

NEW INVENTIONS.

Mr. Lester Low, of Ryegate, Vt., has patented an improvement in carpenter's squares, which consists, first, of a square provided with crenulations or notches along one or more of its edges, arranged to coincide with its graduations.

Mr. Randolph P. Cory, of Union City, Ind., has patented an improvement in that class of revolving firearms in which a chambered cylinder is adapted to slide as well as revolve on a horizontal axis and is forced up against the barrel just previous to each discharge.

Mr. George T. Hedrick, of Weaverton, Ky., has patented an improvement in bag stoppers, which consists of a short solid cylinder or disk, externally flanged at top and bottom, with a central circular groove between the flanges, to receive the upper end of the bag and its drawing string, the lower flange being provided with two or more holes for attaching one side of the stopper to the bag, so as to be swung outside of the bag and out of the way of the grain in filling a bag or emptying it.

Mr. George Cressey, of 175 Third St., Louisville, Ky., has patented an electric water meter register. The object of this invention is to provide a practical and reliable means for registering the amount of water passed through a meter. The invention consists, principally, in combining an electro-magnetic register, a battery, and a circuit wire with a water meter, which circuit wire enters the meter, and through proper insulations and contact faces makes and breaks the current at every impulse of the piston or other working part of the meter without the necessity for a stem or any other movable part operating through the meter case

IMPROVED GOVERNOR.

We give an engraving of an improved governor recently patented by Mr. Joseph H. Stombs, of La Crosse, Wis. This governor is of the class in which an auxiliary weight is used in connection with the customary governor balls, the weight engaging with the stem of the governor valve and serving as a means for controlling the action of the valve, to make it more sensitive.

The improvement consists in a cylindrical shell of glass provided with detachable heads having a central tube, which passes through the cylindrical shell and receives the stem or long arm of a lever fulcrumed in a block or support carried by the base plate of the governor frame. The cylinder is movable on the lever, and is half filled with a suitable liquid. The short arm of the lever engages the valve stem. The lever rests upon a knife-edged fulcrum.

The governor stem carries the customary bevel wheel, into which meshes a bevel wheel on the governor driving shaft. The stem is loosely fitted in an encircling sleeve, which receives the inner ends of the arms carrying the governor balls.

A collar secured to the stem below the sleeve serves to form a temporary connection between the governor balls and the valve stem when said balls are thrown in an outward direction by centrifugal force, tending to close the valve. The governor stem is surmounted by a ball, which causes the stem to slide through the frame and bevel wheel when the governor balls drop by reason of the breakage or stoppage of the driving mechanism. It necessarily follows that the downward movement of the stem facilitated by the weight will cause the governor valve to close and instantaneously arrest the flow of steam to the engine.

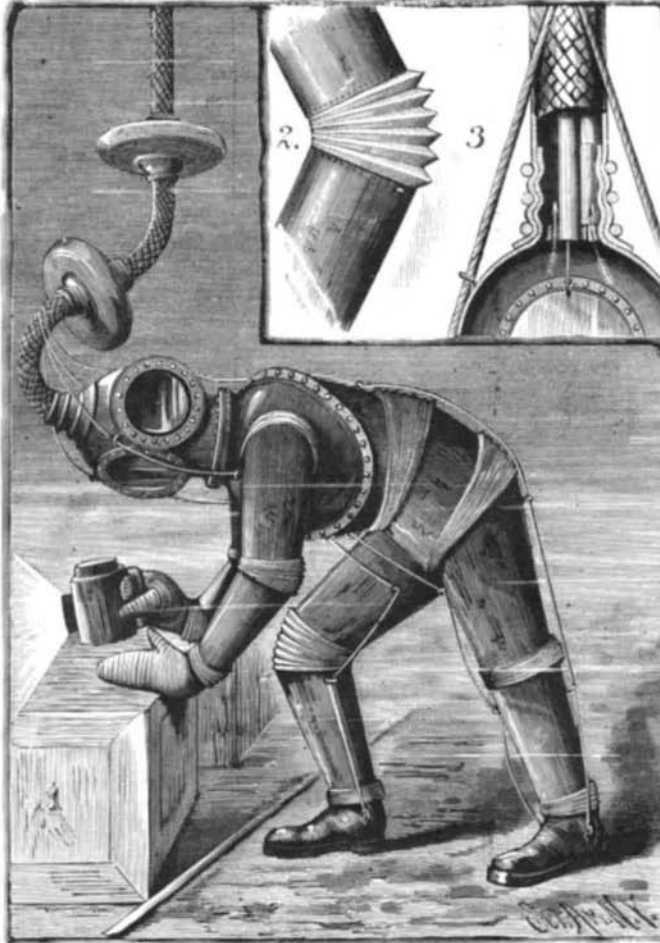
The sleeve below the bevel wheel, which connects the valve rod with the governor stem, has a transverse pin carrying wedge-shaped blocks at its ends. The face of the sleeve adjoining the end of the weight lever has a recess, which forms a seat for the wedge-shaped block.

It will be apparent that when the thin end of the block is turned in a downward direction the end of the weight lever will remain engaged therewith during the ordinary movements of the governor balls; but when the latter have assumed their lowest position the end of the lever will glide off from the block, so as to disengage it from the valve and governor stems, which will permit the valve to close by means of the independently movable governor stem. By placing the thick edge of the block down, the parts are so set that the lever cannot become disengaged from the valve and governor stems. The lever is only to be used in this last described manner when the motor is being "shut down." When the stop motion is on, which is the case when the thin end of the wedge-shaped block faces in a downward direction, the

regulator or weighted lever will be unshipped in the manner already described, and in dropping down it falls upon a spring, which breaks the fall of said lever. In the ordinary working of the governor the center of gravity of the weighted lever is shifted with every upward and downward movement of the lever, making the governor more sensitive than it could be with a fixed weight on the lever.

NEW DIVING APPARATUS.

In diving apparatus shaped to the human body it has been difficult to combine with the requisite flexibility of material



TASKER'S IMPROVED DIVING APPARATUS.

a rigidity sufficient to resist at every portion of the armor the external pressure of the water without re-enforcing or aiding the material of which the apparatus is composed by pumping within it a supply of atmospheric air not only sufficient to insure life to the diver, but also sufficient to balance the external pressure of the water.

The armor, shown in the engraving, overcomes this difficulty, and is of itself of sufficient strength to resist at its every portion the external pressures without re-enforcement by an oversupply of internal air, and is at the same time sufficiently flexible to permit of the movement of the diver.

The joints corresponding to the joints of the limbs are of bellows form, permitting of the free movement of the body and limbs. The joints are stayed so as to prevent collapse from external pressure, as shown in the sectional view, Fig. 2.

It is obvious that this joint has the advantage of being laterally very stiff, compact, and light, a few rings cut from light sheet metal insuring, from their form and arrangement, both strong resistance to exterior pressures and large extension to the flaps. The flap portions are thoroughly protected by the rings when closed, and held with certainty in their folds, while the connection of section with section is steady and strong, whether the joint be open or shut. The apparatus, therefore, considered as a whole, is a casing at all parts, joints, and unjointed surfaces, capable of resisting external pressures.

The trunk portion of the apparatus is provided with a coupling, which starts from one shoulder, extends obliquely around the body, front and back, and terminates below the arm which is opposite to the shoulder mentioned, so that the apparatus can be easily put on and taken off.

The helmet of the apparatus, shown in section in Fig. 3, is adapted to be removed.

The air tubes consist of an inner tube for supplying air, and an outer tube for carrying off the exhaled air. These tubes are made to resist a high degree of external pressure and to have a tensile strength sufficient for raising and lowering the apparatus.

This new diving apparatus is the invention of Mr. Stephen P. M. Tasker, of Philadelphia, Pa.

Charles A. Spencer.

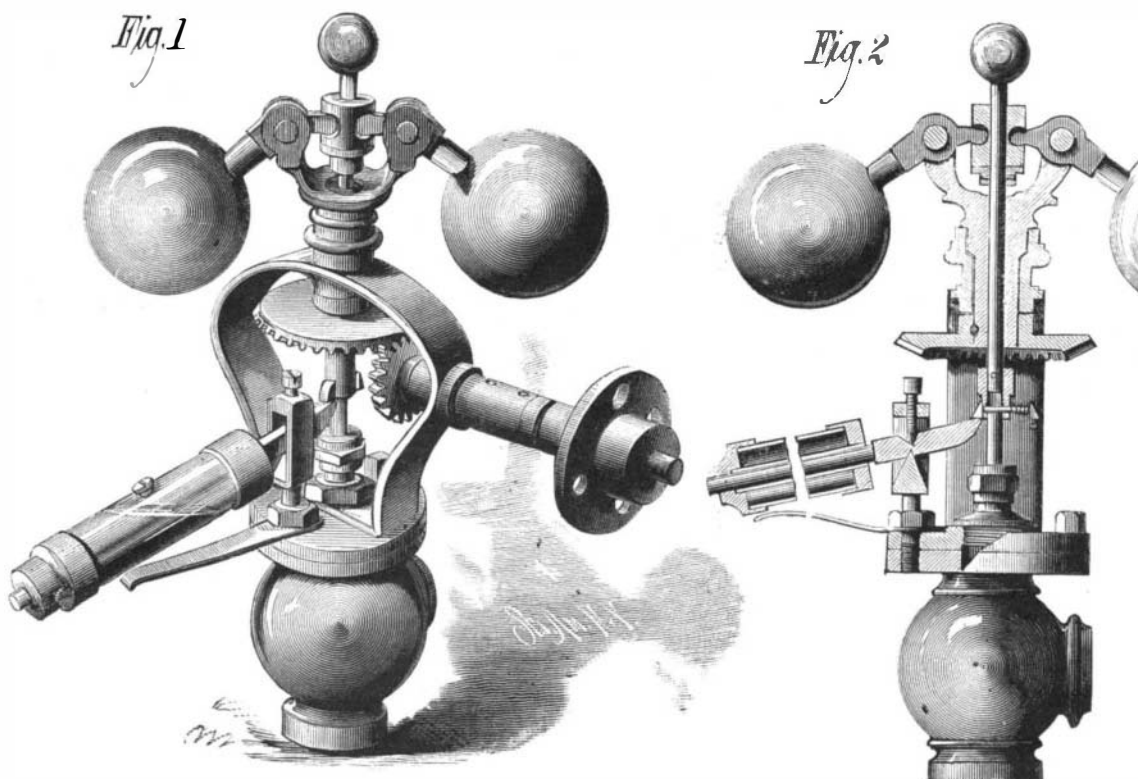
For many years the little town of Canastota, N. Y., has been known to scientific men the world over as the source of the most perfect and efficient microscopic lenses to be found. Their maker, Charles A. Spencer, died recently, at the age of sixty-eight, in Geneva, N. Y., whither he removed five or six years ago. With all his genius and skill, Mr. Spencer had none of the traits of a money-maker, and his whole life was troubled by poverty due very largely to his inability to carry on a business by business methods. His great difficulty apparently was that he never reconciled himself to the idea of spending his life as a mechanic, though in his sphere the best mechanic in the world, and so devoted to classical and other studies time that should have been devoted to the business interests of a calling for which he was pre-eminently adapted.

An intimate friend says of him in a communication to the *Utica Herald*: "At an early day he acquired a reputation which opened the broadest market for his glasses and instruments, but the trouble was his tariness in filling orders. He would suffer none to go from his shop until tested by him and found perfect, and to do this he would take time, and that discouraged patrons. I have been shown by Mr. Spencer unfilled orders on hand at one time, from all parts of the country and from Europe, amounting to from \$20,000 to \$25,000, or more. One of the first great triumphs of Mr. Spencer was in the discovery of the markings on a specimen of the *naviculæna*, an infusoria of the waters of

the Hudson, sent to him as a test object by Prof. Bailey, of West Point. The professor had a microscope of the last make of Ross, of London, that defined the longitudinal lines of that infinitesimal object, and he thought Spencer's glass would not exhibit them. On applying it Mr. Spencer found not only these, but much finer transverse lines, plainly marked, quite to the confusion and astonishment of the professor. That triumph soon went through Europe, and that test object took the name to this day of the *Navicula Spenceri*. Ross, the celebrated scientist and optical instrument maker of London, set the limits to the powers of glasses. Spencer at an early day far transcended those limits, confounding the most learned in Europe. A professor in the university of Dublin reported to that university the fact of that triumph as having been accomplished by a 'young man of the western forest,' to his surprise and great pleasure. Thus did he

invade the old and long obscured formulas, and strike off in a line overthrowing all and leading to such perfection."

The detection of the imperfect adjustment of the great telescope at Washington, after it had been many years in use, characteristically illustrates the acuteness of Mr. Spencer's perception in such matters. Observing that the instrument was not adjusted so as to display its full powers, he



STOMBS' GOVERNOR.

The flexible waterproof covering of the armor is made of rubber, water-proof cloth, or other fabric, which, while both strong and elastic, is impervious to water.

An interior metallic casing constitutes the inner layer, or body of the suit. The lining has rigidity sufficient to retain the contour of its various sections against the collapsing pressure of the water.