New Inventions.

Improved Cut-Off for Steam Engines.

This is a variable cut-off, which will be understood by the following description and accompanying engravings, in which Fig. 1 is an interior view of the steam chest of a steam engine, with a side view of the slide, cut-off, and mechanism for operating the latter; Fig. 2 is a longitudinal section of the slide valve, and its seat with a corresponding section of the cut-off; Fig. 3 is a perspective view of one of the seats of the cut-off valves, and Fig. 4 is a perspective view of one of the rings which are attached to the cut-off valves for the purpose of operating them.

A is the steam chest, B is a slide valve of the well-known kind, for the induction and eduction of the steam to and from the cylinder, working on a seat, *a a*, and moved by an eccentric on the crank shaft of the engine; *b b'* are the steam ports, and *c c'* the exhaust ports in the valve seat, the former communicating with the cylinder, and the latter with the exhaust pipe; *d d'* are the induction passages through the valve, and *e e'* are eduction cavities for forming communication between the ports, *b* and *c* and between *b'* and *c'*. D D' is a sliding box containing two steam chambers, D and D', and fitted to a slide on the back of the main valve, B; these chambers being separate from each other, and open on the side next the slide valve to communicate respectively with the induction passages, *d d'*, of the main valve, but being closed to the steam chest, A, except through the two hollow plug cut-off valves, E E', whose seats, *f f'*, extend all the way through their respective steam chambers, so as to admit steam at all times to the interiors of the cut-off valves, E E'. These valves have each several very narrow openings, *g g*, in their sides, to correspond with the same number of openings, *j j*, in their respective seats, to admit steam from the chest, A, to the chambers, D D', to be supplied through the passages, *d d'*, to the cylinder, and to cut it off by a very slight movement circularly in their seats. The two-chambered sliding valve box, D D', is connected with one eccentric on the crank shaft, and from the movement of this derives the necessary motion for their operation.

The manner in which these valves are operated is as follows:—At one end of each valve is secured a collar, *h h'*, on which there is a projection, *i i'* (Fig. 4), which, from its form, may be termed a toe and heel piece; and inside the steam chest, on each end of the valve, is secured a piece, *l l'*, these are placed in such a position that the toes, *i i'*, will strike them, as the sliding valve box and piston arrive near the end of their stroke in either direction, and thus cause the cut-off valves to be opened in their proper turn by the time the piston completes its stroke ready to admit the steam to the cylinder as the slide valve, B, begins to open the port *b* or *b'*. On the same side of the valve as *i i'* are two bar G G', each having shoulders, *k k'*, so arranged that the heels of the projections, *i i'*, will strike them after the piston has performed a certain portion of its stroke, and thus cause the cut-off valves to be closed in their proper turn. The cutting off is caused to take place sooner or later in the stroke by changing the position of the bars, G G', longitudinally, to throw *k k'* farther apart or bring them closer together, and to admit of this they are attached to a stationary stand, I, by means of bolts, *m m'*, passing through slots, *c c'*, and provided with pins, *n n'*, working in slots, *p p'*, in the stand. The shifting of the bars is effected by a small shaft, *q*, passing through a stuffing-box in the steam chest, and having a pinion, *r*, on it, gearing into toothed racks on G G'.

It will be seen that the cut-off valves being hollow and receiving steam at the interior, and having openings at opposite points in themselves and their seats, must receive an equal pressure of steam on all sides, or in other words, they are balanced laterally, but owing to their taper form there is a slight pressure in a longitudinal direction tending to force them into their seats. To prevent the friction that would be produced by this pressure in turning the valves, they are caused to move a slight distance longitudinally out of their seats, by making the ends, *f f'*, project out of the valve box, D D', with a spiral inclination (the form of a single turn of a screw thread) as shown at *s s*, Fig. 3, and making the inner faces of the collars, *h h'*, of corresponding form, as seen at *t*, Fig. 4.

CROSBY'S CUT-OFF FOR STEAM ENGINES.

Fig. 1

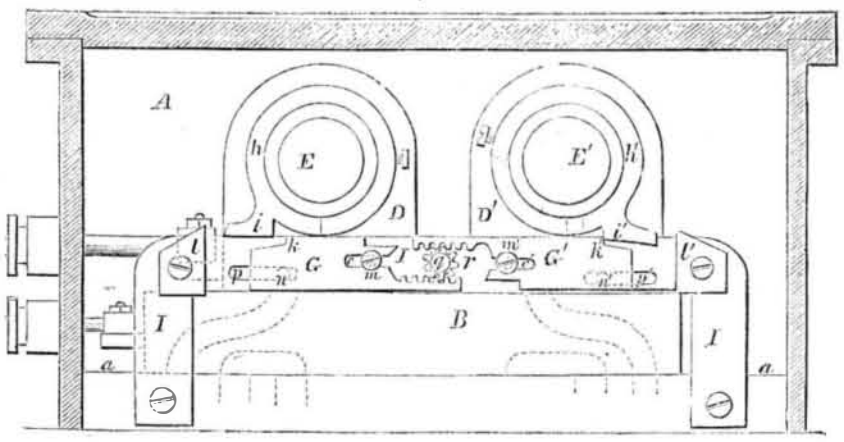

Fig. 2

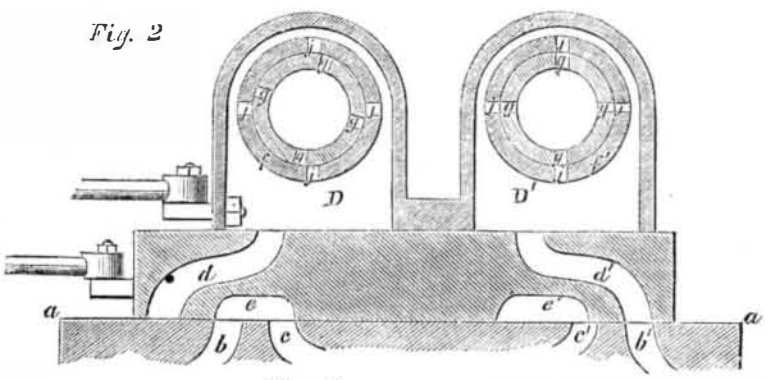

Fig. 3

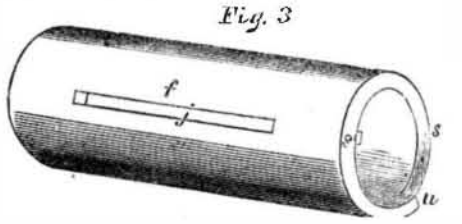

Fig. 4

The jogs, *u u*, on the seats, *f f'*, and collars, *h h'*, serve as stops to prevent the turning of the cut-off valves further than is necessary in closing.

This cut-off prevents the waste of much steam, and consequently saves fuel. It is the invention of Addison Crosby, of Fredonia, N. Y., and was patented Jan. 19, 1858, from whom all further information can be obtained. A notice of it will be found on page 166 of the present volume of the Scientific American.

RAGUE'S PATENT CAR COUPLING.

Fig. 2

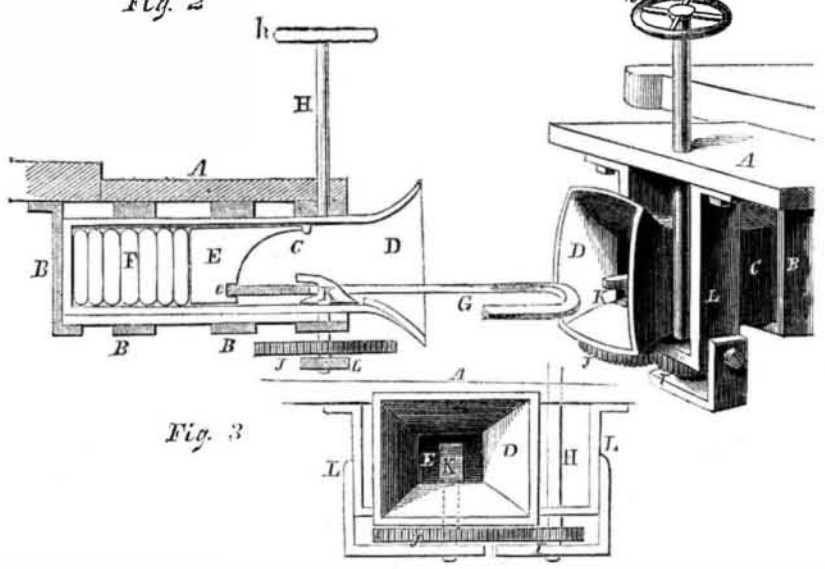

Fig. 1

Fig. 3

There is an amount of carelessness on the part of railway managers, in regard to the life and safety of those in their employ, that is really shocking. It is by no means an unfrequent occurrence that brakesmen and others are crushed between the buffers of cars while coupling them together, and yet on the majority of railroads this old and barbarous system of coupling by hand is still persisted in, notwithstanding that there are many inventions patented which would entirely avoid the risk of accident. The invention we are about to describe is among the very best of these, because of its simplicity and security, and it possesses the great advantage of allowing the brakesman to uncouple the cars at whatever speed they may be going without stepping off the platform.

In our engravings, Fig. 1 is a perspective view of the coupling attachment, Fig. 2 is a section of the same, and Fig. 3 is an end view. Similar letters indicate the same parts in each. A is the platform of the car having links, B, suspended from it, which carry the box, C, having a trumpet-mouth D; the top of this trumpet-mouth or draw-head, should be perforated, so that the brakesman can see if the car be coupled or not. The box, C, contains a buffer, E, of the shape shown in Fig. 2, having a small recess, *e*, cut in it to fit the end of the coupling link or shackle, and may have a small spring above or below it between the box and itself, so as to allow any slight vertical play when one car is lower than the other, as on inclines; behind this is the buffer spring, F, which may be made of any efficient material. G is the coupling link or shackle. Through the platform there passes a shaft, H, provided with a wheel, *h*, by which the brakesman can turn it, and on its lower end is a small toothed wheel, I, gearing into another one, J, the axle of which carries the hook, K. This hook is made of wedge form, having a recess cut in its broadest end into which the shackle can fit, and in which it is kept by the buffer, E, and spring, F, being prevented from jerking out by its also fitting into the recess, *e*. The hook, K, is sunk a little below the bottom of D, so that when the link enters the drawhead, it cannot catch, but is at once met by the inclined side of K, and it passes over it into its proper place, from which it is impossible to dislodge it until the brakesman by the wheel, *h*, turns K directly round, when the link being outside, and the incline in, the shackle has no bearing, and is at once pulled out, leaving the cars detached. It is quite obvious that this can be done at any time without the slightest reference to the speed of the train. The gearing, I J, is supported by the brackets, L. There is no doubt that this is a thoroughly good coupling, and one which we hope may come into an extended use, as there is no liability of loss of life in its employment, and as far as we can see will answer much better than the method at present practised.

It is the invention of John F. Rague, of Dubuque, Iowa, and was patented by him Dec. 29, 1857. He will be happy to give any further information respecting the invention.

Removing Scale from Boilers.

We have received from Mr. E. Watson, of New Bedford, Mass., the description of a very safe and—as he states—an effectual method for removing scale or crust in steam boilers. It is as follows:—"Take of slippery elm or flax seed, or any mucilaginous vegetable matter, in quantity about three ounces to every horse power of the boiler—such as 24 ounces for an eight horse power engine—and throw it into the boiler. In a very short time afterwards, the scale will come off in flakes, and it can then be blown out by the blow-off cock. I have used the slippery elm with great success. Formerly I took two hours to get up steam, owing to the crust in the boiler. I now do the same in less than two-thirds of that time, and effect a great saving in fuel."

We are aware that flax seed had been used for this purpose before, and can endorse its good qualities. Indian meal and sweet potatoes also answer the same purpose. We have never known of the slippery elm bark being used before; but from its nature, we believe it accomplishes all that is claimed for it by Mr. Watson.

Steam Fire Engines.

A steam fire engine recently built by Messrs. Reany, Neafie & Co., of Philadelphia, Pa., for a hose company in that city, is stated to have given great satisfaction, and is designed for city use. In Cincinnati, steam fire engines and no others, we understand, guard the city from conflagrations. In New York, although prizes have been awarded for such machines by the city authorities, no such effective fire wardens have yet been added to the fire department.

Mr. R. Pook, the naval archictect, in Boston, is laying down the lines of an iron sailing vessel of about 450 tuns for Captain R. B. Forbes, as an experiment against a wooden sailing vessel. We hope this vessel will be more successful than the iron steamer lately built in Boston for the Pasha of Egypt.