

amount of work each can do; but as these are the statements of the exhibitors themselves, should there be any inaccuracy it will be their fault.

In this same section of the building there are half a dozen or so rival inventors of fire and steam regulators, close together, and as these are now in actual operation on the smoke pipes of various boilers in the vicinity the competition of the exhibitors is strong.

A Fire Regulator, it is well known, is a contrivance for so moving the damper of a smoke pipe, or pump valve, that when the steam attains too great a pressure the damper shall be closed, thus hindering the fire from making more steam than is required. This is effected by a valve box, which communicates by a small pipe with the boiler, on the top of the valve rests a metal plate and this lifts, when raised by the pressure of steam within a weighted lever, which in its turn elevates or depresses the bent arm of the damper. Now the various modifications of this common plan are: first, one by Patrick Clark, who maintains that, by a peculiarly shaped lever, he can control any sized damper; he moves the fulcrum as the size of the damper increases, thus obtaining the power required. This invention is owned by a company. E. R. Pratt is secretary, whose office is at 229 Broadway, New York. See engravings on page 281, Volume 9, SCIENTIFIC AMERICAN. The peculiarity of Patrick White's is that his valve is square or rather rectangular in shape, and is composed of one piece of rubber tubing, the valve seat is also oblong and acts by a force free to move so that it can always remain perpendicular. His address is 10 Water street, Brooklyn, and he has a large placard posted up to inform the public that his regulator "needs no blowing."

Timothy Clark adopts either a rubber valve or a metal one—his metal one having the shape and form of a pair of circular bellows, and is certainly sensitive to a high degree. He claims to be the original inventor of fire regulators, his patent extending back to 1847. His address is 206 West 37th street, this city.

William S. Gale, 91 Elizabeth street, New York, has a simple Regulator. It consists in a simple plate of india rubber and a metallic one underneath. The valve seat rests on the rubber, and works with freedom and ease. It can be repaired by any mechanic when worn, and is not liable to get out of order.

The "Conical Volute Car Springs" of the New York Metallic Car Spring Co., No. 227 Broadway, New York, are strong, light, and work without friction, as a space is left between each coil of the spiral, thus rendering them perfectly elastic. We saw one weighing only twenty pounds, perfectly elastic under a pressure of 13,500 pounds, which it bore with ease under a concussive strain.

The Hadley Falls Co., of Holyoke, Mass., have a magnificent array of stamping, punching and cutting machinery for iron, manufactured under Dick's patent. They look massive, as they are, and plainly say "We are for use, not ornament; give us steam and iron, and we will show you what we can do." We saw evidence of their power in the perforated thick metal plates under the punch, and scraps cut from thick plates under the shears.

"Atmospheric Hammer," by Milo Peck, of New Haven, Conn. See engraving and description on page 137, Vol. 11, SCIENTIFIC AMERICAN.

J. H. Collier, Poughkeepsie, N. Y., exhibits a case of machine-cut files, which are very good specimens of their kind, the cut of the teeth being regular and equal.

The harness of a loom is a frame having a number of strings knotted so as to form a loop in the center, passing from side to side, and through each of these loops a thread of the warp passes; when weaving, these harnesses are alternately lifted up and down, by means of a treddle, and thus elevating a portion of the warp, forms a space for the shuttle to pass through. There is here a pair of harness made of thin copper wire, which is, apparently, better than twine, as there is less friction.

It is said that they are not so liable either to cut or wear the warp thread. They are made by M. Finkle, Broadway, New York.

The Clinton Wire Cloth Co., of Clinton, Mass., display some wire cloth woven by power looms; it is a very firm and well woven material, and can, no doubt, be turned out very rapidly. The particulars we could not learn.

We do not know whether the cities of the United States are this winter to be infested with the gangs of garroters and burglars that have occasionally visited us, but should we be obliged to resort to self-defence, we know not a better weapon than "Buckman's Cane Gun," which is decidedly the novelty of the firearm department. It is a simple hollow cane, which can be used as a pistol or rifle, is not liable to go off accidentally, and is immediately ready for use. It can be loaded with powder and ball in the ordinary manner, or with a loaded bullet containing fulminating powder, as in breech-loading firearms. No one would suspect a gun was concealed in such a slight walking-stick, and every part is sufficiently strong. Ira Buckman, 95 Bank street, this city, is the patentee.

ELECTRIC TELEGRAPHS.

Of all inventions that have originated in the mind of man, that of the electric telegraph has taken, and for all future time must maintain, a most prominent place. Its blessings and benefits are common to all, and its source of power is as unfailing and bountiful as the broad domain of nature itself. The telegraph, as now in use in our country, is simply made the medium of communication for business necessities or friendly salutations. But it may be made to subserv the dearest interest of the thousands that travel upon our many railroads, by operating as a safeguard—sending its silent admonitions ahead of approaching danger, or the assurance that all is well.

Looking into European railroad statistics, we find that the loss either of life or property is comparatively small, and mostly confined to individual cases, with which the companies have nothing to do. If we look for the superior safety of European roads over our own, we find that it lies in their close attention to, and excellent management of, their system of railroad telegraphs.

The want of a complete system of telegraphs in this country, to protect the lives of the traveling public, as well as the interest and property of the railroad companies, has been for years the subject of severe comment by editors, and the unfailing ground upon which to charge carelessness home upon the managers. If every railroad were furnished with its own complete telegraph, the number of accidents would be greatly diminished.

Charles Kirchhof, of No. 86 Duane street, New York, exhibits two of his newly invented telegraph instruments, and they are the only articles of the kind in the Fair. This invention is specially designed for use on railroads, fire-alarm telegraphs, police stations, etc. Its distinguishing feature is that any person, without previous experience, can operate its parts, and readily forward and receive messages. The instrument is contained within a small ornamental box having a glass dial and pointer. The dial has the letters of the alphabets marked thereon; and a series of keys are arranged in a circle around the dial. By touching a key, the pointer moves to the corresponding letter on the dial. The instrument operates beautifully, and is one of the greatest novelties in the Exhibition.

The superior qualities claimed by the patentee for his invention are as follows:—Any person who can read the alphabet and form letters into words is capable of operating, and can do so after a few minutes' familiarity with the instrument. No special operator is necessary, as any one connected with the railroad—conductor, engineer, or ticket-master—can use it with success. All mechanical force, such as clock-work, in operating the instrument, is dispensed with, electricity being the only material power depended on; hence, an uniform and certain action, not subjected to

changes or disturbances, is attained. Its last, but not least, superior quality, is its portability, and reliableness under any emergency that circumstances may offer. It can be as easily operated by the road-side, upon a man's knee, as when permanently placed in an office. One or more of the instruments may be carried on the railroad train; and in case of accident, telegraphic communication may be immediately opened with any desired station along the line, by throwing a piece of wire over the main telegraph conductor. The invention is adapted to telegraphing upon a large or small scale.

MUSIC BY STEAM—THE CALLIOPE.

The horrible shriek of a steam-whistle, which is either so piercing as to make one tingle all over, or else so very hoarse that one is inclined to think the engine has got a cold in its head, and that it will shortly have to stop and blow its boiler—this ugly inharmonious sound is, at the Crystal Palace, made to fall in regular cadences, and produce tolerable music, and is what may truly be called a novelty. It is, in fact, the attractive feature of the Exhibition. Whenever it plays an immense crowd always gather to hear it "discourse sweet music." The method of its arrangement is very simple: a number of steam whistles, each tuned and regulated to produce a certain note, are placed in order on a long steam pipe, and the steam admitted to each by valves, which are connected by wires to a key-board at one end, and a barrel at the other, so that it can be played as a barrel organ or as a piano. This is another application of steam, for which we are scarcely prepared at present; and it may be difficult to realize the fact that the same force which we now employ for hard, unflinching work, can be made to be an object of ornament—a high grace of art. And yet, when we consider that the steam engine is the result of the singing of a tea kettle impressing the genius of James Watt, it may not be inappropriate that its highest application should be a musical instrument. It is far more suitable for sacred than secular music, from the volume and deepness of its tones; and the day may not be far distant when it will be considered a necessary adjunct of large churches.

The Calliope has, however, one great advantage, and that is, that it can be heard by multitudes at once, as it is very loud. The agent is A. S. Denny. These organs are manufactured by the American Steam Music Co., Worcester, Mass. The American and European patents were secured through the Scientific American Patent Agency.

The Best Form of Iron to Resist Internal Pressure.

Professor Fairbairn, of England, expresses it as his opinion that the cylindrical or spherical is the most eligible and the strongest form in which iron plates will resist internal pressure. The deduction for loss of strength, on account of riveted joints and the position of the plates is about 30 per cent for the double-riveted joints, and 44 per cent for the single ones, the strengths—calling the plates 100—being in the ratio of 100, 70, and 57. The Professor found that 34,000 pounds to the square inch was the ultimate strength of boilers having their joints crossed and soundly riveted. Flat surfaces, frequently essential, are not so objectionable with respect to strength as they appear to be at first sight, and when properly stayed, are the strongest part of the construction. There is found to be a strong analogy as respects the strength of the stays when screwed into the plates, whether of copper or iron; and riveting adds nearly 14 per cent to the strength which the simple screw affords.

Making Wood Fire-proof.

Professor Rochelder, of Prague, has just discovered a new anti-phlogistic material, which promises to become of importance. It is a liquid chemical composition, the secret of which is not yet divulged, which renders wood and other articles indestructible by fire. Several successful experiments have been made, and others are promised on a larger scale.

Pleasure of Reading.

Of all the amusements that can possibly be imagined for a working man, after daily toil, or in the intervals, there is nothing like reading a newspaper or a book. It calls for no bodily exertion, of which already he has had enough, perhaps too much. It relieves his home of dullness and sameness. Nay, it accompanies him to his next day's work, and gives him something to think of besides the mechanical drudgery of his every-day occupation; something he can enjoy while absent, and look forward to with pleasure. If I were to pray for a taste which would stand by me under every variety of circumstances, and be a source of happiness and cheerfulness to me through life, and a shield against all its ills, however things might go amiss, and the world frown upon me, it would be a taste for reading.—*Sir John Herschell.*

Variabie Eccentric.

The variable eccentric does away with the great amount of link work usually connected with eccentrics on steam engines. This invention relates to the fitting of the eccentric to its shaft in such a manner as to be capable of adjustment transversely to the shaft to vary the length of, or reverse the direction of, the throw. This is done by giving the eccentric a permanent eccentricity in a direction at right angles to the direction of the adjustment, by which arrangement a constant lead is given to the valve in either direction of the revolution of the engine, and thus a single variable eccentric is made to constitute a complete and perfect substitute for the two eccentrics and link motion employed in the locomotive engine. It is the invention of S. L. Wiegand, of Philadelphia.

Burglar Alarm and Defense.

This little implement of war is a pistol a few inches long, so that it can be used as an ordinary pistol and carried in the pocket, or so arranged that at night it can be screwed into your bedroom door, and on any attempt to force it open, the pistol is discharged, and sends a bullet through the intruder before he is aware of it. It is a useful invention for travelers and others, and was invented by E. M. and J. E. Mix, of Ithaca, N. Y.

Setting Diamonds.

Isaac Lindsley, of Providence, R. I., has invented and patented a new method of setting diamonds, natural or artificial, in an open setting, which combines great strength with lightness. He sets them in points, which are stamped on by a die, and have a firm, flat plate of metal at the back, so that very little metal is seen, and it improves the appearance of the brilliants.

Laths and Fence Pickets.

J. H. Bachelder, of Rome, Mich., has invented a machine for sawing laths and fence pickets out of the rough log at one operation. There is no taking the log out, and cutting first one way and then the other, but the whole is done automatically by the machine, thus saving time and labor.

Self-Acting Gate.

By this gate, the invention of C. A. Howard, of Pontiac, Mich., the trouble of opening gates is done away with, as by an arrangement of springs and suitable mechanism, when a vehicle approaches it, it opens itself, and when through, closes again. This will answer well for gentlemen's grounds and other places.

Spikes.

Orrin Newton, of Pittsburg, Pa., has invented a new form of spike, which consists in giving the four faces a concave form, thus economizing the metal by giving greater strength with the amount of material than any other form, and renders it easier to drive, and has a firmer hold when in.

Pressure Gage.

Henry Bates, of New London, Conn., has invented a new pressure gage, which is considered a very great improvement. The claim in our List of Patent Claims explains the nature of it.