valve 14; thus opening a communication between the space above the runner and that below the runner, equalizing the pressures in said spaces. This causes the runner and shaft to descend; but as the shaft descends it reverses the operation, closing the valve 14, and shutting off vacuum from be-



802,775.

low runner; which will be replaced by pressure from water leaking in from the space above runner, again causing the runner to ascend. At some point in this operation the shaft and runner arrive at an equilibrium, and will float free in the water.

Explosion Engine.—E. T. Pollard.—803,623.—The high efficiency explosion engine shown, has three cylinders, two of which (preferably the two outside cylinders), are ordinary explosion-cylinders, but each provided with a port or



ports so situated as to be uncovered by the piston just at the end of its out-stroke. The port communicates by a passage in which is a non-return valve with the rear of the middle cylinder. Thus the products of combustion pass

## GREAT BRITAIN.

Automatic Coupling-Buffers.—Edgar Allen and Co., Limited, Sheffield.—(W. McI. Robinson and E. E. Letchford, Pretoria, Transvaal.)—357.—In the mechanical appliances at present in use the coupling-gear consists of a pin and link.



The object of this invention is to obviate the danger to which an employee is exposed in either coupling or releasing such gear, and the delay often caused by the pin becoming bent or jammed.

Wrenches, Spanners, and the like.—Raisse.—21,228.—The wrench comprises two fixed jaws and a number of movable blades, which can be inserted as desired so as to make the space correspond to the diameter of the nut, etc., to be turned.



Elastic-Fluid Turbines.—Corthesy and Griffin.—25,269.— The turbine described has a rotor part with a number of impact vanes on its periphery, and steam impinges upon them for a number of tangential jets in the circumference



of a stationary stator or casing. The steam supply passages alternate with exhaust passages. The turbine may be reversed by supplying steam to an inner stationary ring provided with a number of similar jets.

Variable-Speed Gearing.—Kenrick.—19,739.—Two cones, facing each other, are mounted on the same axis, and two beveled carried wheels are mounted on a shaft pivoted upon the axis of the cones. This shaft is caused