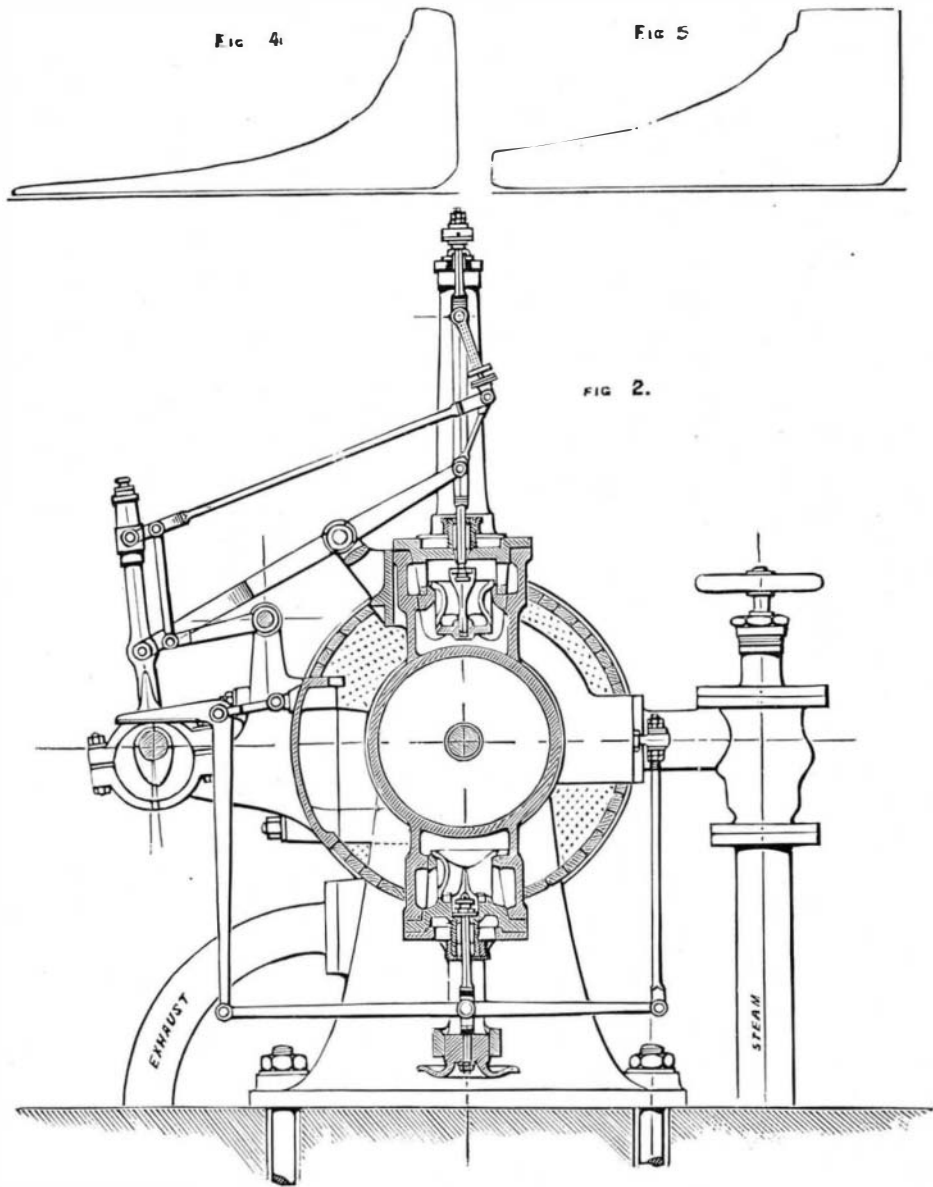


**COLLMANN'S VALVE GEAR.**

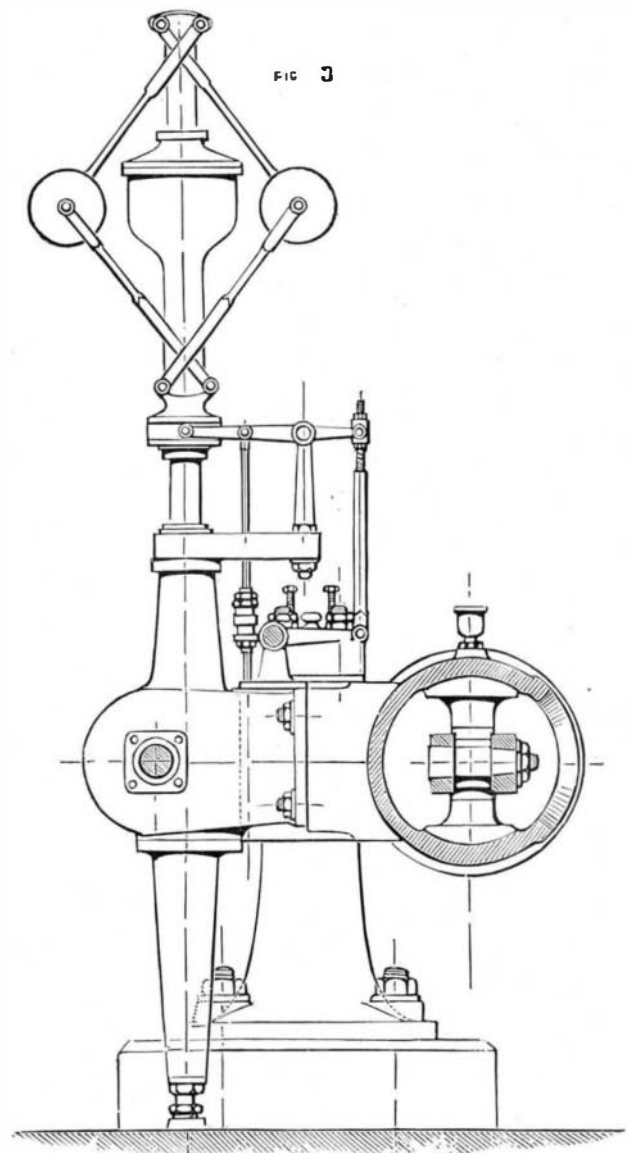
We illustrate on this page a system of valve gear, recently invented by Herr A. Collmann, of Vienna, which, in certain points, resembles the well known Corliss and Sulzer gears. In our engravings (which we copy from *Engineering*), Fig. 1 is a perspective view, taken from a photograph

connected by a light link to the lower end of a little buffer rod working in a socket which is itself jointed above directly to the valve spindle. The pin on the buffer rod is connected by a long link to a block capable of sliding on the upper end of the eccentric rod, which is made cylindrical for that purpose. Suppose this block to be fixed on

end of the socket rests on the buffer plate (which is covered with leather), and as the eccentric descends the latter is lifted (by the action of the lever), and the valve is thereby opened. As the eccentric descends the valve receives a motion determined jointly by the motions of the eccentric and its rod. The former by itself would lift the valve; the upper end of



**SECTION THROUGH CYLINDER.**



**SECTION THROUGH GUIDES.**

of a horizontal engine fitted with the Collmann gear; Figs. 2 and 3 are sections through the cylinder and the guides respectively; Figs. 4 and 5 are copies of indicator diagrams taken from the engine shown in Fig. 1. Double beat valves are used, two for admission on the top of the cylinder, and two for exhaust below it. All four valves are worked from a horizontal shaft parallel to the axis of the cylinder, driven from the crank shaft by miter gear-

ing. The governor (Figs. 1 and 3), of an approximately isochronous type, is driven from this shaft through a pair of screw wheels. The exhaust valves are worked by cams through an arrangement of lever shown plainly in Fig. 2. These valves are lifted by the cams and allowed to drop shut by their own weight, and that of the levers and rods connected with them.

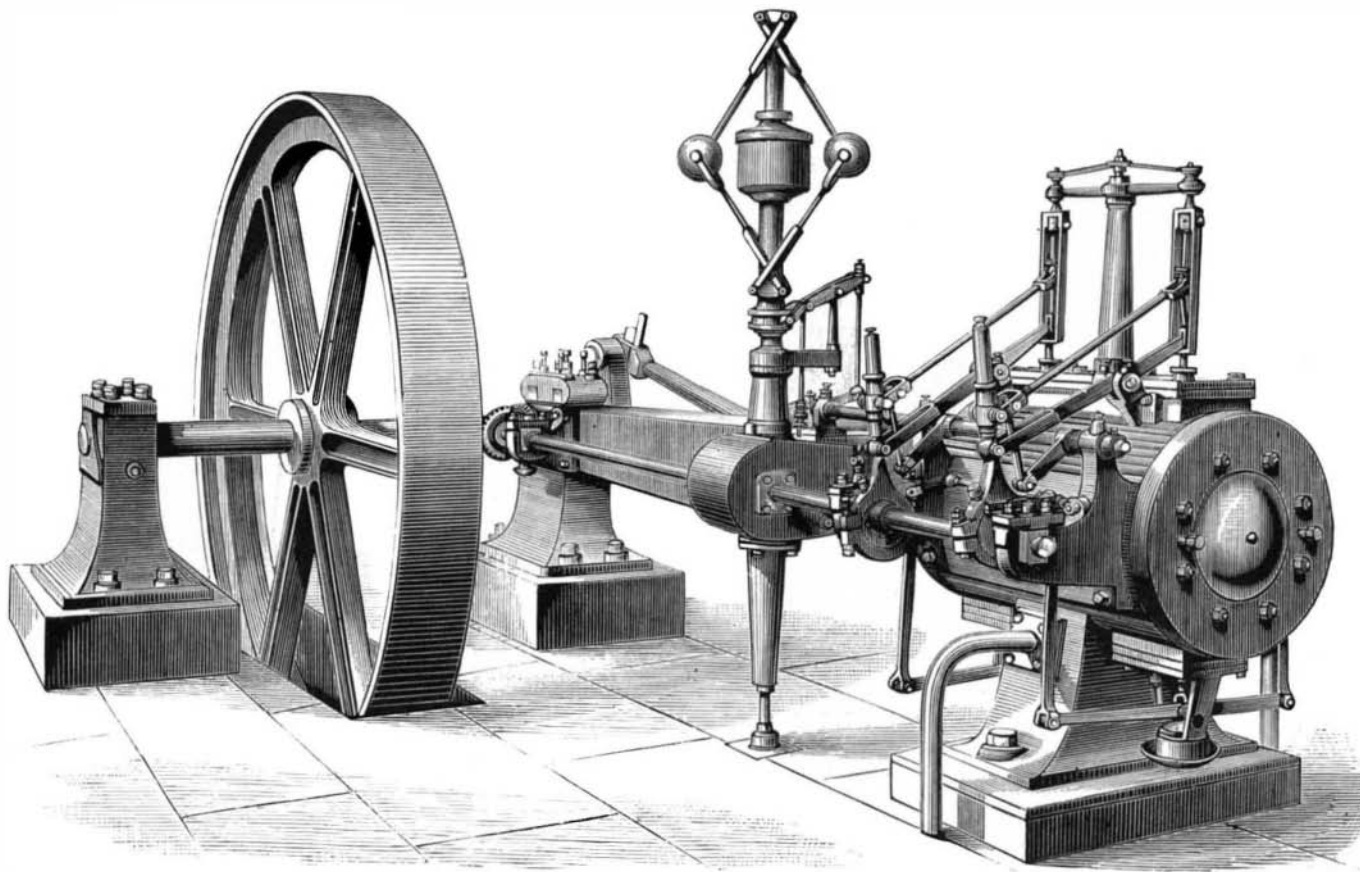
The mode of working the steam valves is, however, the characteristic feature of this gear. Referring to Figs. 1 and 2, it will be noticed that on the auxiliary shaft there are two eccentrics, one for each valve. A pin in the eccentric rod is jointed directly to one end of a lever working on a horizontal axis fixed to the cylinder. The other end of the same lever is

connected by a light link to the lower end of a little buffer rod working in a socket which is itself jointed above directly to the valve spindle. The pin on the buffer rod is connected by a long link to a block capable of sliding on the upper end of the eccentric rod, which is made cylindrical for that purpose. Suppose this block to be fixed on

end of the socket rests on the buffer plate (which is covered with leather), and as the eccentric descends the latter is lifted (by the action of the lever), and the valve is thereby opened. As the eccentric descends the valve receives a motion determined jointly by the motions of the eccentric and its rod. The former by itself would lift the valve; the upper end of the rod, however, comes continually nearer the cylinder, and by so doing pushes away the lower end of the buffer rod, a motion which would, by itself, tend always to leave the valve free to drop shut again. The particular point at which the valve does actually close will depend upon the position of the sliding block on the eccentric rod. The higher this is the greater will its motion be, the further will the knee be pushed out for any given position of the eccentric, and the earlier, therefore, will the cut-off take place. To make the change of cut-off automatic it is only necessary to control the position of the block on the eccentric rod by the governor, and this is done by the arrangement of levers shown in the engravings.

**New Industries.**

Within the past few years a great number of new industrial operations have been established in the United States, from which have come two very important results—the employment of labor saving machinery in a cheaper, more rapid production, and the incitement to the greater activity in improvement and invention of appliances. With the fact accomplished that one machine can do the work of



**Fig. 1.—HORIZONTAL ENGINE WITH COLLMANN'S VALVE GEAR.**

a dozen men, we see the evil of something worse than convict and Chinese cheap labor in our midst. We have an enormous addition to our population in the shape of automatic labor-saving machines. If one superintendent can take care of ten or twenty men, so here one man can take care of a half dozen machines doing each ten men's work. The machines have the advantage that they cost nothing for provisions—slaves unfed, unclothed, and harnessed down for life, breathing steam and living on fire.

While there is such an enormous increase in the power of production, with no increase in the demand for consumption, it is necessary that much invention and effort should be at work to increase the industrial employment of the people, and to increase the wants and requirements of a higher civilization now rendered feasible. While our people are thus thrown out of one employment, another should be offered. It is a fixed law that every citizen should have what he pays for—all the benefits and opportunities which the nation has power to bestow. Employment is the first right of man; traffic, pleasure, or associations resulting from labor are secondary considerations. To have employment the people of the United States should be engaged in producing everything which the world produces, not incompatible with climate or nature. A close observer of the industrial economy of Germany, France, and Great Britain finds such a number of profitable industries there existing, and of which America has no knowledge, and for the productions of which we pay our money, as would give every person in America steady employment. The care of the United States should be, while affording an asylum to the over-crowded population of other nations, to enable them to bring their industries with them.

**AN ETHER ICE-MAKING MACHINE.**

The machine shown in the accompanying illustration is one made by Messrs. Duvallon & Lloyd, of Birmingham, England. It uses ether, and the apparatus consists of an engine and air pump combined on the same bed plate, a refrigerator, an ether condenser, a circulating pump, and one or more ice boxes, according to the quantity of ice required. In the machine illustrated the air pump is 9¼ inches in diameter, driven direct by a steam engine, with 7½ inch cylinders, the stroke being 21 inches. The two cylinders are arranged in line, the two piston rods being cottered to the crosshead. The guides consist of hollow angle pieces working on the corners of the square bars. The air pump is double-acting. The connecting rods, one at each side of the cylinder, work on crank pins inserted in disks keyed on to the main shaft, one of these disks being of considerable weight, so as to act as a fly wheel. In the center of the main shaft is a pulley for driving overhead shafting, from which the circulating pump and the agitator derive their motion. The two inlet passages of the air pump, one at each end, are connected by a copper pipe, from which branches another copper pipe, placing them in communication with the refrigerator. This is a cylindrical vessel, similar in construction to a multitubular boiler, covered with felt and lagged with wood; the tubes are made of copper and riveted to brass end plates. On the other side of the air pump, the two outlet valves, connected in the same manner as the inlet valves, are placed in communication with the ether condenser, which is similar in construction to the refrigerator, but is of rectangular section and has no copper shell. The tubes communicate at each end with metal chambers, one of them acting as a receptacle for the air which finds its way inside the condenser. The whole is immersed in a tank of wood or galvanized iron, through which a constant stream of water is made to pass for cooling and condensing the vapor of ether. A vacuum of about 25¼ inches, it is stated by Iron, from which we obtain these particulars, is maintained by the air pump in the refrigerator, vaporizing the ether at a low temperature. The absorption of heat due to this operation lowers the temperature of the strong

brine, made to circulate, by means of the pump provided for that purpose, through the tubes and the ice box. The latter is a tank of red deal, varnished inside, with partitions having holes bored in them for allowing the brine to circulate slowly. Between the partitions are suspended zinc moulds of rhombic form, varying in width according to the shape of the blocks of ice required, and filled with pure water.

**IMPROVED SHOE BRUSH.**  
Mr. Frank H. Kean, of Cincinnati, Ohio, has added a useful attachment to blacking brushes, in the shape of an adjustable scraper knife, by which hardened mud, etc., may be easily removed from the shoe. The arrangement of the device is perfectly plain from our engraving. It will be noticed that the knife is curved at its front end, and that by



IMPROVED SHOE BRUSH.

the thumb nut it may be clamped so as to project as much as desired. This device was patented April 30, 1878.

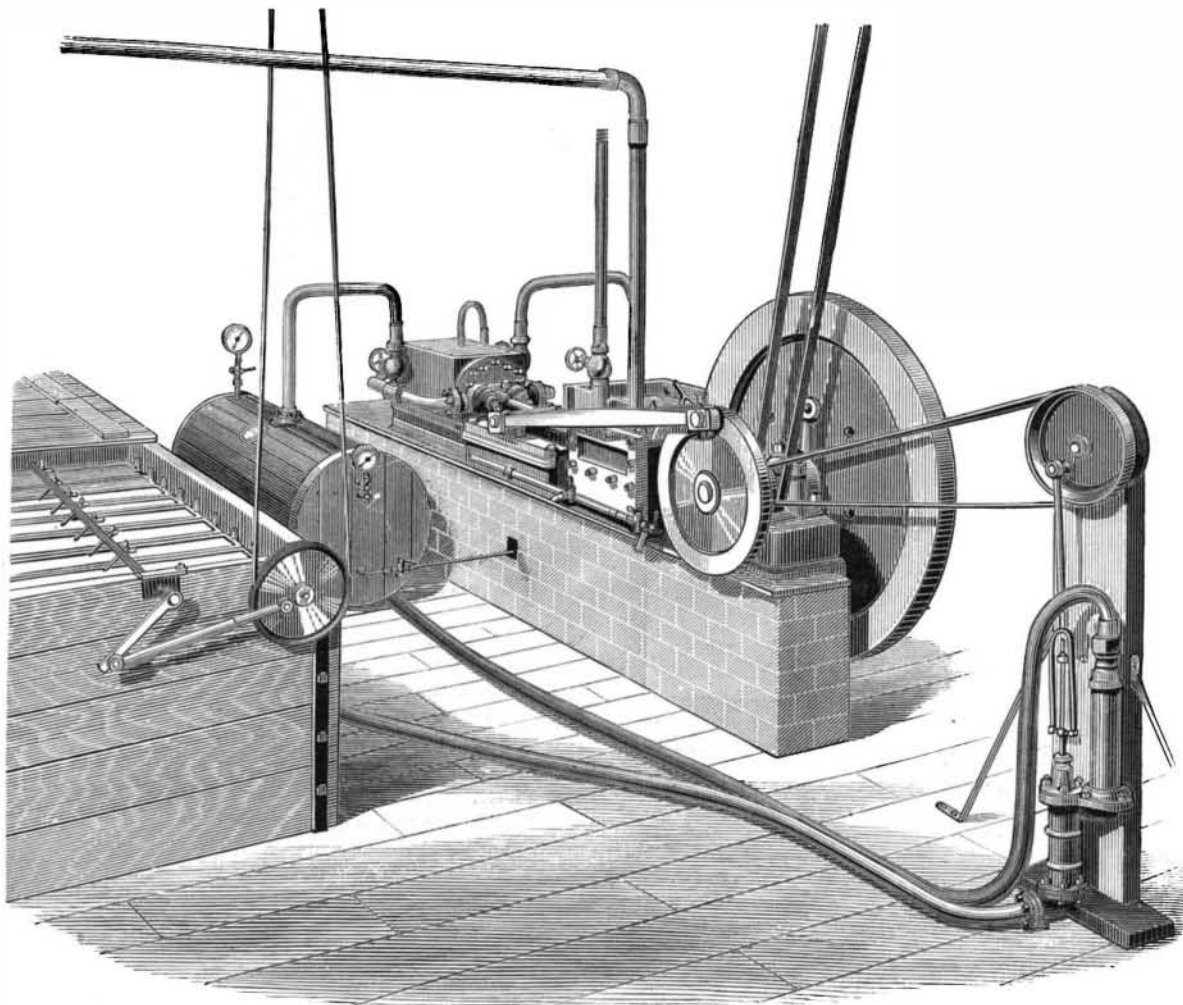
**Burns and Scalds.**

Dr. G. F. Waters, of Boston, Mass., author of the alkaline treatment, now so widely known for its remarkable success, says:

"My treatment is to apply to the burned surface bicarbonate of soda, if it is a wet surface, in fine powder; but if it is a dry burn, use a paste of bicarbonate of soda and water, or a strong solution of the bicarbonate of soda in water, and apply to the burned surface. This relieves sunburns as well as burns from hot coals, melted sulphur, hot iron, steam, etc.

"Always dispose the burned surface so that the blood can gravitate toward the heart if possible, as otherwise a continuous pain may be felt, due to the dilatation of the blood vessels from the weight of the contained blood.

"If bicarbonate of soda is not at hand, bicarbonate of potash is the next best; biborate of soda does as well, but is not often found handy. Then the emulsion of lime water with oils makes a good dressing where the skin is broken. But



ETHER ICE-MAKING MACHINE.

vaseline is preferable, as there is no odor from it and it is quite as bland."

FIFTY thousand dozen of American hay rakes, says a writer in the *Sheffield Daily Telegraph*, have been ordered and partly received by a single firm in Sheffield for this season's demand only.

**New Inventions.**

Mr. W. C. Phillips, of Norwalk, Conn., has invented an improved Stair Fire Escape, made in parts, the number of which in use is determined by the height of the point to be reached, each part consisting of hinged sections capable of being locked in line or at angles by means of bolts operated by cords, suitably braced and capable of a variety of adjustment.

An improved Ice Pitcher, invented by Mr. H. B. Beach, of West Meriden, Conn., has an interior china, glass, or other suitable lining, strengthened by a metallic layer spun around it, and secured to the body of the pitcher by a screw bolt and nut at the bottom. While the usual air space about the bowl is left, the strengthening obviates the danger of cracking the lining by dropping lumps of ice upon it or in case of falling.

Mr. A. R. Sherman, of Natick, R. I., has patented a convenient Book Rack for church pews, in which a number of improvements are introduced, designed to hold the books shut, and also adjustable to hold small books in place.

Mr. H. S. Cate, of Millerstown, Pa., is the inventor of an improved adjustable and removable rubber Packing for Oil Wells, which is attached to the casing head, surrounding the tubing or cable, for the purpose of preserving the vacuum or controlling flowing oil or gas while withdrawing tubing or drilling.

Mr. J. R. Pierce, of Orfordville, N. H., has patented a Horseshoe Spring which is claimed to spread the hoof of a horse's foot without injury and without affecting the attachment of the shoe. The spring is V-shaped, pivoted at its angle to the toe of the shoe, and so formed that its arms extend back along the sides of the frog and bear against the inner sides of the rim of the hoof, at its heel.

Mr. Emerson Cole, of Brooklyn, N. Y., has patented an improved Bung Fastener, made of a tapering pointed strip of sheet metal, having near its wider end burrs, which enter the sides of the bung hole as the bung is driven in with the fastener between it and the hole. The fastener is also made in convenient form to bend over the bung after it is driven in.

An improved Sled, the invention of Mr. R. Armstrong, of Portland, New Brunswick, is so constructed that each runner is allowed sufficient mobility to pass over inequalities of road without disturbing the position of its fellow to any material extent.

In an improved Cooking Stove, patented by Mr. H. R. Smith, of Minnesota Lake, Minn., the arrangement is adaptable to burning hay as well as wood or coal, mainly for the purpose of utilizing the cheap hay crops of the Western States, after the hay is properly prepared or baled for the purpose.

An improved Oil Well Torpedo, invented by Mr. W. Haus, of Church P. O., Pa., consists of an interior exploding shell and an exterior case filled with a sawdust or paper mixture. The object is to furnish means for exploding the torpedo in case the regular caps fail, without drawing it out of the well; and to this end a supplementary exploder, with capped rods and a second anvil, operated by dropping a weight from above, are provided.

In a new Iron Fence the inventor, Mr. A. Zimmerer, of Nebraska City, Neb., provides the lower ends of each fence post with a screw thread corresponding with a screw hole in a metallic base plate attached to a block set firmly in the earth. Each post is notched at its upper end, and the top rails have oblong slots, so that the rails may be secured to the posts by inserting the ends through the slots and then turning the posts in their screw sockets.

Mr. J. Gallaspie, of Russiaville, Ind., has patented an improved Trace Holder, constructed with a view to keeping the traces straight and preventing them from swinging about when slack. It is formed of two pieces, hinged together at their lower ends, notched upon their inner sides to allow a space for receiving the trace, and secured to each other by a thumb-screw at the upper end of the smaller part. An eye in the upper end of the longer part receives a supporting strap, which is secured to the hip strap of the harness.

A Rainwater Filter, designed to filter the water passing from a roof to a cistern, has been patented by Messrs. W. H. Thomas and T. H. Carter, of Mount Sterling, Ky.