

unfiltered. This is a very simple, cheap, and thorough filter. For engraving and description, see *SCIENTIFIC AMERICAN*, Volume 11, page 373.

#### Breech-Loading Fire-Arms.

Frederick D. Newbury, of Albany, N. Y., exhibits specimens of his improved breech-loading fire-arms. The method of loading and firing is strikingly simple and effective. It is one of the best improvements that we have seen. We are preparing an engraving which will shortly appear with full description.

#### Printing Presses.

S. P. Ruggles, of Boston, Mass., exhibits several of his patented printing presses in operation. Their movements attracted great attention. Mr. Ruggles' inventions are noted for their simplicity, compactness, and effectiveness.

C. Potter, New York, exhibits Davis' new oscillating power printing presses. The types are placed upon a flat oscillating bed, and the impression is produced by a circular, oscillating platen, located above the bed, and acting in concert with it. Both the platen and bed have a pendulum-like motion. The movements are all simple and easy. The inking arrangements are excellent. No springs are used. The press is evidently one of great strength and durability. The work which we saw it execute was well done. Price \$700 for folio post or smallest size. The prices are about 25 per cent. less than cylinder presses.

#### Pumps.

The Ames Manufacturing Co., Chicopee, Mass., exhibit Ball's Patent Safety Pump, for steam boilers. The construction is such that when the water in the boiler falls below a certain line, the steam rushes through a tube, into a pair of cylinders of an oscillating engine, causing it to operate and throw water into the boiler.

Wm. Burdon, Brooklyn, N. Y., exhibits in operation a number of his improved steam pumps, for feeding boilers, and other purposes. They possess the merit of compactness, simplicity, and effectiveness.

Fletcher & Durkee, Williamsburgh, N. Y., exhibit their newly patented steam pump. It is so arranged that it may also be driven by hand, if desirable.

Taylor, Campbell & Co., Brooklyn, N. Y., exhibit a good steam pump and fire engine.

Blake, Wheelock & Co., of New York, exhibit a well made, substantial steam pump.

C. & G. M. Woodward exhibit an improved safety steam pump. Price \$100 and upwards.

Carey's Patent Rotary Pump New York, is notable for the ease and regularity of its movements, and the large and steady volume of water which it delivers. For an engraving and description see *SCIENTIFIC AMERICAN*, Vol. 3. Price \$35 and upwards, according to size.

Downs & Co., Seneca Falls, N. Y., exhibit specimens of De Yampert's patent Double-Acting Pump. Two pistons, connected on the inside of the pump, by means of cross levers, are simultaneously operated in different directions, by one piston rod. Four pistons can be operated, on the same principle, by one piston rod, if desirable. It is a singular construction, but works well. For a full description and engraving see *SCIENTIFIC AMERICAN*, Vol. XI., page 28.

Butcher & Reed, New York City, exhibit some improved double action force and lift pumps.

Joseph Smart, Philadelphia, Pa., exhibits several double-action force pumps, of improved construction.

Lindsey's Patent Pump, is exhibited by J. M. Edney, 56 John street, New York. A pair of pump barrels and pistons are attached to a hollow pipe, and placed in the well below the surface of the water. The pipe extends up to the surface of the ground, where it is rotated by a crank. The ends of the pistons below strike against a cam-shaped ring, and thus receive a reciprocating motion, by which the water is forced up the hollow pipe. For an engraving and description see *SCIENTIFIC AMERICAN*, Vol. 11, page 310.

Carpenter's Patent Rotary Pump, is exhibited by Wakeley & Tenney, Madison, Wis. The internal arrangements are quite simple, and the delivery of water good. For engraving and description see *SCIENTIFIC AMERICAN*, Vol. 11, page 244.

W. D. Andrews, of this city, exhibits a new centrifugal pump, which throws a very large quantity of water, and works extremely well.

L. P. & W. F. Dodge, Newburgh, N. Y., exhibit their patent pumps. Price \$15 and upward.

E. G. Day & Co., New York, exhibit their double-action, anti-friction force pumps, which are alleged to be of such construction as to wear for several years, without renewal of packing.

Denison & Bradley, No. 55 Cliff street, New York, exhibit specimens of pumps of novel construction. An india rubber tube is bent into circular form, and placed within a metallic ring. Friction rollers operated by a crank in the center of the circle, revolve around and pass the rubber against the metallic ring, thus alternately collapsing the tube, producing a vacuum and ejecting the water. See *SCIENTIFIC AMERICAN*, Vol. 11, page 324, for engraving and description of this novel invention.

A. W. Gay & Co., New York, exhibit Warner's patent force and lift pump, of which great things are said. The same parties also exhibit West's improved pump. The barrel is surrounded with an air chamber which is alleged to protect it from freezing, and render its operation more easy.

Peter W. Nefus, New York, exhibits his improved double-acting force pump, which is claimed to have the merit of throwing more water, according to the power applied, than ordinary pumps.

Edson's Patent Force Pumps, are exhibited by R. F. Washburn & Co., N. Y. They are claimed to be of great power. By throwing up the handle the water runs back, and freezing is thus prevented.

Gerard Sickles, of Brooklyn, N. Y., exhibits a new rotary pump which works well and runs easily.

[It will be seen from the foregoing that the pump department of the exhibition was very full. The united discharge of all these water forcers would almost rival Niagara.]

#### Marine and Stationary Governor.

Thomas Silver, of Philadelphia, Pa., exhibits his patent Governor, for steam machinery. This invention is used on the steamships of the Collins line, running between New York and Liverpool. As a marine governor it acts with the greatest success. For stationary engines it is much superior to the ordinary governors. In appearance it looks like a combination of two of the common governors, there being four balls and two pair of arms. For an engraving and description of its principles, see *SCIENTIFIC AMERICAN*, Vol. 11, page 356.

#### Rotary Engines.

Silsby, Mynderse & Co., of the Island Works, Seneca Falls, N. Y., exhibit several specimens of rotary engines made under Holly's patent. They work well. We are preparing an engraving of this invention which will shortly appear.

Buffum & Crowell, of this city, exhibit a rotary engine, which consists of a rotary disk, encased within a shell. Flap valves are employed in connection with the disk, to form the necessary abutments for the steam to act upon. The opening and closing of these valves makes a very disagreeable, clattering noise. See *SCIENTIFIC AMERICAN*, Volume 4, 1849, for engravings of similar engines.

Gerard Sickles, Brooklyn, N. Y., exhibits a rotary engine that operated with much success.

#### Book Folding Machine.

S. T. Bacon, of Boston, Mass., exhibits North's Patent machine for folding printed sheets. Book-folding requires great accuracy. The work is now done by hand, by girls, large numbers of whom are employed in the various publishing establishments of this country. The machine shown at the Palace is said to do the labor of thirty girls. It operates with great precision, and does the work with much greater exactitude than it is generally done by hand.

#### Transparent Oil Cup.

William Gee, New York, exhibited a new oil cup, for feeding oil into the cylinders, valves, bearings, etc., of engines. One of the novel features is, in having a slip of glass on the side of the cup, so that the height of oil

therein, and the quantity fed is always under the eye of the attendant, and subject to his control. The invention is highly spoken of.

#### Fuel Cutter.

G. C. Webster & Co., New York, exhibit Daniel's new machine for cutting up brush-wood, for kindling purposes. It is constructed somewhat after the manner of a straw cutter; it cuts up stout sticks with great rapidity. For engraving and description see *SCIENTIFIC AMERICAN*, Vol. 11, page 228.

#### Preserved Fresh Meats.

There is an interesting display of fresh pork legs of mutton, and chunks of beef, preserved at Constantine, in Africa, in 1855, without salt or spices, by the process of P. Marle, of Paris. Some of this meat, a year old, is stated to have the same flavor as newly killed meat, and to be equally as juicy. The process of preservation, we understand, consists in exposing the meat, when fresh, to weak fumes of sulphur for a few minutes, then dipping it into a hot solution of 215° of molasses 1 part and gelatin 2 parts, until all the air is expelled, so as to coat the meat with a thin impenetrable skin to keep out the air. There are useful articles on the preservation of meats on pages 38, 90, 158, and 219, Vol. 11, *SCIENTIFIC AMERICAN*. Farmers and others about to lay down their winter stock of meat would do well to read those articles.

#### Gas Stoves.

A number of stoves—large and small—for cooking and heating by the common gas used in our streets, are exhibited in full operation by W. F. Shawe, of Boston. The jet of gas for a small stove is suffered to spread through a wire gauze cover, and the air is supplied around it by a perforated cylinder, so as to mix and spread the air and gas into a thin sheet. A small stove, with one jet from a common burner, costs \$10—larger ones cost more in proportion; one with four burners costs \$20. They can be used for cooking and heating, and are very convenient in cities. The air is supplied to the gas in such quantities as will produce perfect combustion with the greatest amount of heat.

#### Shearing and Punching Presses.

Samuel Hall, of this city, exhibits one of his patent Shearing Presses. It cuts through thick sheets of metal with great ease. Its construction is such as to impart unusual strength to the jaws between which the cutting is done.

Dick's presses for shearing, punching, etc., several forms, are exhibited by W. J. Buck, of this city.

#### Turning Lathe.

Albin Warth, of New York, exhibits a newly improved, self-acting turning lathe, which produces ornamental work of various kinds with great rapidity.

#### Mortising Machines.

Lane & Bodley, Cincinnati, Ohio, exhibit Guild's patent power mortising machine. The mortising is done by a chisel which moves up and down, like the hand mortise machines. The arrangement for stopping and starting the chisel mandrel, is simple and convenient, being done without interfering with the power and without the use of clutches or pulleys.

The movements of the chisel are under complete control of the operator. The machine works with great success, and is highly spoken of. Large numbers are in use. It is adapted to all kinds of mortising, hubs, etc. Price \$100 and upwards.

Messrs. Payne & Pier exhibit a self-acting mortising machine, for general work, which operates well. The mortises are cut by an auger-shaped tool. It may be set to cut mortises of a given length and depth, and, when finished, throws itself out of gear. It is not necessary to lay off or mark the work beforehand.

#### Lithograph Presses.

Cummings & Balfour, of Boston, Mass., exhibit specimens of their improved Lithographic Presses. The improvements consist in a novel method of regulating the pressure applied to print from the stone, in a new way of hanging the tympan, to prevent blurring of the impression, in diminishing the friction, and in a general combination of the bearings and parts, which afford increased strength.

\$350,000,000 are annually expended for ardent spirits, wine and beer, in Great Britain.

#### Information Respecting the Manufacture of Iron and Steel.

The New York *Tribune* of the 17th ult states that the attention of metallurgists have been directed to three new methods in the manufacture of iron and steel recently introduced into Europe. These are stated to be the inventions of Messrs. Duchatras, an Austrian officer, Bessemer, of London, and Avrill of France. The several processes of these inventors, it states, are simple, cheap, doing away with puddling, and producing steel of the first quality.

Mr. Bessemer's process was first published in our columns on this side of the Atlantic, and our readers now know that he has invented nothing. There is no inventor named Duchatras. F. Uchatius, an Austrian officer, is the person intended by the *Tribune*. His process was described on page 309, Vol. 11, *SCIENTIFIC AMERICAN*.

The *Tribune* states that M. Avrill's process is superior to Bessemer's and Uchatius', and all others, because of its simplicity and saving of fuel. It says:—

"Cast-iron serves as a point of departure. The ore in the blast furnace will come out either malleable iron or steel, according to the desire of the operator. The means employed no effect this end are a modification of the crucibles at present in use, tuyeres of oxidation on the parabolic bottom of the crucible; and lastly, what is entirely new in metallurgy, the employment of ozone."

It states that tuyeres of oxidation form part of Avrill's process. Why, tuyeres are the nozzles of the blast pipes, and require to be made of the least oxidizable iron, or some more refractory material. There is nothing new about Avrill's tuyeres; the only thing entirely new about his process, is the use of ozone, as stated by the *Tribune*, and that he does not use at all. What he does use, or rather proposes to use, is pure oxygen gas, as a blast. As this invention has also been highly spoken of by foreign periodicals, we allude to it for the purpose of expressing the opinion that cheap steel cannot be manufactured by it. Every good chemist will bear us out in the opinion that pure oxygen gas cannot be manufactured cheap enough to be used as a blast in converting iron into steel; besides, it is not required, as the same object stated to be effected by it is now obtained by a process in very common use, namely, a little manganese in the crucible.

The use of ozone, as alleged, in Avrill's process, is an absurdity, for it is unfit for such a purpose, being destroyed by a heat of 140° Fah. Besides it is very expensive, because it is obtained only with the utmost difficulty, and in very small quantities, by any process. The cheap new process of M. Avrill will have to wait for success until some person discovers a cheap method of making oxygen gas, and it may be safely placed, for the present, on the same shelf with the Paine light, Ericsson's hot air engine, or the Static pressure engine.

#### The Steam Frigate Merrimac.

This war vessel—one of our six new steam frigates—made a trip from this port to Southampton, Eng., to show the Britishers a sample of what Uncle Sam's shipwrights could do in these times of improvement; and the result has been as great a surprise to Uncle John as the victory of the yacht *America*. The English papers assert that it is a noble war vessel in every respect, and that it is equal to the largest steam line-of-battle ship in the English Navy. The armament of the *Merrimac* is heavier than that of the *Duke of Wellington* of 131 guns; and it would have a decided advantage over that large ship in a free fight.

The British Navy does not contain the equals of the six new steam frigates belonging to our Navy.

#### Use of Guano.

At the recent meeting of the Herts (Eng.) Agricultural Association, Sir E. B. Lytton stated that within the last three years, independently of the sum expended on ordinary manures, the farmers of Great Britain had laid out five million sterling in the purchase of guano, and that within the same period a million of fresh acres had been brought into cultivation.