

NEW SHEEP PROTECTOR.

The engraving shows a curious device intended to protect sheep from the ravages of dogs and wolves; but whether sheep would be safer with a machine of this sort than with the dogs and wolves is a question which we leave to the reader to decide. This device was recently patented, and is thus described by the inventor: The invention consists of two collars for the neck of the sheep, which are provided with sharp pointed projections, and are coupled together by two or more links. To the upper side of the rear collar is attached a chain, strap, or strip of metal or other material, which passes along the back of the sheep and branches off toward the thighs of the hind legs, and is attached to a shield on each hind leg, which shields conform to the parts of the hind legs above the knee, the shields being perforated and furnished with outward projecting points. It has been observed that dogs often attack sheep at the points covered by the shields, hence the employment of them in combination with the collars. The projections or points on the collars and shields operate to lacerate the mouth of the dog in case it should attack the sheep, the point of attack, as a rule, being the parts covered by the collars and shields.

Spontaneous Combustion of Charcoal.

Among the substances subject to spontaneous combustion, according to the *Fireman's Journal*, pulverized charcoal is said to be one of the most remarkable. Incidental to this phenomenon a story is told that a load of charcoal was delivered in an outhouse of a clergyman in Leipsic, and showed no signs of burning until the door by accident was left open, when the wind blew sprinklings of snow on the charcoal. The rapid absorption of oxygen from the melting snow caused the charcoal to ignite, and as the day was windy the whole range of buildings was burned to ashes. In this connection a fruitful and unsuspected source of fire suggests itself to those of our American housekeepers who burn wood as fuel, and who store the ashes in boxes or barrels. The accidental disturbing of such ashes, even after years, will cause them to ignite, provided the air is damp or foggy. The phosphuret of potash from decayed wood renders wood ashes highly inflammable, and mysterious cellar fires in the rural districts are, no doubt, in some cases, caused by this form of spontaneous combustion.

MACHINE FOR ORNAMENTING METAL SURFACES.

The machine shown in the engraving produces all kinds of chased or matted surfaces, but is more particularly designed for producing a peculiar surface called the "snow flake" finish. The tool used in the machine is of novel form, and has a combined rotary and impacting movement.

A standard rising from the base of the machine supports an arm, which carries at its outer end a sleeve containing a vertical mandrel, which is supported by a spiral spring in the lower part of the sleeve. This mandrel receives its motion through a quarter twist belt from a pulley on the driving shaft, and carries a chasing tool whose face is composed of fine parallel ridges and center punch indentations.

Above the mandrel there is a hammer, which is alternately lifted and allowed to fall by the action of the cam on the driving shaft. The hammer is drawn downward by a spring which insures a positive and elastic blow.

The tool intermittently advances against the surface to be finished with an impact derived from the blow of the hammer, having meanwhile a rotary motion about its axis from the action of the belt. The sudden impact of the tool against the surface to be finished causes a set of parallel indentations on the metal surface, which appear in patches, with the parallellines of one patch appearing at a different angle to those of the next. As the time of contact between the tool and surface to be finished is only momentary, the parallel lines are not obliterated by the rotary action, the latter serving only to place the patches in different angular relation on the metal surface.

This invention was recently patented by Messrs. John Hewitson and Elijah Tolman, of Taunton, Mass.

How to Fire Steam Boilers.

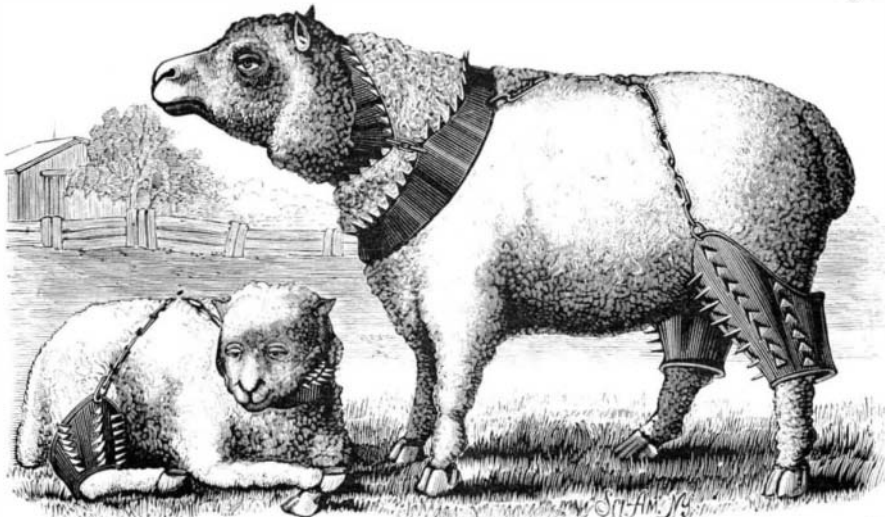
Mr. J. F. Tallant, in the *Milling World*, tells its amateur engineer readers how to set and fire steam boilers.

In placing a steam boiler in a furnace, says Mr. Tallant, it is usual to employ grate bars, even for coal, about four feet long, the same length that was necessary where wood fuel was used. The rear end of the bars should be at least the thickness of a brick, or upwards of two inches, lower than the front. The boiler should also be placed two inches lower at the rear than at the front, and the bridge wall

should come within three inches of the boiler, if the draught is good.

The best grate bars now used are of a zigzag shape on the top, so closely placed that coal lumps upwards of one-eighth of an inch through cannot drop between. Three stoking pokers should be used—one a plain straight poker, another with claws, and another like a hoe. In firing, the coal should be so distributed as to be totally consumed without smoke, if possible. The more smoke the worse the firing.

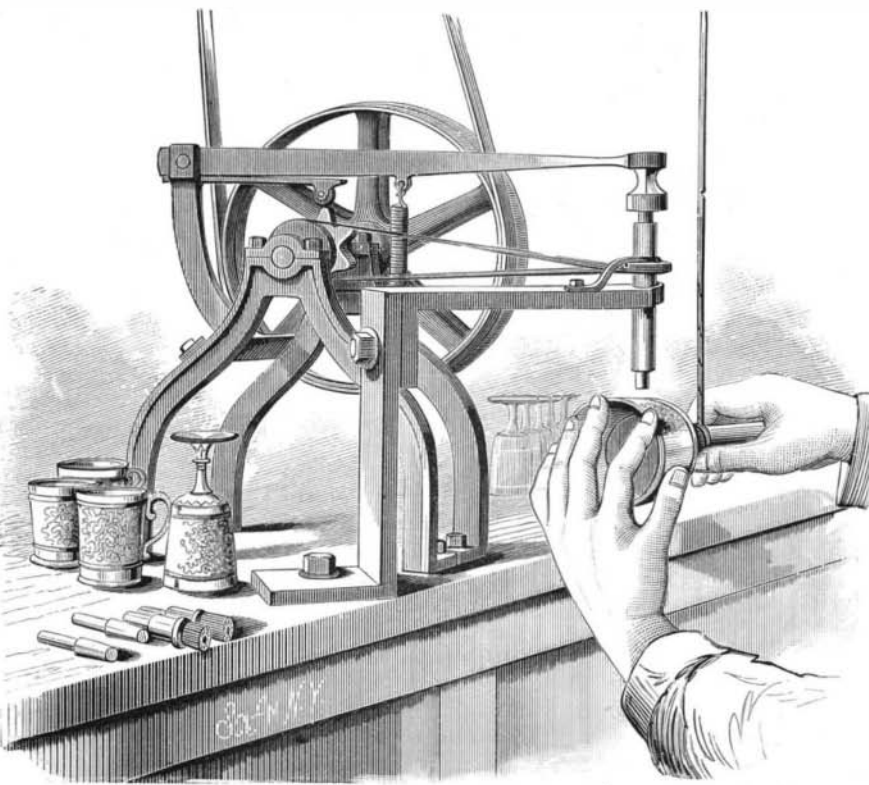
After steam is raised and work is fully begun, in replenishing the fire, the glowing coals should be pushed back with the iron hoe toward the bridge wall, and if any clinker



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is seen, remove with the claws. The fresh coal should be well scattered over the front, so that the smoke will pass over the red hot coals and be consumed by them. Avoid making piles of coal on the bars. It is often beneficial to have a very small steam pipe open into the furnace, to give a spray of steam to the flaming mass. Water being composed of two most combustible ingredients, oxygen and hydrogen gases, when the steam is decomposed the heat becomes most intense. This pipe should be regulated by a cock, and its use requires considerable skill, as an oversupply of steam will quench the fire instead of increasing it.

To permit a boiler to run too full of water is as wasteful of fuel as it would be dangerous to have too little. Of the two extremes, the latter is most common, generally through carelessness. To fire efficiently yet economically is a very skillful, intelligent operation, and the man who can do it and actually does it for his employers cannot be too highly



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esteemed by them, or be too well paid. Brains and vigilance as well as main strength and muscle must be used continually.

The World's Wool Clip.

The wool clip of the world has increased five times since 1830, when it was about 320,000,000 pounds in weight. In 1878—the latest year for which there are complete figures—Europe produced 740,000,000, River Plate 240,000,000, United States 208,000,000, Australia 350,000,000, and South Africa 48,000,000 pounds, making a total of 1,586,000,000 pounds. Great Britain and France consume each about the same quantity of wool—380,000,000 pounds a year. Germany consumes about 165,000,000 pounds; United States 250,000,000 pounds; and Russia, Austria, and other countries, 400,000,000 pounds.

ENGINEERING INVENTIONS.

Messrs. Peter Vanbriggles, Lewis Vanbriggles, and Henry Vanbriggles, of Kempton, Ind., have patented an improved rotary engine. The invention consists in regulating the supply of steam to the engine by forcing air from the steam cylinder into a connected air chamber to operate a cut-off valve therein, increased speed of the engine causing a corresponding reduction in the supply of steam.

Mr. William C. Perry, of Brattleborough, Vt., has patented an improvement in automatic couplers, which consists of two hooked coupling bars pivoted in suitable recesses in each drawhead and resting on springs, of spring actuated catches for holding the hooked heads of the coupling bars, and of recesses within said drawheads to admit of coupling with the old style of link and pin.

Mr. Gordon W. Hall, of Havana, N. Y., has patented a steam boiler having central magazines or reservoirs for fuel. The object of the invention is to insure more perfect combustion and to superheat the steam. The invention consists in a vertical boiler provided with a steam dome containing tubes placed above a combustion chamber at the upper end of the boiler, the tubes of the steam dome being fitted with removable caps at the upper end. The caps give access to the boiler tubes as required, and also cause return of the draught to the smoke box around the ash pit.

An improved car coupling has been patented by Mr. Robert E. Pogue, of Quincy, Ky. This invention relates to that class of car couplings which are known as "self-acting couplers," and it consists in a novel combination and arrangement of a coupler, a cap, and a series of levers,

whereby provision is made for coupling the cars automatically and for uncoupling them without the necessity for going between the cars.

Messrs. Samuel Barrow, David Barrow, and Jacob Barrow, of Indianapolis, Ind., have patented an improvement in steam boilers, which consists in a heating box combined with a tubular flue boiler in a manner to form one side of a chamber into which the flues discharge. This heating box is hinged to the main boiler, and the inlet and outlet pipes from the box are provided with separable joints, so that the box may be swung out to give access to the flues. The box is also provided with a filtering chamber between its inlet and outlet for filtering the feed water.

Messrs. Samuel Barrow, David Barrow, and Jacob Barrow, of Indianapolis, Ind., have patented an improvement in rotary engines, water motors, or pumps, wherein a wheel is fitted eccentrically in an elliptically shaped chamber or steam and water way, and fitted with two pistons, which are projected from the periphery of the wheel and travel in an elliptical path.

An improvement in the class of steam-generating apparatus for use in cooking feed for live stock, has been patented by Messrs. Mortimer B. Mills and Charles B. Rice, of Chicago, Ill. The apparatus is compact in form, adapted for heating the water quickly, and provided with means for automatically regulating the supply of water.

An improved construction of boat designed more particularly for use on canals, shallow rivers, etc., has been patented by Mr. John O. Smith, of Savannah, Ga. It is formed with a view to the production of the least possible waves in the water, so as to avoid the washing of the bank. It is an improvement in that general class of boats which are propelled by an endless chain revolving in a longitudinal channel around two sprocket wheels.

An improvement in the class of clutch and spring mechanism which is so constructed and attached to a car axle that the spring may be wound up when it is desired to retard the speed of the car, and allowed to unwind or expand when it is desired to start the car, has been patented by Mr. T. Judson Langston, of Johnstons, S. C.

An improved reversing and cut-off mechanism for steam engines has been patented by Mr. William L. Miller, of Cleveland, Ohio.

The object of this invention is to dispense with the guides, crosshead, and link required in reversing mechanism of usual character, and to move the valves for cutting off and reversing by the use of a single eccentric.

Honoring an Old Inventor.

The ceremony of unveiling a bronze statue in honor of the seventeenth century inventor and precursor of Watt in applying steam as a motive power, Denis Papin, took place in the little town of Blois, France, August 29. Among the prominent speakers was M. De Lesseps, who gave an interesting account of the life and discoveries of Papin. Like so many early inventors, Papin suffered cruel persecution at the hands of the people whose descendants now unite to do him honor.