with a loop or bend or eye 26, which passes around the other. I prefer to use this loop or eye upon or in the shaft which has the least rotary motion. This is usually the semaphore-shaft, as shown in the drawings. When a ninety-degree semaphore-arm is used, the loop or bend or eye may be in either of the shafts, as there is then no difference between their movements, both turning ninety degrees when operated. The connection between the vertical and horizontal shafts may take various forms, such as cams, arms, or links; but I prefer to use a regular or an irregular gear connection. Thus, as shown in Fig. 4, the gear 16 is connected to the shaft 23 by means of a segmental gear 27, having its hub fastened on the shaft 23. I prefer that the eye or loop 26 in the shaft 23 shall be of such dimensions that its end or ends will engage and be stopped by the upper section of the shaft 10 to limit the throw of the semaphore-arm 24.

The use and operation of my invention will be understood from the foregoing and may be summarized as follows: The semaphore is placed directly above the switch-stand. The semaphore-gear is supported on the switch-stand by the vertical pipe or column. The pipe or column is in turn braced and held against rotation by the simple, strong, and rigid plural ladder, tower, or post. The connection between the column and the tower is such that the column and the part within it may be raised at any time to permit the removal of the switch-stand without disturbing the semaphore mechanism. The semaphore mechanism is at a convenient height above the tower and may be reached conveniently by men standing on the opposite sides or ladders of the tower. When the throw-lever B′ is moved to throw the switch-points, it operates the gears B^2 and gives the operating-shaft 10 a quarter-revolution. This is communicated directly to the lamp at the upper end of said shaft 10 and is simultaneously communicated to the shaft 23 and the semaphore-arm 24 through the medium of the gears 16 and 27. Thus the semaphore-arm and the lamp are simultaneously and positively operated, and their positions must always correctly correspond. The lamp, if desired, may by slight modification of the structure be placed below the semaphore; but I do not advocate this modification of my invention, preferring always to place the lamp upon the wide flanged bracket at the upper end of the operating-shaft. It is obvious that just as the switch-stand may be removed without disturbing the tower so may the tower be removed, repaired, or adjusted as to alinement without disturbing the switch-stand or its connections to the switch.

It is obvious that numerous modifications of my invention will readily suggest themselves to one skilled in the art, and I therefore do not confine the invention to the specific construction herein shown and described.

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

1. In a high-semaphore switch-stand, a switch-stand proper and a semaphore mechanism, in combination with a tower or pole, a suitable foundation for said switch-stand, another foundation for said tower, and means extending from said switch-stand upward through the tower to operate said mechanism, substantially as described.

2. In a high-semaphore switch-stand, a switch-stand proper, in combination with a semaphore tower or pole, comprising two ladders joined at their upper ends, a semaphore mechanism arranged at the top of said tower, and means connecting said mechanism and stand, substantially as described.

3. In a high-semaphore switch-stand, a switch-stand proper, in combination with a semaphore tower or pole, erected above the same but having a different foundation, a semaphore mechanism at the top of said pole and a vertical shaft revoluble by said switch-stand, for operating said mechanism, substantially as described.

4. In a high-semaphore switch-stand, a semaphore tower or pole, composed of ladders joined at their upper ends, in combination with cross braces or ties, said post being substantially an isosceles triangle, in elevation, substantially as described.

5. In a semaphore mechanism, a vertical shaft, in combination with the semaphore-arm

shaft having bearings on opposite sides of the vertical shaft, and one of said shafts being provided with a bend or loop, to avoid the other, substantially as described.

6. In a semaphore mechanism, a vertical shaft and means for rotating the same, in combination with the semaphore-arm shaft, having bearings on opposite sides of the vertical shaft, a semaphore-arm thereon, one of said shafts having a loop or bend, to avoid the other, and a lamp revoluble by said vertical shaft, substantially as described.

7. In a semaphore mechanism, a suitable box or casing, in combination with a support whereon the box or casing is held against rotation, a vertical shaft passing through the bottom and top of said box, a lamp on the upper end thereof, a cross-shaft having bearings in the ends of said box, a semaphore-arm thereon and means connecting said cross-shaft to said vertical shaft, for operation thereby, substantially as described.

8. In a semaphore mechanism, a suitable box or casing, in combination with a vertical shaft extending through the same, a lamp-bracket on the upper end of said shaft, a cross-shaft having bearings in said box, a semaphore-arm thereon, means connecting said shafts, and one of said shafts being provided with a loop or bend, to avoid the other, substantially as described.

9. In a semaphore mechanism, a frame or casing, in combination with a vertical shaft therein, a horizontal shaft having bearings on opposite sides of the vertical shaft, the axes of said shafts intersecting, one of said shafts having a loop or bend, to avoid the other, and signaling devices actuated by said shafts, substantially as described.

10. In a semaphore mechanism, a box or casing, in combination with a vertical shaft therein, a horizontal shaft having bearings on opposite sides of the vertical shaft, the axes of said shafts intersecting, one of said shafts having a loop or bend, to avoid the other, means connecting said shafts for simultaneous operation, and signaling devices actuated by said shafts, substantially as described.

11. In a semaphore mechanism, a vertical shaft, in combination with a horizontal shaft having bearings on opposite sides of the vertical shaft, one of said shafts having a loop or turn, to avoid the other, means connecting the shafts for simultaneous operation, signaling devices connected with said shafts, and means for rotating one of said shafts to operate the signaling devices simultaneously, substantially as described.

12. In a semaphore mechanism, a suitable box or frame, in combination with a cross-shaft having bearings at its ends, a semaphore-arm thereon, a vertical operating-shaft, means connecting said shafts, said operating-shaft having a separable section in said box or frame, extending through the top thereof, and a lamp arranged on said section, substantially as described.

13. In a semaphore mechanism, a suitable box or casing, in combination with an operating-shaft extending through the same, a cross-shaft also therein, means connecting said shafts, one of said shafts being provided with a loop or bend, to avoid the other, and a lamp-bracket having a bearing on the top of said casing and attached to said operating-shaft, substantially as described.

14. In a semaphore mechanism, a box or casing, in combination with a semaphore-arm, an arm-operating mechanism in said box or casing, a signal-lamp, a bracket therefor, and a bearing for said bracket in the upper part of said casing, substantially as described.

15. In a semaphore mechanism, a frame or casing, provided with bearings in its top and bottom, in combination with a gear arranged in the lower bearing, a lamp-bracket arranged in the upper bearing, a shaft for rotating said gear and bracket, a semaphore-arm, and means for operating the same from said gear, substantially as described.

16. In a semaphore mechanism, a frame or casing, in combination with a vertical shaft therein, a cross-shaft having bearings in said casing and provided with a loop extending around said vertical shaft, and rotatively limited thereby, substantially as described.

17. In a semaphore mechanism, a fixed column, in combination with a frame or casing secured upon the upper end thereof, an operating-shaft arranged in said column, a cross-shaft arranged in said casing, means connecting said shafts, and a semaphore-arm operated by said cross-shaft, substantially as described.

18. In a semaphore mechanism, a suitable tower, in combination with a column fixed therein, a semaphore mechanism on the upper end of said column, an operating-shaft arranged in said column, for actuating said mechanism, and means at the lower end of the column for rotating said operating-shaft, substantially as described.

19. In a high semaphore, a suitable tower, in combination with a column fixed therein, an operating-shaft in said column, a semaphore mechanism provided on the upper end of said column and actuated by said shaft, a switch-stand, and a suitable detachable connection between the shaft of said switch-stand and said operating-shaft, substantially as described.

20. In a high semaphore, a suitable metallic tower substantially in the form of an isosceles triangle, in combination with a switch-stand, a vertical shaft arranged in said tower and having its lower end attached to the operating-shaft of said switch-stand within the base of said tower, and a semaphore mechanism connected with and actuated from the upper end of said operating-shaft, substantially as described.

21. In a high semaphore, a suitable tower or

pole, in combination with a box or casing, an operating-shaft, a cross-shaft in said box, a semaphore-arm thereon, an extension-shaft, 10^a, a lantern-bracket connected with said extension-shaft, and means operatively connecting said shafts, substantially as described.

22. In a high semaphore, a suitable tower or pole, in combination with a box or casing, an operating-shaft, a gear in the bottom of said box and connected with said shaft, a cross-shaft in said box, actuated from said gear, a semaphore-arm thereon, an extension-shaft, 10^a, actuated by said gear, and a lantern-bracket connected with said extension-shaft, substantially as described.

23. In a high semaphore, a suitable tower, in combination with a switch-stand, a column held by said tower and seated upon said switch-stand, an operating-shaft in said column, connected with the shaft of said switch-stand, and a semaphore mechanism arranged on said column and actuated by said operating-shaft, substantially as described.

24. In a high-semaphore switch-stand, a tower, in combination with a column held therein, a switch-stand whereon the lower end of said column is seated, the staff of said stand extending into said column, an operating-shaft in said column and attached to said staff, and a semaphore-gearing and signals connected with said operating-shaft, substantially as described.

25. In a high semaphore, a tower, comprising a substantial isosceles-triangular frame, a column arranged vertically in said frame, and held against rotation, a gear-box arranged on the upper end of said column, a semaphore-arm and an operating-shaft in said column and connected with said arm, substantially as described.

26. A semaphore-tower, comprising the ladders, 2 and 3, joined at their upper ends, in combination with the cross-braces, provided with central collars, and a signal-bearing column arranged in said collars, substantially as described.

27. The combination of the switch-stand ties, with the switch-stand thereon, a cross-tie, the ladders erected on said cross-tie and joined at their upper ends, suitable braces for said ladders, and an elevated semaphore mechanism connected with said switch-stand, substantially as described.

28. The combination of the switch-stand with the framed semaphore-tower, a column fixed in said tower, means for supporting the column in different positions in said tower, to permit the removal of said switch-stand, a signal mechanism at the top of the tower and means in said column connecting said mechanism and stand, substantially as described.

29. The combination of a switch-stand and its staff, with a semaphore-pole, a semaphore mechanism on said pole, an operating-shaft depending therefrom and a telescoping connection between said shaft and staff, substantially as described.

30. In a high semaphore, a switch-stand and a signal mechanism, in combination with a tower adapted to support said signal mechanism, and comprising two ladders connected in triangular form and having said switch-stand between them, substantially as described.

31. In a device of the class described, in combination, a switch-stand, a signal-operating mechanism directly above said stand, and a telescoping connection, permitting said switch-stand to be removed without disturbing said signal mechanism, substantially as described.

32. In a device of the class described, a switch-stand having a shaft, in combination with a vertical mast extending upward from the switch-stand shaft, a shaft forming a vertical extension of said mast, a lamp-bracket on the upper end of said shaft and operable therewith, a semaphore-arm operable by the extension-shaft, suitable bearings for said mast and its extension, substantially as described.

33. In a high-semaphore switch-stand, the combination of a switch-stand with a signal-operating mechanism, comprising two ladders forming a triangle and erected above said switch-stand and below said signal mechanism, substantially as described.

34. In a high-semaphore switch-stand, in combination, two ladders forming a triangular frame, a signal-operating mechanism at the apex of said frame and a switch mechanism within the base of said frame and operatively connected with said signal mechanism, substantially as described.

35. In a device of the class described, a switch-operating mechanism, in combination with a signal-operating mechanism, comprising a closed gear-box, a transverse shaft journaled in the sides of said box, carrying exteriorly thereto a signal-arm and interiorly thereto a segmental gear, a revoluble vertical shaft within said box carrying at its upper end a lamp-bracket and having its lower end seated in a gear-wheel journaled in the bottom of the box, said gear-wheel meshing with said segmental gear, for operating said signal-arm, and means for revolving said gear-wheel, substantially as described.

36. In a device of the class described, a signal and signal-operating mechanism, in combination with two ladders adapted to support said mechanism, a switch-stand beneath said signal and between said ladders, and means adapted to operate said signal synchronously with said switch, substantially as described.

37. In a semaphore, a switch-stand, in combination with a hollow post extending upward from said stand, a signal and signal mechanism on the top of said post, and two ladders forming a tower for said column and said signal mechanism, substantially as described.

38. In a high-semaphore signal, a semaphore-tower composed of the symmetrically-inclined

ladders, in combination with means joining said ladders at the top and at intermediate points, the semaphore mechanism, a box or casing therefor at the top of the tower, and the operating-shaft for said mechanism having bearings held by the ladder connections or ties, substantially as described.

39. In a semaphore mechanism, a box or casing, in combination with a semaphore-arm supported by said box, means within said box for actuating said arm, a vertical revoluble lamp-bracket having a bearing upon the box, means within said box operatively connecting said lamp-bracket with said semaphore-arm, and said bracket being provided with a lamp-holding stud and a base-flange for the lamp, substantially as described.

40. In a semaphore mechanism, a box or casing, in combination with a semaphore-arm, means within said box for operating said arm, a lamp-bracket, a bearing in the top of said box for said bracket, and means for simultaneously operating said arm and rotating said bracket in its bearing, substantially as described.

41. A semaphore-tower, comprising the symmetrically-arranged ladders, 2 and 3, in combination with a suitable foundation therefor, a block joining the upper ends of said ladders, a central bearing in said block, cross ties or braces extending between said ladders and provided with central bearings, a signal device arranged at the top of said tower, and a vertical mast arranged in said bearings, for actuating said signal device, substantially as described.

42. In a semaphore mechanism, a box or casing, in combination with the semaphore-arm, means in the box for actuating said arm, a bearing, 14, in the upper part of said box, a lamp-bracket having a stud or boss held in said bearing, the operating-shaft coupled to said boss, said bracket being provided with the flange 19′, and a lamp-stud, and the lamp having a recess for said stud and provided with a wide base resting upon said flange, 19′, substantially as described.

In testimony whereof I have hereunto set my hand, this 18th day of September, A. D. 1903, in the presence of two witnesses.

GEORGE L. MANSFIELD.

Witnesses:

C. G. HAWLEY,

JOHN H. GARNSEY.