

**THE BUCKEYE AUTOMATIC STEAM ENGINE.**

The accompanying engravings represent the latest improvements in a horizontal steam engine, built by the Buckeye Engine Company, of Salem, Ohio, which is claimed to possess many new and sterling features both in design and construction. Fig. 1 shows a longitudinal elevation on the valve chest side. Fig. 2, a horizontal section of cylinder and valves. Fig. 3, the governor. Fig. 4, we are informed, is an exact facsimile of a pair of cards from a Buckeye engine of 250 H. P., in Lafayette, Ind., showing its performance.

By reference to Fig. 1, it will be seen that the general design is symmetrical and well conceived. Both cylinder heads are sunk from four to six inches into the cylinder, and being cast hollow are filled with non-conducting material, as is also the space under the cast iron jacket, the entire surface being thus protected from external condensation. The piston is of the well known Babbitt-Harris type, consisting of sectional rings set out by German silver springs. The crosshead is divided vertically and lengthwise into halves. Into this the steel piston rod is screwed, and the halves are clamped firmly upon the thread and upon the taper and shoulder of the pin by three strong bolts. There is claimed to be no possibility of the rod backing out; the use of jam nuts or keys is avoided, and instead of compensating for the wear of the connecting rod brasses by putting in liners, the bolts are slacked, the rod is screwed in sufficiently, and the parts are clamped fast again. The guides are flat surfaces with a central V groove, and both the top and bottom guides are oiled from graduating cups with glass bowls, as seen in Fig. 1, thus avoiding the use of the squirt can. The shafts are hammered, and have exceptionally large and long bearings, the proportion invariably being, length of bearing the diameter of cylinder, and diameter of shaft one half the diameter of cylinder. The crank head, fly wheel, and connecting rod are carefully balanced.

By reference to Fig. 2, the main valve is seen to be a hollow box, taking steam on the inside, balanced by the exclusion of steam pressure from the back, and driven in the usual way by an eccentric fast on the shaft. Steam is admitted from the inside of the valve to the cylinder and exhausted into the chest, the reverse of the ordinary operation. For this the following advantages are claimed: The valve seat is brought close down to the bore of the cylinder, and the engine being two ported, and these ports short and direct, the clearance volume is reduced to less than two per cent of the volume of the cylinder; the chances of leakage are reduced one half; freedom from back pressure is attained; surface condensation is avoided; and the live steam is enveloped in hot exhaust instead of being exposed to cold air. There being no pressure in the chest, no packing is required in the joints, and the valves and piston can be readily inspected for leakage by running the engine with the chest lid removed.

The valves are fitted up under steam at 80 lbs., insuring freedom from leakage or cutting from distortion caused by expansion under heat or pressure. The cut-off mechanism consists of a light cut-off valve, working on the inner face of the main valve, the stem passing out through the hollow steel stem of the main valve, and being driven from a loose eccentric on the shaft with a special motion derived from the compound rock shaft. This loose eccentric is controlled by the governor, Fig. 3, which is a shell fast upon the shaft and revolving with it. In this shell are pivoted two weighted levers, the outer ends of which are linked to the flange on the elongated sleeve of the loose eccentric. The centrifugal force developed in the weights throws them outward, and two well-tempered steel coil springs furnish the centripetal force. The system being coupled is independent of gravity, and it is readily seen that the speed determines the position of the weighted arms, which, in turn, determine the angular advance of the eccentric and the consequent point of cut-off, the range of which is, we are informed, from zero to nearly three quarters of the stroke.

All parts of the governor are relatively at rest while running, and hardened steel ball and socket joints secure flexibility. The whole system is claimed to retain the well known advantages of slide valves, and to secure perfect im-

The company claim, in the highest degree, and will in all cases specifically guarantee, power, economy, and especially absolute and sensitive governing. A perusal of their illustrated circular and a critical examination of the engine will repay the manufacturer or mechanic.

Three of these engines were exhibited at the Centennial International Exposition, Philadelphia, and two of them, of one hundred horse power each, are now furnishing the entire power at the Permanent Exhibition.

The company have recently opened an office and warehouses at 87 Liberty street, this city, where their engines can be examined, both in stock and running, and where information can be obtained.

**New Inventions.**

Mr. S. W. Poland, of Monson, Mass., has patented an improved Vapor Escape Attachment for Cooking Apparatus, consisting of jointed and adjustable escape pipes, which are connected by swinging horizontal portions to intermediate steam drums, and finally to an exit in the stovepipe.

A Galvanic Battery, intended especially for running light machinery, has been invented by Mr. C. A. Hussey, of New York city. When in use it has the functions of a "dry" battery, and is not liable to spill the liquid contents or to be deteriorated by the saturation of the exciting liquid by the zinc salts. There is an exterior zinc cup with an open bottom, and an interior porous cup with perforated bottom, the space between the two, and in the porous cup around the carbon pole, being filled with absorbent packing, which permits the liquids to be drained off at the bottom.

Mr. Adam Collignon, of Westwood, N. J., has patented an improved Steamer Chair, which is easily adjusted to a variety of positions as a reclining chair, and which may be folded into a compact form.

A new Flux Compound for Emery Tools, which is claimed by the inventor to cause remarkable resistance to abrasion, has been patented by Mr. August Caesar, of New York city. It is composed of quartz, red lead, glass, saltpeter, and borax, mixed in certain proportions and treated in a peculiar manner.

An improved Carpet Lining, invented by Mr. R. J. Macdonald, of New York city, is made of paper stock or similar material, in a continuous sheet, and cut at intervals in such a manner that small portions of the sheet may be lapped under, forming spring supports for the carpet and providing pockets for the dust.

Mr. Daniel Martin, of Hotchkissville, Conn., has patented a Pocket Knife for Opening Cans, which is simply a knife of the usual construction, to which is added a short beveled blade for opening cans, a pin on the blade serving to assist in opening the knife and as a stop in opening cans.

An improved Wagon Seat Spring, invented by Mr. J. F. King, of Edwardsville, Kan., consists of two or more rigid bars jointed together, and having between them, near their joints, blocks of rubber, which are compressed when the bars are moved toward each other, and expand when the bars are released. Springs made on this principle are applicable to a variety of uses.

Mr. H. A. Walker, of Ranaleburg, N. C., has patented an improved Saw Cleaner for Cotton Gins, consisting of a series of notched wipers, composed of flexible material, and attached to the periphery of a drum or wheel which is rotated at the back of the gin saws.

Mr. J. H. Martin, of Hartford, N. Y., has patented a Combination Chair, a single piece of furniture, which is constructed to be used as a chair, an ironing table, a step ladder, and a commode, being adjustable to each use as desired.

A convenient form of Sealed Cans, for paints, canned goods, etc., invented by Mr. A. J. Nolty, of Chattanooga, Tenn., is made with a circular slot in the top, closed by a strip which is soldered on, this strip being provided with a ring at one end, by means of which it may readily be removed without the use of a knife.

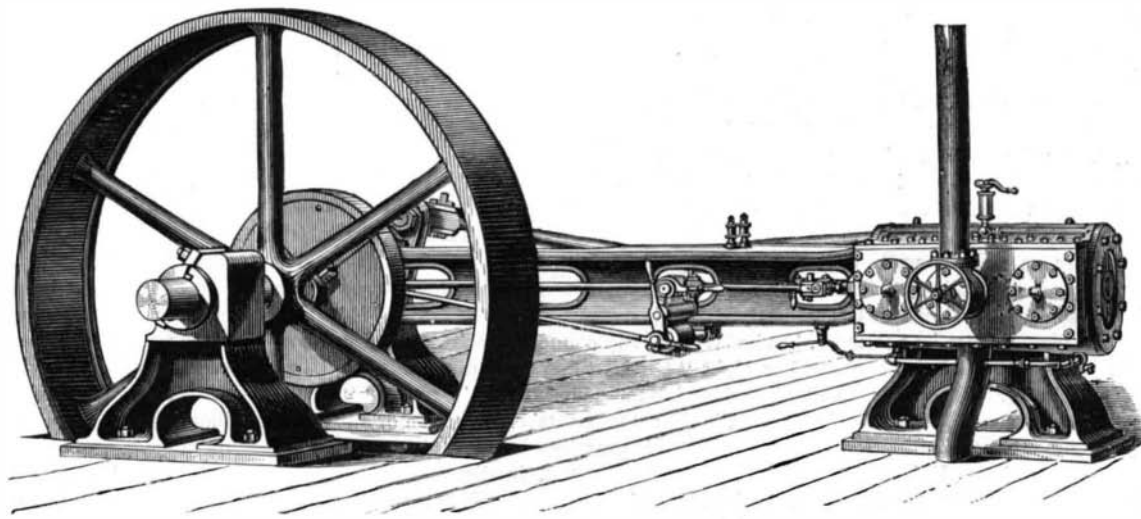


Fig. 1.—THE BUCKEYE AUTOMATIC STEAM ENGINE.

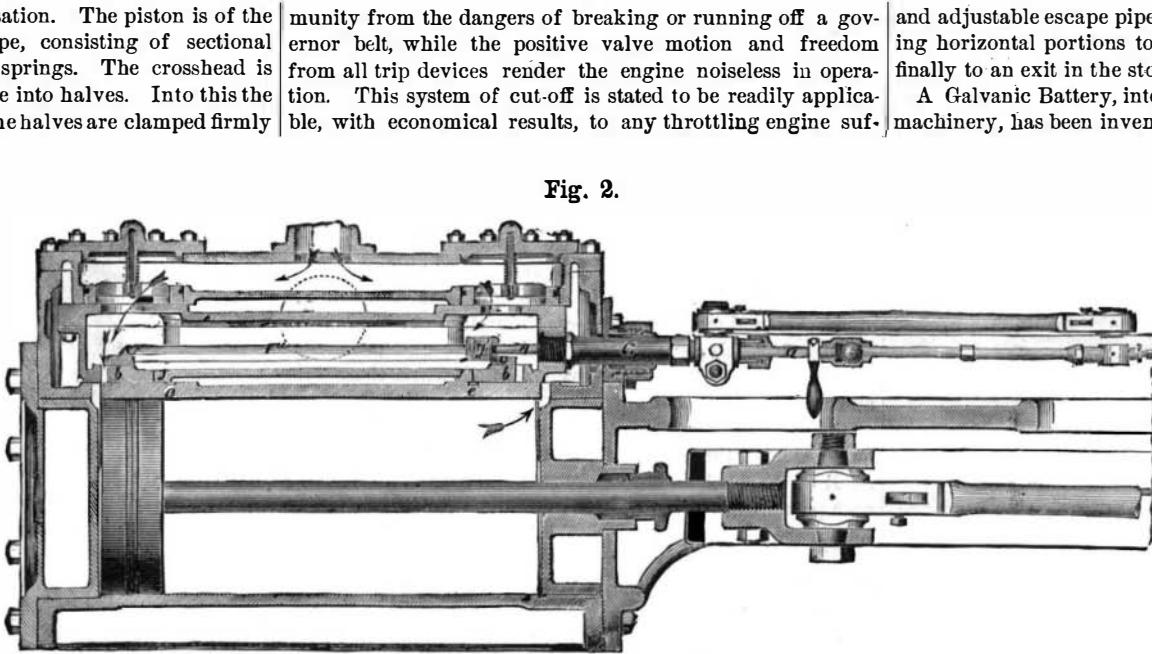


Fig. 2.

munity from the dangers of breaking or running off a governor belt, while the positive valve motion and freedom from all trip devices render the engine noiseless in operation. This system of cut-off is stated to be readily applicable, with economical results, to any throttling engine suf-

ficiently substantial in its parts. Among the minor details may be mentioned a device in the drop hooks which obviates all lost motion or tendency to "kick out;" cylinder

cocks which relieve automatically from water, and an ingenious device for oiling the crank pin from a can while running.

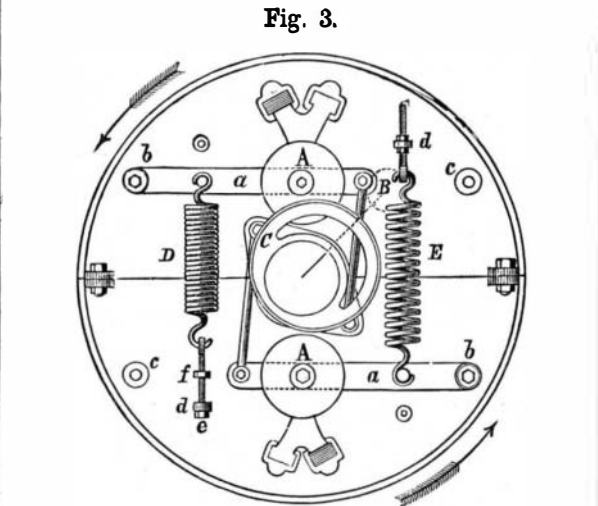


Fig. 3.

The piston speed is, for all sizes, 500 feet per minute.

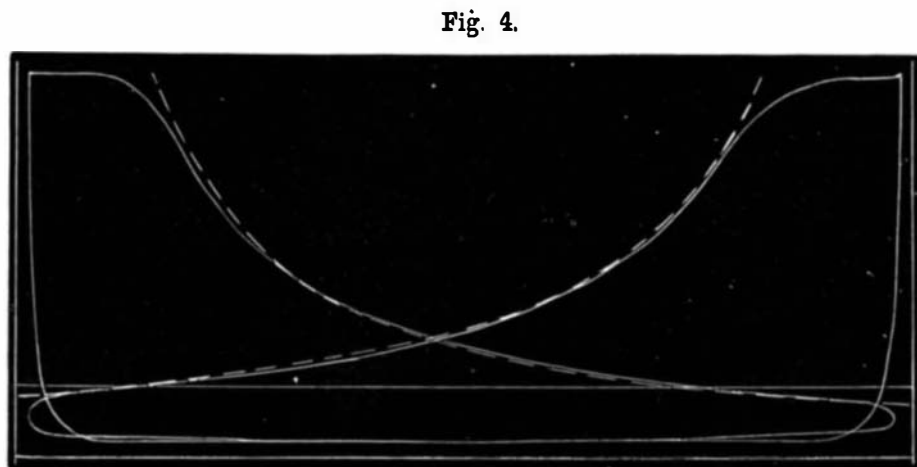


Fig. 4.