

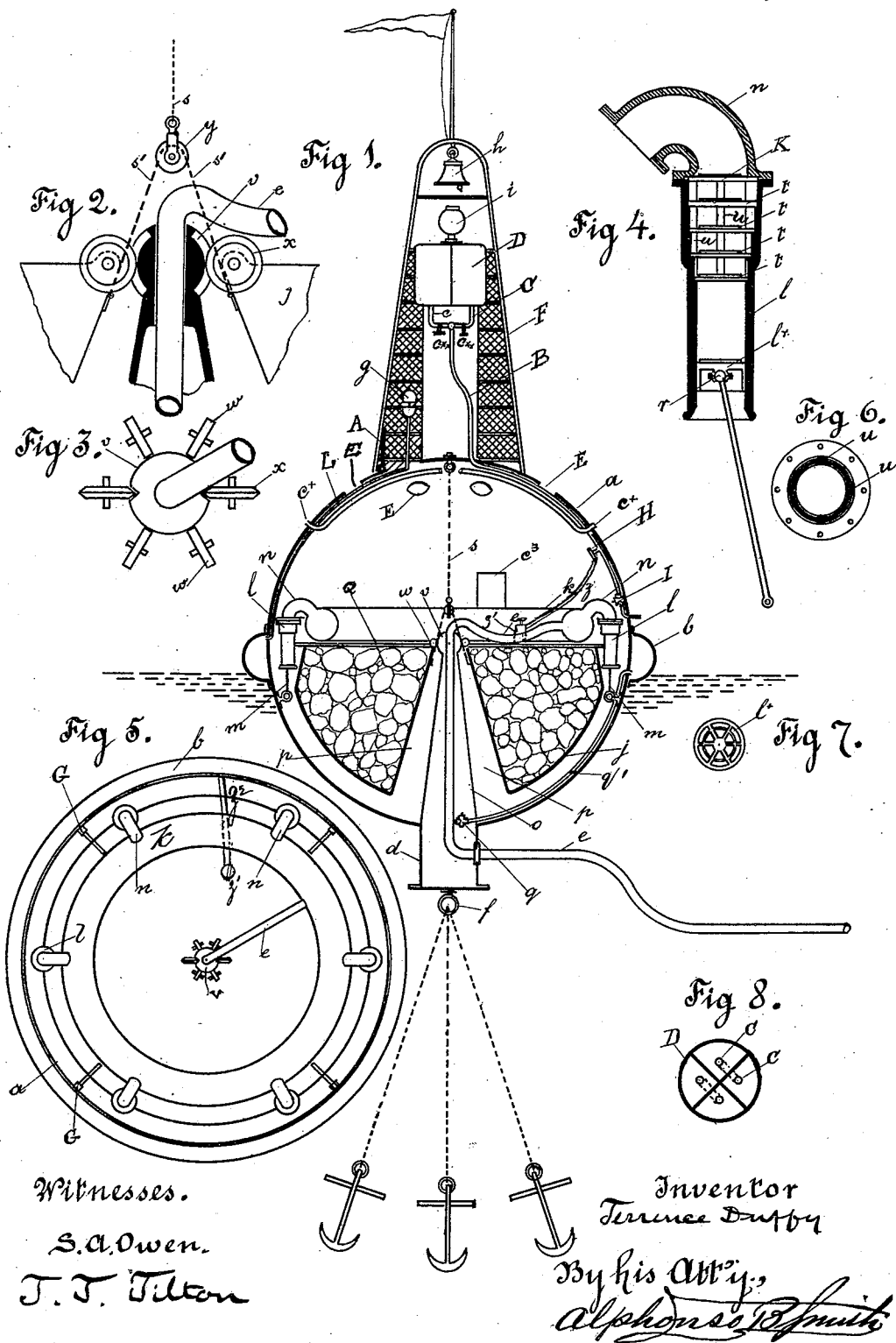
(No Model.)

T. DUFFY.

SIGNAL BUOY.

No. 352,527.

Patented Nov. 16, 1886.



Witnesses.

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SIGNAL-BUOY.

SPECIFICATION forming part of Letters Patent No. 352,527, dated November 16, 1886.

Application filed June 27, 1885. Serial No. 170,012. (No model.)

To all whom it may concern:

Be it known that I, TERRENCE DUFFY, a resident of the city and county of San Francisco, State of California, have invented a novel and useful Signal-Buoy; and I hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings.

My invention relates to means for providing a signal-buoy with alarm-signals and light for service in harbors, rivers, and bays, and other navigable waters.

The following description fully explains the nature of my said invention and the manner in which I proceed to conduct, apply, and operate the same, the accompanying drawings being referred to by figures and letters.

Figure 1 represents a section through the middle of the buoy, showing the general arrangement of the oscillating basin and the suspending-chain, cone-shaped well, and ball-head, the internal and external air-chambers, the air-pumps and their connection with the shell of the buoy and the internal air-chamber, the main delivery-pipe for compressed air, and the connecting-pipe for conducting air to the external air-chamber, the air-pipes for supplying air to the buoy, the door and skylights in buoy, the tower-frame covered with lattice-work, the arrangement for the whistle in connection with the external air-chamber, the reservoir for water in the tower, and the arrangement of the pipes for filling and emptying the same, the electric light and the alarm-bell, and the swivel-joint for the anchor-chains. Fig. 2 is an enlarged view of the details of the central swivel-joint, showing arrangement of the guide-rollers and the suspension roller and chain, and a part of the main delivery-pipe for compressed air. Fig. 3 is a plan view of the same, showing two V-shaped rollers and four plain rollers. Fig. 4 is an enlarged view of one of the air-pumps, showing the check-valve, four receding valves, the bucket, and connecting-rod with universal joint, and the discharge-pipe. Fig. 5 is a plan view of the buoy with the upper part removed, showing arrangement of the air-pumps and their discharge-pipes into the internal air-chamber, the main delivery-pipe entering the ball-head with its guide-rollers, and the arrangement of the lock-bolts. Fig. 6 is a plan view of one of the air-pumps, showing the

guide-bars and the recesses in the receding valves. Fig. 7 is a plan view of the buckets in the air-pumps. Fig. 8 is a plan view of the reservoir, showing four compartments with the water-pipes.

In Fig. 1, *a* is the buoy; *b*, external air-chamber; *c*, door in buoy; *d*, outward projection of cone-shaped well; *e*, main discharge flexible pipe conveying compressed air from the internal air-chamber through the cone-shaped well to any point; *f*, swivel-joint for anchor-chains; *g*, alarm-whistle in tower connected with external air-chamber; *h*, alarm-bell, and *i*, electric light in tower; *j*, oscillating basin, ballasted; *k*, internal air-chamber; *l*, air-pumps; *m*, connecting piston-rods attaching air-pumps to shell of buoy; *n*, air-discharge pipes from air-pumps to internal air-chamber; *o*, cone-shaped well; *p*, conical chamber in center of oscillating basin; *q*, valve for connecting pipe *q'* from main delivery-pipe *e* to the external air-chamber; *s* and *s'*, suspending-chains for oscillating basin; *v*, ball-head attached to cone-shaped well for guiding the oscillating basin; *w*, guide-rollers for ball-head; *Q*, deck over oscillating basin; *A*, trap-door in upper part of buoy; *B*, pipe for filling and discharging reservoir; *C*, branch pipes to compartments in reservoir; *D*, reservoir in four compartments; *E*, skylights in buoy; *F*, tower-frame and lattice-work. *H* is a connection for supply-pipe from force-pump to reservoir-pipe; *I*, faucet discharging from reservoir; and *L*, pipe connecting whistle with external air chamber.

In Fig. 2, *e* is the main delivery-pipe; *s* *s'*, suspending chains for oscillating basin; *v*, ball-head for guiding oscillating basin; *x*, V-shaped guide-rollers; and *y*, chain-pulley for oscillating basin.

In Fig. 3, *v* is the ball-head for guiding oscillating basin; *w*, guide-rollers; and *x*, V-shaped guide-rollers.

In Fig. 4, *k* is the check-valve in air-pump; *l* *l'*, bucket in same; *n*, short pipe from air-pump to internal air-chamber; *r*, universal joint for air-pump connecting-rod; *t*, upwardly-opening valves in air-pump; *u*, guides for same; and *m*, piston-rod.

In Fig. 5, *a* is the buoy; *b*, external air-chamber; *e*, main delivery-pipe; *k*, internal air-chamber; *G*, lock-bolts for oscillating basin; and *n*, short pipes from air-pumps to internal air-chamber.

In Figs. 6, 7, 8; *u* is the guide-bars for upwardly-opening valves in air-pumps; *l*^x, bucket in air-pumps; and *c*, branch pipes to compartments in reservoir.

5 In a buoy, *a*, at anchor, the ballasted oscillating basin *j* is suspended from a chain, *s*, which is attached to a pulley-wheel, *y*, over which passes a chain, *s'*, which is made fast to each side of the basin. The basin is prevented
10 from swinging and is guided in its action by the ball-head *v*, and the four plain rollers *w*, and two V-shaped rollers, *x*, the plain rollers working against the ball-head and the V-shaped rollers *x* working in grooves in the
15 ball-head, Figs. 2 and 3. The ball-head is part of the cone-shaped well *o*, which projects through the buoy, and through which the main delivery-pipe *e* conducts compressed air from the internal annular air-chamber, *k*, to any de-
20 sired point. From the main delivery-pipe compressed air is conducted to the external annular air-chamber, *b*, by the valve *q* and connecting-pipe *q'*. Lock-bolts *G*, which, as shown,
25 are simple pivoted arms hinged to the side of the buoy and adapted to be turned down against the swinging interior chamber or vessel, are provided to check the oscillation of the basin during repair or other cause for stoppage. The air-pumps *l* are provided with
30 receding valves *t*, having recesses for the guide-bars *u* on the pump-barrel. The buoy is lighted by skylights *E*, and fresh air is supplied by pipes *c*^x, the external opening being considerably below the point of discharge inside the buoy, to prevent the ingress of water
35 to the buoy. The buoy is entered by the door *c*². The oscillating basin is decked, around which is placed the internal air-chamber. At the top of the buoy a trap or door, *A*, opens
40 into the tower.

The tower *F*, attached to the buoy, is constructed of a frame-work of iron, well braced and protected by wire-lattice-work. Suspended from the top of the tower is an alarm-bell, *h*.
45 Below the bell is an electric lamp, *i*, connected and operated in the usual manner from source not shown. Directly under the lamp is a reservoir, *D*, subdivided into four compartments, Fig. 8, which are connected in pairs with branch
50 pipes *c*, and these branches connect with a supply and discharge pipe, *B*, near the end of which is a discharge-faucet, *I*. A pipe, *z*, from the force-pump *z'* on deck, connects with the supply-pipe, and a pipe, *z*², connects the pump
55 with the exterior water. Near the bottom of the tower, on either side, is an alarm-whistle, *g*, of ordinary construction.

The operation of my signal-buoy is as follows: When the buoy *a* is at anchor, the motion of the water causes the suspended and ballasted basin to oscillate, and this oscillating action works the air-pumps, which compress the air and force it into the internal annular chamber, *k*, from which it is conducted
65 by the main delivery-pipe *e* to any point of the shore. At a point in the lower part of the cone-shaped well *o* a valve, *q*, and connecting-

pipe conducts compressed air from the main delivery-pipe to the external annular air-chamber, *b*, where it is stored for use in the operations of the signals and other purposes. The motion of the buoy, which is rendered regular and continuous by the oscillations of the suspended basin, sounds the alarm-bell. The lamp *i* is reached from the buoy through the trap-door *A*, and is supplied with carbons or repaired. The alarm-whistle *g* is connected
75 by a pipe, *L*, with the external air-chamber, *b*; the compressed air from which operates it.

The reservoir for water serves to ballast the tower and to induce motion when the action of the oscillating basin is weak and irregular, owing to smooth water. The action of the reservoir is regulated by dividing it into four compartments, any two of which on the line of equilibrium may be filled or discharged, while the other two remain empty. This is made possible by having cocks *c*^x *c*^x to shut off the flow from or to either pair.

The water for the purpose of manipulating the compartment-reservoir is taken in through pipe *z*², (shown in Fig. 5,) which extends outside of the buoy beneath chamber *b*, and connects with force-pump *z'*, by means of which water is taken in and forced up through pipe
95 *z* (shown in Fig. 1) into supply-pipe *B*, and thence distributed to the compartments, as above described.

When the action of the oscillating basin is regular and energetic, the water may be discharged from the reservoir.

In an application for patent made by me on the 31st of March, 1885, Serial No. 160,833, I have shown and described devices for compressing and storing air similar to those shown herein, and I do not claim said devices in this application.

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

1. In a signal-buoy, the combination of buoy-body and the signal device, as *g*, with the interior swinging part, *j*, and air-pumps *l*, substantially as and for the purpose set forth.

2. In a signal-buoy, the combination of the buoy body or shell, a weighted part, as *j*, capable of oscillation, the air-pumps connected to it and to the shell of the buoy, a signal adapted to be operated by compressed air, means for supplying air thereto from the air-pumps, an internal air-chamber, and the tube
120 *e*, for conveying air from said chamber, as set forth.

3. In a signal-buoy, the combination of the buoy-body and tower thereon, the compartment-reservoir *D*, connecting-pipe *B*, and branch pipes *c* *c*, said reservoir being located in the tower of the buoy, as described.

In testimony whereof I have hereunto set my hand and seal.

TERRENCE DUFFY. [L. S.]

Witnesses:

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D. T. JESTER.