

THE APPARATUS OF THE UNITED STATES LIFE-SAVING SERVICE.

BY WALDON FAWCETT.

The series of especially disastrous wrecks, which has occurred during the past year or two on the Atlantic and Pacific coasts and on the Great Lakes, has caused an unusual activity in the invention of life-saving devices. The United States governmental board of experts detailed to examine and test all new inventions offered for the use of the United States Life-Saving Service has been sorely taxed by the effort to give serious consideration to the many novelties which have been presented.

This official sifting process has, however, resulted in few additions to the standard equipment of the nation's life-saving stations. Our life savers to-day rely solely in their rescue work on three utilities—the lifeboat (interchangeable with which is the surfboat), the lifecar, and the breeches buoy. As accessories to the use of the two last mentioned pieces of apparatus, is the wreck gun which is used to hurl lines to ships stranded in exposed positions.

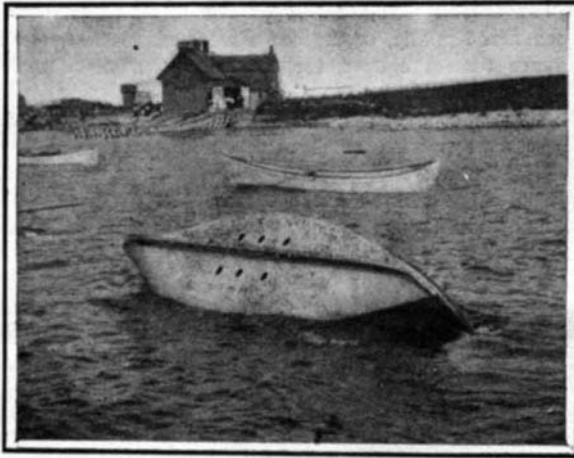
Many of the rescues effected by the United States Life-Saving crews are accomplished by means of lifeboats or surfboats. During the year 1905, for instance, there were landed by the surfboats and lifeboats upward of one thousand persons, whereas only about half a hundred persons were rescued by the breeches buoy or lifecar during the twelve months in question.

The lifeboats and surfboats are each propelled by a crew of six or eight rowers—all trained oarsmen of the Life-Saving Service. These staunch craft, weighing perhaps seven hundred or eight hundred pounds each, and by reason of their self-righting and self-bailing qualities rendered virtually unsinkable, are obviously the ideal vehicles for taking considerable numbers of persons from imperiled vessels in a limited space of time. The first duty of a patrolman who in his vigils on the beach discovers a vessel ashore is to ascertain whether the conditions are favorable for the use of a boat in the rescue work. In such event either the large lifeboat is launched from its ways in the station and proceeds to the wreck by water, or else the lighter surfboat is hauled overland to a point opposite the wreck and there launched.

To the crew and passengers of a shipwrecked vessel the space of one to four hours that usually intervenes between the burning of the red light which signals the patrolman's discovery of the wreck and the arrival of the life-saving crew often seems an interminable wait, but such a lapse of time is almost inevitable save on stretches of coast where the stations are located

exceptionally close together. This will be appreciated when it is taken into consideration that the beach patrolman must in many instances walk three or four miles, perhaps in the face of a storm, to report the discovery of a wreck, and then the crew of life savers must drag the beach apparatus and perhaps the surfboat an equal distance through the sand or over rough

roads. If circumstances permit the use of either the lifeboat or surfboat, the keeper of the life-saving station assumes command and steers the boat—the latter requiring the highest refinement of skill when women and children are to be taken off in a tempestuous sea, since under such circumstances the rescuing craft must approach close to the shipwrecked party, yet without allowing the small bark to be overturned or dashed to pieces by a collision with the stranded hull. Help-



The Surfboat Turning Over.

less persons and passengers are usually passed into a rescuing boat first, and as a rule several trips are necessary before all members of a ship's company are safely conveyed to shore. In the comparatively few cases when a ship is wrecked amid comparatively dangerous rocks, or when so high a sea is running that neither lifeboat nor surfboat could make any progress even were it able to withstand the destructive force of the waves, recourse is had to the breeches buoy or the lifecar. Under such circumstances the first consideration is to get a line to the stranded vessel. To this end a leaden missile with a line attached is fired across

In any event, once the shipwrecked mariners have a line of any kind placed in their hands, they can speedily haul out lines of fair size, and eventually the three-inch hawser which is to serve as an aerial cableway and a highway to safety. Attached to every hawser thus sent out to an imperiled vessel is a board which bears, in English on one side and in French on the other, instructions how to fasten the hawser to a mast or other secure support, together with directions for signaling to the life savers on shore that the hawser has been made fast according to instructions.

As soon as the rescuers on shore are informed that the other terminal of this life line is fastened, the hawser is hauled taut and the shore end elevated by means of a tripod, in order to lift the rope well clear of the water. There is then sent off to the ship a breeches buoy, suspended from a traveler block or a lifecar from rings running on the hawser. Only one, or at most two persons, can be carried ashore at each trip of the breeches buoy, but from four to six persons can be accommodated in the lifecar. The efficiency of this latter apparatus was well attested in a memorable wreck on the New Jersey coast, when a single car was the means of saving more than two hundred lives.

After all persons have been landed from a wreck, the life savers draw out to the abandoned ship along the cableway an ingenious mechanical device known as a hawser cutter, which upon arrival at the terminus of the line automatically cuts the rope, allowing the crew to draw the hawser to shore and thus preserve intact a valuable part of their apparatus. In connection with this phase of life-saving operations, great care is necessary in coiling the initial line to be hurled to the imperiled vessel, in order that the slender rope may run free when the shot to which it is attached is fired from the mortar. Any tangling of the rope at this juncture would probably cause it to fall short of the wreck and might involve costly delays.

The United States government, which boasts the only life-saving service in the world supported wholly at national expense, now maintains upon our coasts a chain of 277 life-saving stations, of which number 200

are located on the Atlantic and Gulf coasts, 61 on the coasts of the Great Lakes, and 16 on the Pacific coast. Each of these stations is manned by a crew of from six to eight surfmen, who in every case occupy quarters at the life-saving station, and are thus in a position to respond promptly to any call to duty. It is estimated that the United States government life savers have since the establishment of the service saved not less than 225,000 lives; and statistics carefully compiled



The Breeches Buoy.



An Unsinkable Surfboat.

the imperiled vessel by means of the wreck gun, a powerful little portable mortar which will hurl a line over a wreck three or four hundred yards distant even in the teeth of a gale. If the wreck be exceptionally far from the beach, it may be necessary first to establish communication with the wrecked crew by firing a long-distance rocket attached to which is a cord.

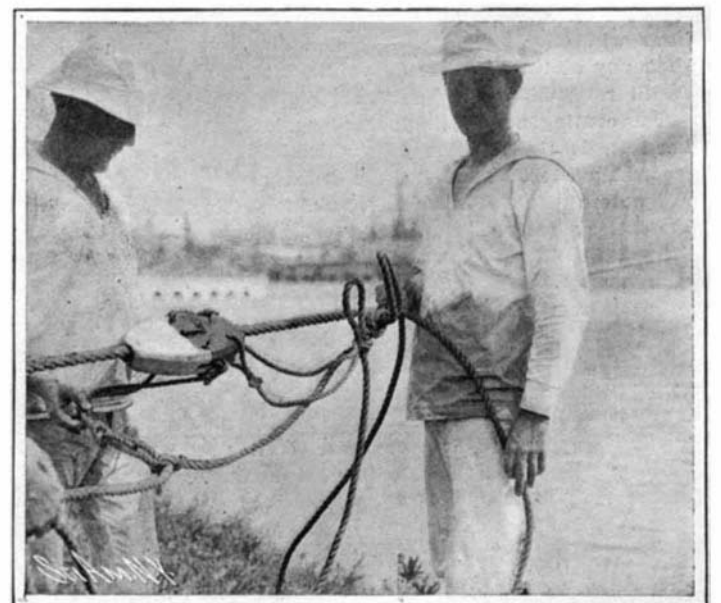
since the year 1871 show that in the interval which has elapsed since that date, an aggregate of \$200,000,000 worth of property has been saved.

Liquid Air in Blasting.

In one of the largest collieries in the north of England, liquid air cartridges are being utilized for the



Setting Out in the Life-Saving Boat.

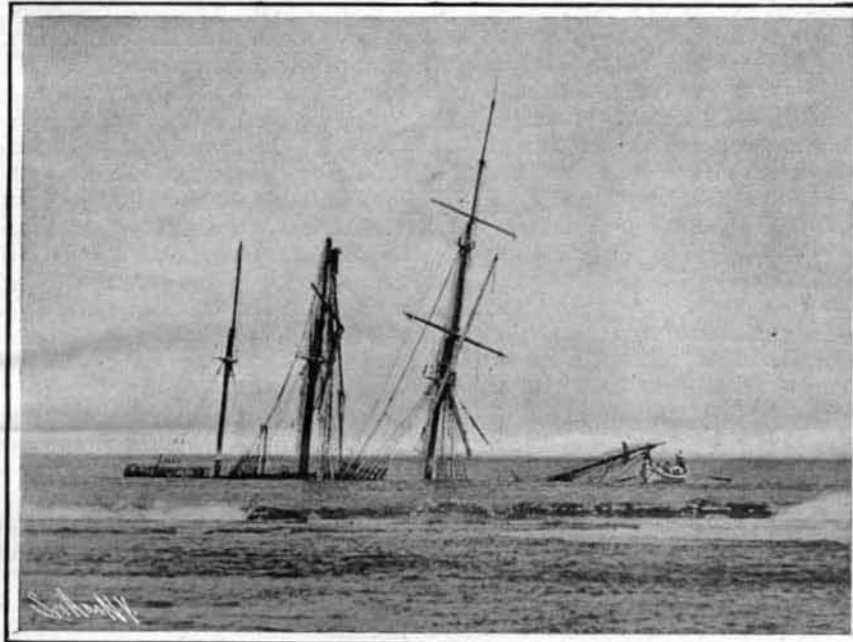


Using the Hawser Cutter.

purposes of blasting the coal in the lower workings. The coal face is drilled and the cartridges are tamped home in the usual manner. The cartridges themselves are of special design. The cases are made of phosphor-bronze of stout thickness. The end which is in-

await the coming explosion, which generally occurs in from six to eight minutes. The liquid air under the influence of the surrounding heat rapidly expands, and the inner end of soft metal affording the least resistance, it succumbs when the requisite pressure is at-

injured by the pressure exerted. A new soft metal cap can be quickly replaced, and the cartridge used immediately if desired. In this way the cost of the process is appreciably decreased. The employment of liquid air for such work is stated by the colliery engi-



The End of Her Last Voyage.



Landing the Rescued from a Wrecked Vessel.

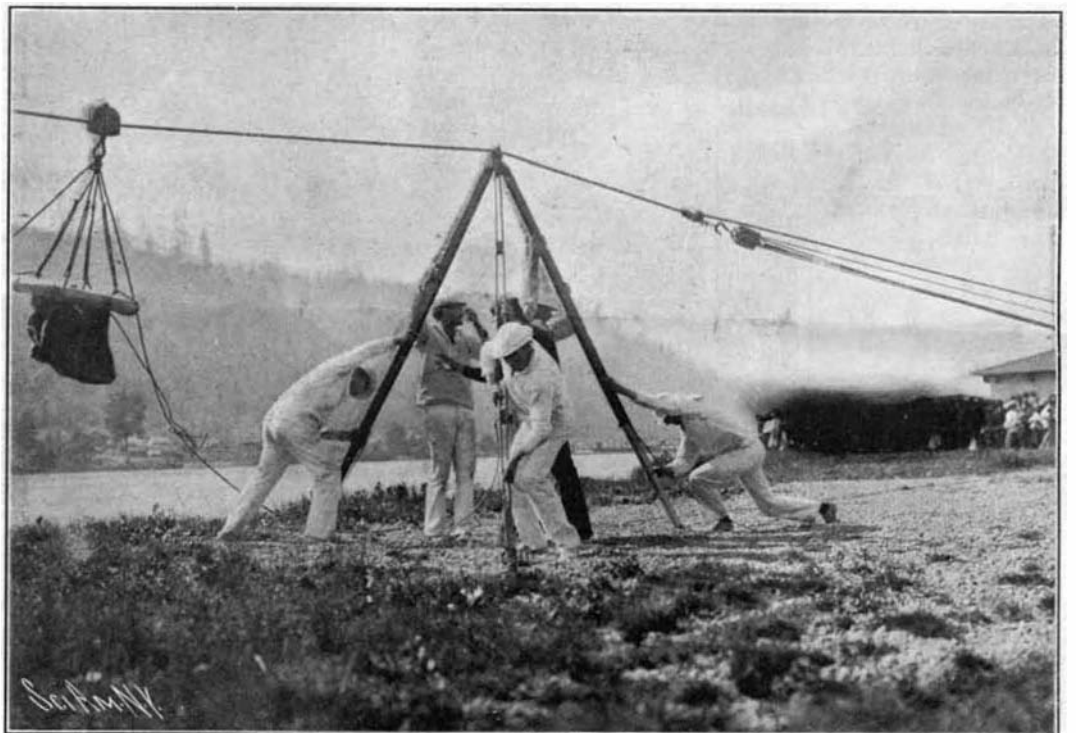
serted in the drill hole is formed of a soft metal similar to that used in type founding. At the outer end the cap is fitted with a tube in which is a non-return valve. The cartridge is inserted in an empty condition. When all is ready for blasting, the miner charges the cartridge with liquid air from a reservoir through the

tained, and the escaping gaseous air disintegrates the coal surrounding the cartridge for a considerable distance. The average amount of coal removed at a blast is about 30 tons, and so complete is the process of disintegration that no removed piece of coal exceeds two feet in length, the greater part being broken up into

neers to possess many distinct advantages over the ordinary explosives generally used. In the first place, misfires are impossible, as the liquid air under the influence of the surrounding heat is bound to revert to its gaseous state, expand, and the explosion result. Moreover, owing to the absence of any flame, the pos-



Reeling Life Line After Using the Life Gun.



Rigging a Tripod for the Breeches Buoy.

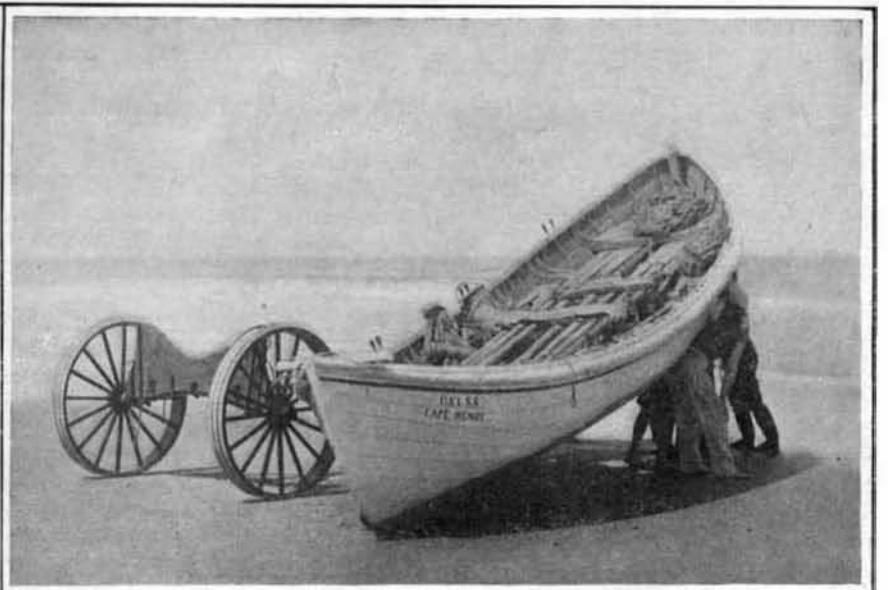
inlet pipe and valve, the latter preventing the air from escaping. The liquid air vessel itself is of convenient size for portability, and the contents are insulated by specially-prepared lamb's wool. The charge inserted in the cartridge is able to exert a pressure of approximately 80 pounds per square inch. When the charge is completed, the miner retreats to a safe distance to

conveniently-sized nuts. In the early experiments the pressure within the cartridge was considerably higher, but it was found that the force exerted was so great that the coal was completely pulverized and rendered unfit for commercial use. By using phosphor-bronze cartridges fitted with a soft metal end, the cases can be utilized repeatedly, as the phosphor-bronze is not

sibility of any gases present in the seam being fired are avoided. The explosion too is more even, and the coal broken up more regularly. In this particular colliery liquid-air blasting is rapidly superseding the more orthodox methods, especially in the lower workings, as the men become initiated into the methods of handling the liquid air.



Resuscitating an Apparently Drowned Person.



Replacing the Surfboat on Its Carriage.