

BLAKE'S SECTIONAL CUSHIONED CRUSHER.

The accompanying engravings illustrate a very important improvement recently made in stone breakers by the Blake Crusher Company, of New Haven, Conn., original patentees and manufacturers of the machine of world-wide reputation, known as Blake's patent stone and ore breaker.

One of these new breakers is now daily in operation at the American Institute Fair, New York city. A careful examination of its merits, as compared with the old forms of the machine, will repay all those who are interested in the rapid and economical reduction of masses of stone to small fragments, either for road material, railway ballast, concrete, or of metalliferous ores, preparatory to further reduction for the extraction of the metals. In the new machine, called the "Challenge Rock Breaker," the heavy solid cast iron frame of their old forms of crusher is dispensed with, and the main tensile strains, due to the crushing between its powerful jaws, are brought upon wrought iron or steel instead of cast iron.

The construction of the machine is well shown in the engravings, and its operation will be readily understood. A three-sided framework of cast iron, with broad flanged base, holding the movable jaw in suspension, forms the front part of the machine, between the upright convergent jaws of which the stone is crushed.

The jaw shaft is held in place by wrought iron or steel clamps, C, which serve to take part of the strain due to crushing in the upper part of the jaw space, and also serve as walls thereof. In the lower part of the three-sided frame or front part of the crusher, and on each side of it, are holes in the casting to receive the main tension rods which connect the front and rear parts of the machine. The rear part, B, is called the main toggle block, and is also provided with holes for the tension rods, R R, corresponding to those in the front casting.

These two parts of the machine are connected by the main steel tension rods, R R, each provided with screw thread and nuts, by which their lengths and the jaw opening are readily adjusted to crush coarse or fine, as may be desired.

The front and rear castings are supported on parallel timbers, to the underside of which are bolted the boxes carrying the main eccentric shaft, provided with fly wheels and pulley. The timbers are thus made component parts of the machine, and take the transverse strain which comes upon the pitman connecting the main shaft and the toggle joint placed in the rear of the movable jaw, and between it and the main toggle block.

Between the broad flanged bases of the front and rear castings and the timbers on which they rest, are placed flat rubber cushions one quarter to three eighths of an inch thick. Every revolution of the shaft brings the toggles more nearly into line, and throws the swing jaw forward; it is withdrawn by the rod provided with rubber spring, L. In this way a short reciprocating or vibratory movement is communicated to the movable jaw.

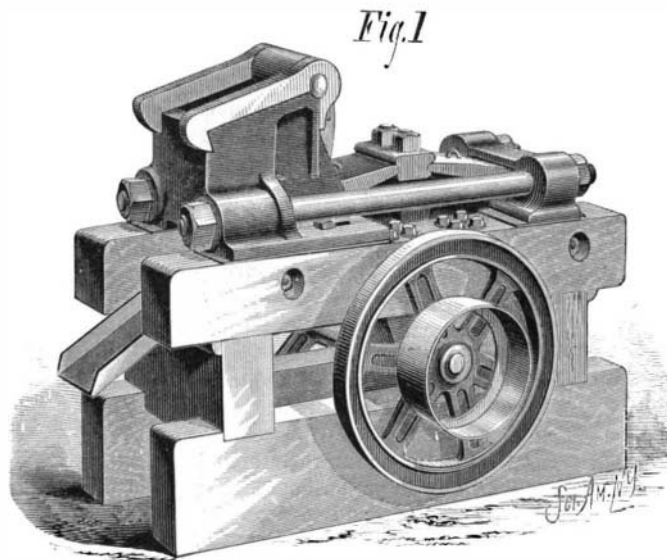
It is evident that this new construction of the Blake stone crusher—while the principle of crushing between upright convergent jaws is the same as in their old machine—possesses many and great advantages over the old forms. It is sectional. The weight of the heaviest piece in crusher size 15x9 inches is about 2,400 pounds instead of nearly 8,000. The rigidity inseparable from machines with cast iron frames, and which is the cause of frequent breakages, is completely overcome, and the longitudinal as well as transverse strains are brought upon materials which are strong and elastic as compared with cast iron. The rubber cushions, while offering sufficiently great resistance to compression in case of the breakage of stone or in doing the normal work of the machine, will, in case of the accidental intrusion of steel hammers or anything of that kind, be compressed and so permit the partial revolution of the flywheels before coming to a full stop, thus relieving the machine of those nearly infinite strains to which those of the old form were subjected, and which resulted in breakage of important parts. The toggles are long, and of equal length, and may be worn indefinitely as compared with those in the old machine. The construction of the pitman is such as to admit of change of inclination of the toggles, and consequently of adjustment of the length of stroke of the movable jaw. The jaw opening can be varied between any working limits by means of the nuts on the tension rods, and the machine be set to crush coarse or fine as may be desired. The crusher, it is stated, can be run at a higher rate of speed with safety than either of the old forms of crusher with cast iron frames, and will consequently do a greater amount of work. The manufacturers inform us that while this machine is very much lighter than the old forms, it has at least double their strength.

The new challenge rock breaker has been repeatedly subjected to the test of a steel hammer being thrown between its jaws, when going at as high a rate of speed as 300 revolutions per minute, without injury to or breakage of the machine. The machine is the invention of Mr. Theodore A. Blake, mining engineer, and Secretary of the Blake Crusher Co., New Haven, Conn. Patents covering main features of the machines have been allowed and will shortly issue.

We understand that several cities are replacing old forms of crusher with the new, among which are New Haven, Conn., Providence and Newport, R. I., and Holyoke, Mass.

MISCELLANEOUS INVENTIONS.

Mr. Thomas L. Rankin, of room 75, Astor House, New York, has recently secured several United States patents for improvements in ice making apparatus. We are informed that during recent trials of the apparatus, in this city, very satisfactory results were obtained. The apparatus, while it is capable of making ice economically, is intended more especially for direct refrigeration, and is especially adapted to the refrigeration of vessels, beer vaults, and cooling rooms of slaughter houses. It will be remembered that not long since Mr. Rankin produced a sheet of artificial ice covering the entire area of Gilmore's Garden in this city, the largest artificial sheet of ice ever made. One of the novel inventions of Mr. Rankin is a cover for soda water



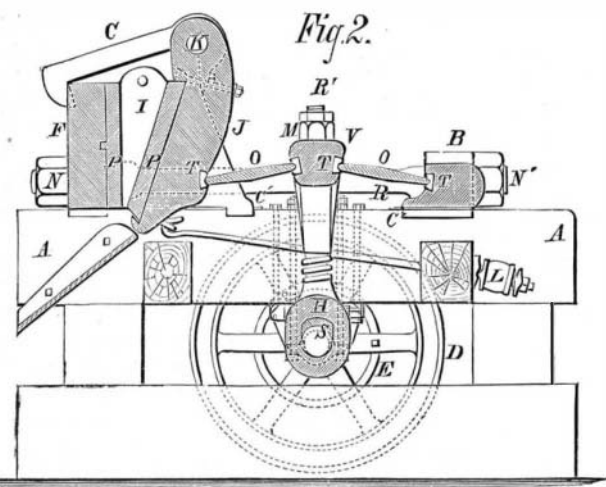
BLAKE'S CHALLENGE ROCK BREAKER, OR SECTIONAL CUSHIONED CRUSHER.

fountains, which is shaped like icebergs and refrigerated to produce a coating of ice on their outer surfaces.

An improved self-adjusting relay has been patented by Peter S. Bates, of Bloomsburg, Pa. The object of this invention is to furnish relay instruments which shall be so constructed that the current passing through it will govern the spring of the armature and cause it to adjust itself to the force of the current, whether the current be very strong or the weakest current that will pass over the line, rendering it unnecessary for the operator to touch the instrument.

Mr. Christopher C. Hackett, of Floyd, West Carroll Parish, La., has patented an improvement in digging and curbing wells which insures accuracy in the shape of the well and the direction of the digging; it also enables the two operations of digging and curbing to be proceeded with simultaneously, and protects the workman from falling bricks and the caving in of the well.

Mr. Nicholas C. N. Laurence, of Detroit, Mich., has invented an improvement in methods of mounting chromos, engravings, pictures, and the like, consisting of pasting a sheet of paper over the back of the chromo or picture, covering the outer surface of the paper with a paste or composi-



LONGITUDINAL SECTION OF BLAKE'S CRUSHER.

tion that will quickly set, and then pasting or gluing narrow strips of cloth on the back of the picture near the edges, and pasting or gluing them to the sides of the stretcher.

Messrs. Melvin A. Belcher and George F. Perrenot, of Rockport, Texas, have patented a manacle or shackle for the hands and feet, that will offer effectual resistance to any attempt to break them while on the hands or feet, and that will, when on the hands, prevent one from using any instrument for effecting his escape.

An improved stovepipe receiver has been patented by Mr. William Shaw, of Millbridge, Maine. The object of the invention is to enable a stove to be set up to any height of flue within the limit of the height of the room, and also to provide an arrangement to be used in connection with any stovepipe hole that will admit of any sized pipe (of the sizes usually made by stove makers) being joined to the hole without trouble or inaccuracy.

Mr. Reinhold P. H. Koska, of East Saginaw, Mich., has patented a device for holding eggs while opening them. The invention consists of a pair of tongs, whose legs terminate in concavo-convex plates, that when closed together shall be in shape like an egg, with its upper third removed, so that when they are brought together they may embrace and cover the lower two-thirds of the egg.

Messrs. Henry W. Wilson and Alonzo Gandy, of Freeport, O., have patented an improved thill-coupling, which will allow the thills to be readily attached and detached, and which will prevent any noise or rattling when in use.

Mr. William R. Kitchen, of Willard, Ky., has patented an easily operated device for detaching the harness tugs from the ends of whiffletrees, and it consists of a ferrule with projecting arms, in which is pivoted a crossbar with a pin which enters a hole in a lever pivoted below. The tug is released by moving the lever.

An improved apparatus for coating pills has been patented by Mr. Henry M. Dury, of Edgefield, Tenn. The object of the invention is to facilitate the operation of coating pills with gelatine and other fluid coating materials. It consists of a shallow circular dish or pan, in the bottom whereof are hemispherical indentations to receive the pills. In this pan works a plunger provided with projecting needles or points corresponding in number to the indentations. Sheathed over these needles or points there is a metal plate attached to a rod passing up through the handle, and held up so as leave the needles unsheathed by a spring, the apparatus being adapted to take up the pills from the pan and hold them while they are being dipped into the coating material and until they dry, after which they are forced from the needles by pressing the metal plate against them.

Mr. Johannes Schuhmacher, of Roemische Posel, Soernowitz bei Meissen, Koenigr Sachsen, Germany, has patented an improved process of producing colloid transfer pictures upon linen or other material, which consists in first washing with a solution of gelatine the surface that is to receive the picture, then flowing it with the colloid mixture described, and printing thereon from the negative, then finishing in the usual manner, then coloring and applying adhesive varnish, and then transferring the colloid picture film.

The Polyphemus.

The Polyphemus, now being completed for commission at Chatham, England, promises to be a complete novelty among offensive ironclads. She is to be built entirely of steel, and her deck is to be covered over with three inch plating of a convex shape. This convex curvature is continued round her sides some distance below the water line, after which her sides converge towards her keel, or rather to where her keel should be in a V shape. Her midship section will thus appear the shape of a kite, the convex deck only rising 4 feet 6 inches above her water line. She is 240 feet between perpendiculars, the extreme breadth is 40 feet, and she will have a load draught of 20 feet. The engines are estimated to work up to 5,500 horse power, and to give her a speed of 17 knots. What a dangerous enemy she will prove is evident from her speed alone, as her principal means of offense are a ram or steel spur and Whitehead torpedoes. Her form of construction is evidently intended to enable her to escape notice, and even when observed, to escape damage by the deflection of shot rather than by absolute resistance to such impact. There is much of interest and importance in this experiment, for such indeed it is, the vessel being constructed after the idea of Sir George Sartorius, a well known veteran of the navy. We consider the Polyphemus as one of the first attempts in construction to foil the impact of heavy shot by diversion rather than by the probably futile resistance of a heavy armor plating. Another important modification has been made in her construction to enable her to benefit to the full extent by the principle of subdivision into water-tight compartments, which is particularly carried out in her design, and on which she must very largely rely for safety. The modification is that an enormous mass of cast iron ballast is carried outside the vessel in a rectangular groove 1 foot 8 inches wide, and 3 feet deep, situated where her keel should be. This mass of ballast amounts to 300 tons; her total displacement being 2,640 tons, and represents in weight a volume of rather more than ten thousand cubic feet. This ballast is so arranged that it can be released from the vessel at will, so that should one or more of her water-tight compartments be pierced, the loose ballast may be dropped from the part of the vessel corresponding to the flooded compartment. The position or power of flotation may thus be retained undisturbed, even after several compartments may have been pierced. She carries no masts, except for signal purposes, and her guns are a few light shell and Gatling guns on her upper deck.—*Marine Engineer.*

An Octoplex Printing Telegraph.

Prof. Klinkerfues, the director of the Göttingen Observatory, has, it is said, taken out a patent for a new invention in telegraphy. The professor has discovered a method by which up to eight different messages may be sent simultaneously by the same wire, an apparatus at the receiving end printing the messages separately and all at the same time.