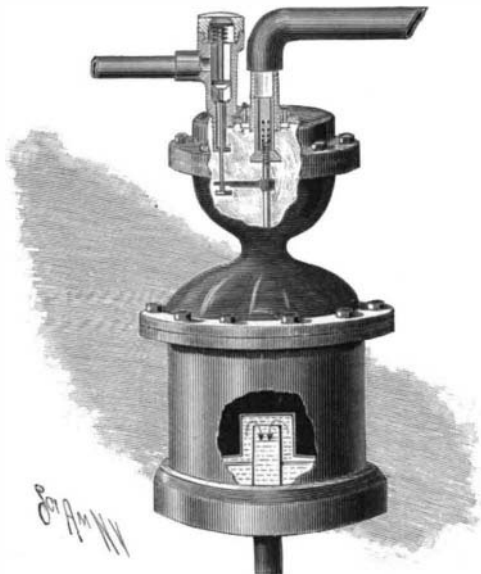


**A CONDENSER FOR STEAM ENGINES.**

The illustration represents a condenser arranged to prevent the water from accumulating in the condenser casing, irrespective of the working of the pump, and without causing back pressure on the engine. It has been patented by William T. Snell, Laurium, Mich. It has a closed casing from whose bottom extends a suc-



SNELL'S CONDENSER FOR STEAM ENGINES.

tion pipe connected with a pump, and in the casing is a bell-shaped float on whose upper end is a vertical stem connected with a spraying nozzle sliding in a pipe leading to the water supply, the rise and fall of the float thus shutting off or regulating the admission of the cooling water. On the upper end of the condenser is also a valve casing connected with the exhaust pipe of the engine, the casing having two valves attached to a common valve stem, whose vertical movement causes the steam to be passed into the condenser or to the outer air. A coiled spring near the upper end of the valve stem holds it normally in uppermost position, the steam then passing into the condenser; and on the lower end of the stem, within the condenser casing, is a collar adapted to be engaged by an arm which is vertically adjustable on the stem extending upward from the float. In case the water accumulates in the casing, from not being drawn off fast enough by the pump, the rising of the float shuts off the supply of cooling water, which is again admitted through the spraying nozzle, when the pump reduces the amount of water and the float moves downward. Should the water supply fail, or water be drawn from the casing faster than supplied, the sinking of the float would cause the arm extended from the stem of the float to engage the collar on the lower end of the valve stem in the casing connected with the exhaust steam pipe, thereby shutting off steam from the condenser and passing it out to the atmosphere. In the under side of the float, as shown in the broken-away portion in the engraving, is a small chamber into which extends the upper end of the suction pipe, permitting air bubbles to be readily drawn out, a spider on the bottom of the float forming a guide for the float on the fixed suction pipe.

**TWO NEW RANGE FINDERS.**

We illustrate herewith two range finders, invented by George M. Searle and George N. Saegmuller, of



SEARLE AND SAEGMULLER'S RANGE FINDER.—Fig. 1.

Washington, D. C., for which United States letters patent Nos. 588,093 and 588,094 were granted them August 10, 1897. The purpose of these devices is to determine the distance of remote objects, such as an enemy's vessel at sea, in a rapid and convenient manner, by means

of a scale on the instrument, and without the delay of calculation.

Fig. 1 is designed for use on the deck of a ship, or other horizontal surface, and its base line is horizontal; its principle of operation being that of a constant angle by means of an adjustable base line. It comprises a graduated base line bar having a fixed right angular reflecting prism at one end, and also a movable one, with a pointer, traveling on the graduated scale of the base line bar, said two reflecting prisms being in different planes to throw their images on different portions of the object glass of a telescope, and a telescope constructed to bring these two images into coincidence whenever the movable reflecting prism reaches the point on the scale indicating the distance of the object viewed.

Fig. 2 is designed to meet the conditions of range finding or distance measuring from an observation point aloft, on the mast head of a ship, for instance. The base line in this case is vertical, and is of a fixed and definite length. This range finder comprises a telescope, two reflecting prisms separated, in fixed relation, a distance apart representing a base line, and arranged in different planes, so that each sends its own rays upon a different portion of the object glass of the telescope; an axially adjustable refracting plate for receiving the rays from one of the reflecting prisms and bringing them into coincidence with the other rays of the other prism; a pointer fixed upon the adjustable refracting plate; and a cotangent scale of equal parts for marking equal spaces for variable distances. This latter device (Fig. 2) is being put upon the United States battleship Iowa, and great results are expected from it. From a preliminary test the following comparison of distances by triangulation and the range finder were obtained.

By Triangulation.	By Range Finder.
2154 yards	2140 yards
1814 "	1800 "
1212 "	1220 "
1184 "	1190 "
4300 "	4270 "

The instruments are being manufactured by George N. Saegmuller (Fauth & Company) Mathematical Instrument Works, No. 108 Second Street, S. W., Washington, D. C.



Fig. 2.

RANGE FINDER.

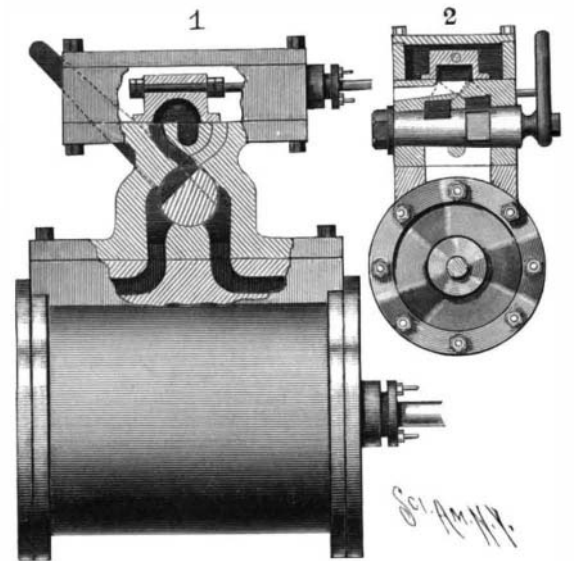
**Time for Surgical Operations.**

In regard to the best time for capital operations, a writer in Gaillard's Journal states that in following the course of such cases and of various operators for a number of years in the hospitals of a large city, it seemed that the early morning hour presented many advantages—that is, a good night's rest, attained artificially if necessary, an empty stomach, the patient all ready for anæsthesia upon awakening, the fear and dread of what is coming being crowded into the fewest possible moments, the whole day with active attendants constantly moving about and alive to every demand of the patient, etc., are a few of the points which seem to recommend an early hour; on the other hand, it is not to be denied that it may be a source of greater task upon the surgeon's powers, especially if he be concerned and anxious, as conscientious men always must be in regard to capital operations, and if this anxiety interferes with the operator's sleep. Even with this disadvantage, however, the operator is capable of doing really better work before he has become tired and annoyed by the various demands upon him during the early hours of the day. Consequently, those who have operated extensively in the early morning hours never volunteer any afternoon operations.

**A REVERSING VALVE FOR ENGINES.**

A reversing valve chest is, according to the improvement represented in the accompanying illustration, interposed between the ordinary cylinder and steam chest, and this valve chest contains a reversing valve and connecting ports, the device being readily applicable to any ordinary engine, although for new engines the reversing valve chest may be made integral with the cylinder or the steam chest. The improvement has been patented by David W. Roy, of Tucson, Arizona Territory, Fig. 1 representing it in side elevation and Fig. 2 in transverse section. The port at one end of the cylinder connects with two ports in the reversing valve chest, containing a reversing valve in the form of a plug valve, and the port at the other end of the cylinder connects with two other ports in the chest, and leading to the bore in which the valve is mounted to turn, the several ports of the valve being arranged opposite each other, but in pairs which lie in a different

vertical plane, and each pair connecting by different passages with ports leading to the steam chest, where the slide valve is operated from the main driving shaft of the engine in the usual manner. Between the ports leading to the steam chest is an exhaust port, and on the outer end of the plug valve is a handle by which the valve may be turned to the right or left for revers-



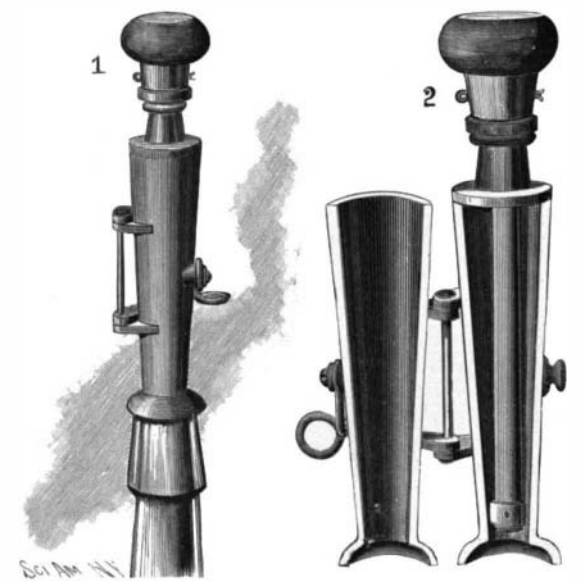
ROY'S REVERSING VALVE FOR ENGINES.

ing the engine, or moved to a vertical position for cutting off steam.

H. WILDE has exceeded his own estimated limit of 400 lb. per square inch for magnetic traction by means of annealed charcoal iron wire 0.57 in. in diameter. The electromagnet was excited by a current of 40 amperes. With a piece of wire 1.2 in. long the unprecedented tractive force of 422 lb. per square inch was obtained. That the magnetization limit was virtually arrived at was shown from the fact that, when the current transmitted round the electromagnet was reduced from 40 to 26 amperes, the amount of the tractive force remained constant. The determinations were made with a single pole electromagnet, says the Electrician.

**INSERTING CORKS IN BOTTLES.**

For driving corks into place in bottles, as may be necessary in small bottling establishments or where families preserve domestic products, the device shown in the accompanying illustration has been invented and patented by Charles von der Linden, of Rhinebeck, N. Y. Fig. 1 shows the device closed, applied to a bottle, and Fig. 2 shows it open. It has two tapering sections, pivoted to swing to open and closed position, the sections being held closed by a clamping arm, and the lower end of each section has a semicircular flange, the flanges forming a dish-shaped cavity adapted to receive the mouth of the bottle. A circular head closes the upper ends of the sections, and in an upwardly extending boss is held a sliding rod or plunger, to the upper end of which a hand knob is removably attached by a cotter pin. A washer of greater or less thickness is placed on the plunger below the hand knob, thus regulating the amount of vertical movement of the plunger. In use, the cork is placed in the open lower end of the device, when the sections are closed to hold the cork firmly, and the flanges are made to embrace the mouth



VON DER LINDEN'S CORKING DEVICE.

of the bottle, after which the hand knob is struck to drive down the plunger rod and force the cork into the neck of the bottle. To drive the cork completely down, flush with the mouth of the bottle, the washer is removed from the plunger rod.