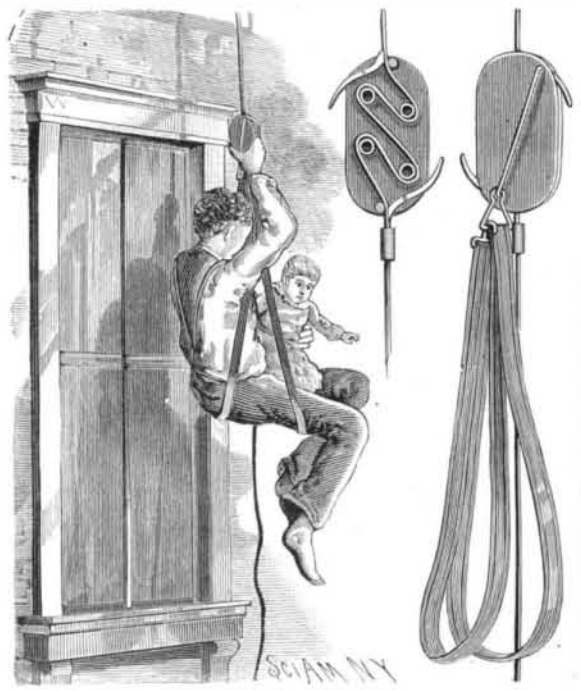
FIRE ESCAPE.

The sides of the block are united by four friction pins, arranged on two diagonal lines, and over which the rope or wire is passed (as clearly shown in the engraving). The rope is also passed over pins at the top and bottom of the block. At each end of the block is pivoted a brake lever, the inner ends of which press the rope against the pins. On a rod secured to one of the outer side surfaces of the block runs a traveler, to which one end of a belt of leather or webbing is secured, the other end of the belt being provided with a hook to be passed over the rod.

To use the escape, one end of the rope is hooked in the



WARE & RICHMAN'S FIRE ESCAPE.

window sill, and the other end thrown out of the window. The belt is passed around the body, and the hook clasped over the side rod. Then the person steps out of the window and slides slowly down the rope, the friction pins in the block preventing a rapid descent. By means of the brake levers the apparatus can be stopped at any time. When the block arrives at the ground, the person unfastens the belt, and the block is pulled up again to be used by another person, who throws the end of the rope that had been fastened in the room out of the window, and secures the opposite end. The device is portable, takes up a small space in a gripsack, and weighs but little.

This invention has been patented by Messrs. David Ware and C. W. Richman, of 900 Walnut Street, Philadelphia, Pa.

LUBRICATOR AND MEASURE.

The lubricator herewith illustrated automatically feeds oil in measured quantities to the valves of locomotives after the steam has been shut off. Slight changes adapt the device to the measurement of liquids. Fig. 1 is a vertical sectional elevation of the lubricator, and Fig. 2 is a sectional view of the device adapted to measure liquids. The oil cup is filled through an aperture in the top, which is closed by a plug. The cup has an aperture in the center of the bottom, and a depending neck, to which is fixed a plate having a central opening in line with the opening in the bottom of the cup.

PETER'S LUBRICATOR AND MEASURE.

The apertures and the neck are formed with interior screw threads to receive a screw plug consisting of a neck entering the cup aperture, a screw plate fitting in the neck, and a lower neck portion fitting in the lower plate. The neck upon the cup forms the side walls of the oil measuring chamber, the bottom of the cup forms the top, and the plate the bottom. In the neck is fitted a double plug valve having upper and lower heads, which seat themselves alternately at the top of the upper neck and at the bottom of the screw plate. Passages lead from the oil to the measuring chamber, the stem of the valve being shaped so as to allow free flow of oil from cup to chamber when the upper valve is opened and the lower one closed. When the upper valve is closed and the lower one opened, the oil in the chamber passes into the valve chest of the engine cylinder.

When the engine is taking steam, the steam pressure seats the lower valve and opens the upper one, thus allowing the oil to flow from the cup into the chamber. When the throttle valve is closed and the steam shut off, the upper valve seats itself, thereby shutting off the flow of oil from the cup, and the lower valve opens to allow the oil in the chamber to escape to the steam chest to lubricate the valves when they are running over their seats while the engine is slowing down. By this arrangement the valves receive oil when they are not being lubricated by steam, and when effective lubrication is most needed. The oil chamber can be enlarged or contracted at will by simply screwing the oil cup up or down, and by screwing the bottom of the cup down to the screw plate all flow of oil from the cup will be prevented.

Fig. 2 shows this principle applied to the measuring of liquids. The measuring chamber is connected to the outlet from the vessel containing the liquid. When the valves are in the position shown in the drawing, the liquid fills the chamber. Moving the lever changes the positions of the valves, closing the upper and opening the lower one, through which the measured liquid is drawn off. An upwardly closing vent plug insures the discharge of the liquid from the chamber. The device can be readily adjusted so as to measure any desired quantity.

This invention has been patented by Mr. John S. Peter, of Angelica, N. Y.

The Properties of Starch.

A number of interesting papers on this subject have lately been published by Messrs. F. Musculus, Brukner, and others, whose researches throw considerable light on the properties of starch, and show how it may be distinguished from the different varieties of dextrine with which it is frequently confounded. The first named investigator espepecially criticises Solomon's recent paper, who treated only of crystalline starch, completely ignoring the amorphous variety. According to Musculus, dilute solutions of crystalline soluble starch give a red coloration with iodine, but concentrated solutions yield a blue color; this crystalline variety dialyzes slowly, and reduces Fehling's solution on boiling; on the other hand, the amorphous modification is soluble in cold water, and always gives a blue coloration with iodine; it cannot be dialyzed, and it does not reduce Fehling's solution. Brukner has especially studied the iodine reaction, and is of opinion that the so-called iodide of starch is not a chemical compound; he considers that the blue color is simply due to the solution of iodine in potato starch, just as violet and brown colors are obtained on solution in chloroform and water respectively. Brukner also states that potato starch yields a blue color, while wheat and rice starch yield violet; but after boiling, the latter are also turned blue by iodine.

CAR AXLE BOX.

Formed upon the top of the housing, A, is an oil chamber, E, that is made with a separable cover. In the center of the bottom of the oil chamber is a boss, G, in which is a vertical hole passing through the top of the housing, and having in its upper part a screw thread, and having its lower part tapered, as shown in Figs. 1 and 2. Oil conducting grooves lead to the base of the boss, where they connect with channels leading to the lower part of the hole. The flow of oil from the chamber can be regulated by the screw, H, whose lower portion is tapered. A jam nut holds the screw in any desired position.

The wedge, J, has a recess formed in its upper side to receive oil from above, and has a hole in its middle part to allow the oil to pass through it. The forward movement of the wedge is limited by a shoulder formed upon the under side of the housing. In order to give it a slight longitudinal play, the wedge is made a little shorter than the space between the shoulder and the inner end of the housing. For convenience in inserting and removing, the wedge has a lip upon the under side of its outer end. Upon the lower side of the wedge are flanges forming a dovetailed groove (Fig. 4) for receiving the dovetailed projection formed upon the upper side of the brass, K (Fig. 3). The movement of the brass is limited by a flange connecting the outer ends of the side flanges. In the brass is made a recess to receive the oil, and through the brass is an opening to conduct the oil to the journal. The journal has a slight play upon the brass, and the latter a play upon the wedge, which has a play upon the top of the housing.

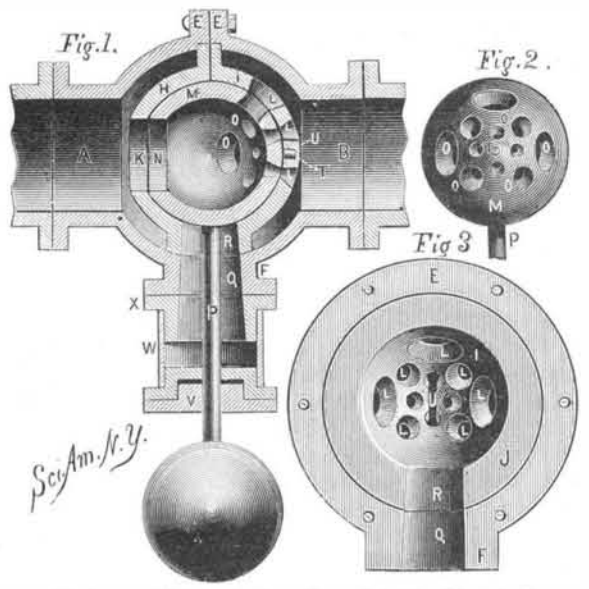
The cotton waste is placed in a cellar box under the journal box, and is held against the journal by curved springs placed in the bottom and attached at one end to the box, which has a closed bottom and fits snugly in the journal box, so as to catch and hold all the refuse oil. This oil is prevented from working out beneath the journal by a guard plate, M, placed between the parts of the double walled end of the box, and held up by spiral springs. The outer end of the journal box is provided with a door, B, clearly shown in Fig. 2.

This invention has been patented by Mr. M. R. Carey, of Mauch Chunk, Penn., who may be addressed for further particulars.

MARINE ENGINE GOVERNOR.

In the accompanying engraving is shown a marine engine governor constructed in such a manner as to shut off steam automatically when the vessel rolls and pitches. The two parts, A B, forming the shell are constructed with flanges at their outer ends for convenience in connecting with the ends of the steam pipe, and at their adjacent ends are flared into spherical form and made with flanges, E, by which they are united. In the lower side of the shell is an opening provided with a fixed collar, F, having a flange at its outer end. Within the shell are placed semi-spherical plates, H I, which have flanges around their edges to fit into the rabbeted parts of the shell, and an opening in their lower side corresponding with the opening in the shell.

Steam is admitted into the space between the two spheres, A B and H I. In the center of the part, H, is formed a



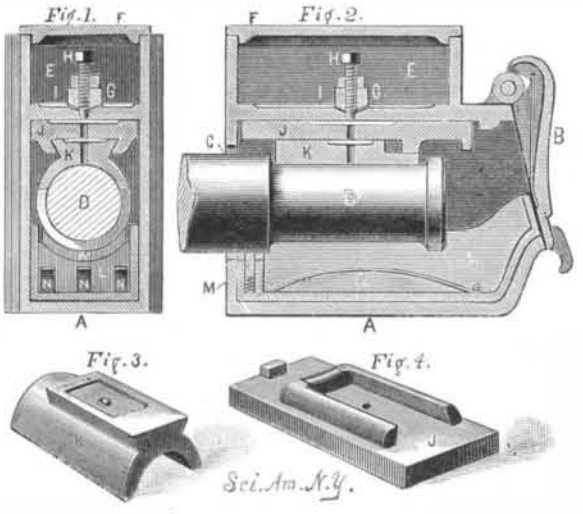
BELL & FULLER'S MARINE ENGINE GOVERNOR.

large opening, K, and in the other part are formed small openings that are either circular, square, or of other desired shape. Within the sphere, H I, is fitted a hollow sphere, M, having an opening, N, in one side corresponding with the opening, K, and in the other side are openings, O, corresponding in shape, size, and number with the openings, L. Upon the lower side is rigidly attached a stem, P, which passes out through openings, and has on its lower end a weight sufficient to hold the stem in a vertical position and the sphere, M, stationary, thereby causing the sphere, H I, to turn upon the sphere, M, as the vessels rocks and pitches. This movement partly or wholly closes the openings, L O, resulting in the steam being partly or wholly shut off and the slowing or stopping of the engine. The sphere, M, is prevented from rotating upon the stem, P, by a pin, T (Figs. 1 and 2), which enters a vertical groove, U (Figs. 1 and 3), in the inner surface of the sphere, H I. The lower part of the stem passes through a stuffing box, V, attached to the outer end of a short, flexible hose, W, whose inner end is secured to the collar, F, either directly or by means of the flanged collar, X. This construction prevents the escape of steam, and allows a free lateral movement of the lower end of the stem.

This invention has been patented by Messrs. A. H. Bell and A. Fuller, and further particulars may be obtained by addressing the latter at No. 10 Renwick Street, New York city.

Plant Nut Trees.

The Baltimore *Market Journal* says: "The idea of planting edible nut bearing trees where shade is desired, instead



CAREY'S CAR AXLE BOX.

of those which are solely ornamental, is not new, but the suggestion is one that will bear thinking about by those who contemplate planting shade or ornamental trees. Chestnut, walnut, hickorynut, and butternut trees are all nearly as fine in appearance as horse chestnut and maple, and, aside from the source of revenue, which will in time accrue to their owners from the fruit, the timber of such trees is always in demand, and the tree itself may become profitable should it become desirable at any time to remove it.