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Breech-Loading Firearms.

The Board of Ordnance officers, consisting of Col. Ripley, Major Ramsay, and Captain Maynadier appointed by the Secretary of War to examine and test all breech-loading firearms that might be presented to them, with a view of adopting a model for the alteration of the old arm to breech-loading, have submitted to the Department a report of their experiments lately made at West Point in obedience to instructions. From reports received from outside spectators at the trials, which are embraced in the statement published on page 390 of the present volume of the SCIENTIFIC AMERICAN, we were inclined to believe that Mt. Storm would have been the successful competitor, but in this we were mistaken, as will be seen by the following concluding paragraph of the report, which embodies the practical result of the labors of the Board :—

"The Board select Morse's model, inasmuch as it differs from the others by including the new and untried principle of a primed metallic cartridge, which may, on actual trial, be found of advantage; and they recommend that the appropriation, or so much of it as the Secretary of War may deem necessary for the purposes of trial by troops in service, be applied to the alteration of old United States arms upon Morse's model, with certain modifications suggested by him."

The other Ordnance Board recently assembled at West Point, under that part of the same act which makes an appropriation "for the purchase of breech-loading carbines of the best model to be selected and proved by a board of Ordnance officers," have not yet made their report.

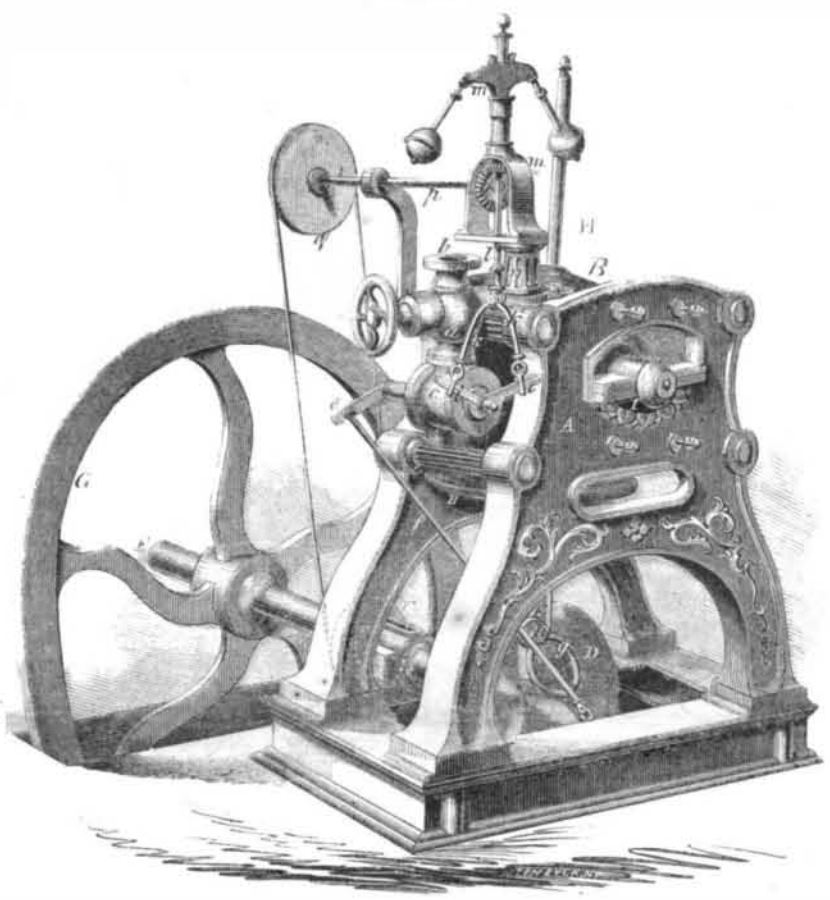
An Instrument for Examining the Eye.

An ingenious instrument called the opthalmoscope, by the aid of which the eye may be internally examined, has recently been introduced to the notice of the scientific world. The instrument is in the form of a concave mirror, with a hole in the center, in which a lens is inserted, and to this another lens is added, which, however, is separated and movable. When the instrument is used a lighted candle is placed at the side of the patient. The concave mirror is then held in front of the eye to be examined, while the movable lens is suspended between the light and the mirror in such a manner as to concentrate the rays of the first on the second. The reflected rays converge on the retina, and on passing through it, diverge and render luminous the whole interior of the eye, which the observer can see by looking through the lens placed in the mirror's center. The retina and the lens form a microcope, the multiplying power of which is about five hundred.

SCIENTIFIC BURGLARY.—One of the most recent improvements used by burglars in this city is the use of the blowpipe, to draw the temper of the chilled iron and steel placed as a guard against cutting instruments around the locks of safes and vaults.

MACKINTOSH & WADSWORTH'S CUT-OFF AND GOVERNOR VALVE.

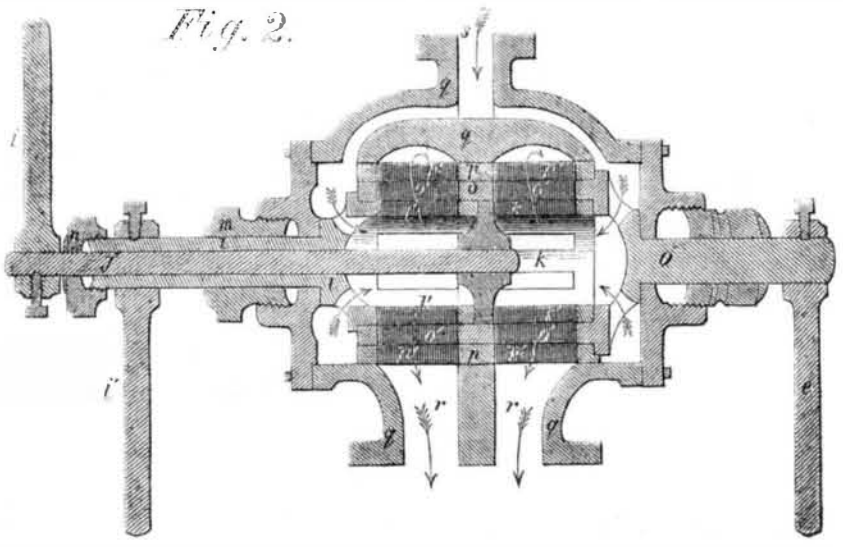
Fig. 1



This invention is a novel arrangement of hollow rolling balanced valves, which affords great convenience for adjustment to cut off the steam at such a point in the stroke of the engine as may be desired under the average or usual load of the engine, and average or usual pressure of steam, but which is capable of being controlled by a governor in such a manner as to vary the point of cut-off to meet variations in the steam pressure or load on the engine, and thereby regulate its velocity.

Our engravings fully illustrate the invention; the first is a perspective view showing its application to an oscillating steam engine, in which A is the frame of the engine, B the cylinder, D the crank, and E the piston rod. F is the main shaft, G the fly wheel, H is a guide

Fig. 2.



rod, and I is the trunnion box or bearing; *a* is the throttle valve, *b* the steam entrance, *c* the cut-off and governor valve box, *e* the lever of the regular cut-off, *f* the connecting rod with crank on the end wrist, *g* crank on the end wrist moving the regular cut-off by rod *f* and lever, *e*; *h* is the crank pin; *i i'* are levers moving the governor valves, *k k'* governor valve rods, *l* is the governor rod, *m* the governor, *n* the governor frame, *o* the gearing that drives the governor from the wheel, *r*, on the main shaft by the belt and wheel *q*, and shaft, *p*. Fig. 2 is a vertical longitudinal section of the cut-off, which we will now describe: *q* is a shell or case (*c* Fig. 1), a passage, *s*, in which communicates with the throttle valve, and the steam enters this shell in the direction of the arrow, passing out through the passages, *r*, to the upper or lower end of the cylinder at each stroke of the piston; *p* is the valve seat, having ports, *p'*, in it. In this valve seat works the positive cut-off, *o*, provided with ports, *o'*, and operated by a stem or shaft passing through a stuffing box in one end of the shell, *q*, to which is attached the lever, *e*, operated from the crank by the rod, *f*. In order that the induction of the steam may be controlled by the governor there works inside the cut-off, *o*, a valve, *l*, having ports, *l'*, the stem of which, *l*, is hollow and passes through a stuffing box, *m*, in the end of the shell, *q*. This is operated by the governor being connected with it by a lever, *i'*. There is another valve, *k*, working inside the cut-off, *o*, to regulate the width of the other set of ports, *o* and *p'*, and this is connected to a solid stem, J, that passes through the hollow stem, *l*, and through a stuffing-box, *n*, at its end. It is operated from the governor by the lever, *i*, seen also in Fig. 1. One of the valves regulate the cut-off of the steam to one end, and the other to the other end of the cylinder.

The operation is simple, the steam entering at *r* passes inside the valves and through the ports into an annular passage, and so out at *r*. As the quantity of steam supplied the cylinder depends upon the area of the ports, it is evident that as the governor controls the area of these ports, opening them wide when they are low and revolving slowly, and closing them altogether when revolving too fast or are too high, but the valves being properly arranged in relation to each other and the governor, they will keep the engine at the proper speed, under the varying pressure of steam in the boiler, and the varying amount of work which may be on the engine.

This cut-off is the invention of W. S. Mackintosh and S. Wadsworth, of Pittsburg, Pa., and they have assigned their interest to Cridge, Wadsworth & Co., of the same place, from whom any further particulars can be obtained. A patent was granted on the 17th inst., and the claim will be found on the next page, and in another column will also be found an advertisement of the assignees.

Hydrophobia Signs.

As we have recently heard of several persons who have died of this terrible malady by having been bitten by dogs not supposed to be affected with *rabies*, a few words of caution on the subject may be of great benefit to the public. It is commonly supposed that this disease in dogs is caused exclusively by hot weather and the want of water. This is a mistaken notion, according to the famous Dr. John Hunter, who states that, for a period of forty years, in Jamaica, a dog was never known to go mad, although great numbers were kept on the island. In Aleppo, in Turkey in Asia, dogs often die by the heat of the climate and for want of food and water, yet this distemper is unknown among them. Hydrophobia, or fear of water, is a wrong term when applied to dogs, but is correct as applied to human beings. Rabid dogs, according to the experiments of Magendie, do not dread water, nor are they always furious, as is generally believed. The common opinion that they *all* dread water, and are furious, has led to the many fatal mistakes to which we have alluded in the cases of those persons bitten by dogs not believed to be mad. A peculiar uneasiness, with a slouching gait and wildness of eye, are the truest signs of *rabies* in a dog. When these are observed, the dog should be confined by his master, or avoided when met.

LOOK TO YOUR CISTERNS.—Those who receive their supply of water through cisterns, for drinking and culinary purposes, should take care to clean them out oftener than many do.