

which no amount of wear and tear seems capable of disjoining. It must be borne in mind that this enormous endurance of cast steel is not owing to its hardness or brittleness, as some have supposed, for, in fact, Bessemer steel possesses an extreme degree of toughness. There is before the meeting an example of this fact: one of the same quality of steel rails having been attached at one end of the main driving shaft of a steam engine so as to twist it while cold into a long spiral, measuring 9 feet in length at top and bottom, and only 6 feet if measured along the center of the web. A single glance at this spiral rail will, it is presumed, dispel any idea of brittleness that may have been entertained."

EXTENT OF THE MANUFACTURE.

"In conclusion, it may be remarked that cast steel is now being used as a substitute for iron to a great and rapidly increasing extent.

"The jury reports of the International Exhibition of 1851 show that the entire production of steel of all kinds in Sheffield was, at that period, 35,000 tons annually, of which about 18,000 tons were cast steel. equal to 346 tons per week; the few other small cast steel works in the country would probably bring up this quantity to 400 tons per week as the entire production of cast steel in Great Britain. The jury report also states that an ingot of steel, called the 'monster ingot,' weighing 24 cwt., was exhibited by Messrs. Turton, and was supposed to be the largest mass of steel ever manufactured in England. Since that date a great change has been made, for the largest Bessemer apparatus at present erected in Sheffield, at the works of Messrs. John Brown & Co., is capable of producing with ease every four hours a mass of cast steel weighing 24 tons, being twenty times larger than the 'monster ingot' of 1851.

"There are now seventeen extensive Bessemer steel works in Great Britain. At the works of the Barrow Steel Company 1,200 tons per week of finished steel can easily be turned out, and when their new converting house, containing twelve more five-ton converters, is completed, these magnificent works will be capable of producing weekly from 2,000 to 2,400 tons of cast steel. There are at present erected and in course of erection in England no less than sixty converting vessels, each capable of producing from three to ten tons at a single charge. When in regular operation these vessels are capable of producing fully 6,000 tons of steel weekly, or equal to fifteen times the entire production of cast steel in Great Britain before the introduction of the Bessemer process. The average selling price of this steel is at least £20 per ton below the average price at which cast steel was sold at the period mentioned. With the present means of production, therefore, a saving of no less than £6,240,000 per annum may be effected in Great Britain alone even in this infant state of the Bessemer steel manufacture."

RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Reversing Gear for Steam Engines.—The object of this invention is to change the motion of the slide valve at the end of each stroke of the piston by the action of parts which are arranged in the interior of the cylinder and operated by the piston or parts attached to the same. This object is effected by connecting the slide valve to a rod which connects two pistons working in cylinders that are formed by the ends of the valve chest, and the outer ends of which connect by suitable channels with chambers which are situated in the cylinder heads and communicate with the cylinder through openings that are closed by spring valves. Whenever the piston approaches one of the ends of its stroke it strikes the stem of one of the spring valves, and by opening it allows the steam contained in the end of the supplementary cylinder to escape, and thereby the equilibrium at both ends of the small pistons connecting with the slide valve is disturbed, and the slide valve is changed automatically. Small channels passing through said pistons allow the steam to pass into the supplementary cylinders, but these channels are so small in proportion to the channels leading from the supplementary cylinders to the chambers in the cyl-

inder heads, that if one of the spring valves is opened, the steam from the supplementary cylinder escapes much quicker than it can be replenished through the small channel, and thus the equilibrium is disturbed and the slide valve changed as above stated. A. S. Cameron, corner of Second avenue and Twenty-second street, New York, is the inventor.

Device for Extracting Stumps and Elevating and Conveying Heavy Bodies.—This invention relates to the application of hydraulic pressure to a carriage for elevating heavy bodies, extracting stumps, raising stones, etc., and conveying them, when elevated and retained in a suspended state, to the place designed for them. The invention consists in the employment or use of an hydraulic apparatus similar to that used in the hydraulic press, placed upon a strongly-built carriage, and arranged with a water tank, and having the axles of the carriage provided with screw jacks—all arranged in such a manner that the desired work may be performed with but little labor, and with great facility. E. C. Haserick, Lake Village, N. H., is the inventor.

Drill Coupling.—This invention consists in a new method of making joints or couplings by which drilling tools are fastened on their rods and the sections of the rods coupled to each other, whereby the joint is made with facility and without injury to the screw thread or to the joint itself. One of the most serious difficulties now experienced in drilling an oil well is from the constant tendency in the couplings of the drill rod to become unscrewed; and, since there are two or more in every set of tools, the hindrances from this cause are frequent. Another difficulty arises from the breaking off of the male screw at its shoulder, caused by the excessive wrenching to which it is subjected when the joint is put together. An other difficulty is the stripping of the threads of the screw, by reason of the violent jar when the drill gives its stroke. The present manner of "wrenching on" the joints or couplings of drill rods and their tools is about as follows:—Two iron wrenches, several feet long, are used, the lower one resting against the ground or some fixed body, and the upper one being turned as tight as possible by hand, when two men, with a wooden lever about six or eight feet long, surge with all their might against the wrench. This throws an immense strain upon the threads, creating new bearings and angles, and causing them to become stripped and broken. This invention is meant to preserve the joints and couplings aforesaid, and to provide a more certain connection, and one which costs less labor to make secure. Job B. Stockton, Oil City, Pa., is the inventor.

Button-hole Sewing Machine.—This invention relates to a button-hole sewing machine which imitates, as near as possible, the hand stitch generally employed in making button-holes. One needle is employed which passes down alternately through the cloth near the edge of the button-hole, and then through the hole itself. Two threads are employed, one of which is carried by the eye-pointed needle and the other by a circular shuttle or bobbin situated in the interior of an oscillating hook. The gimp which is used to strengthen the edge of the button-hole, is carried by a bobbin which lies in the cavity of a revolving hook. The oscillating hook which carries the lower thread serves to take up the loops of the needle thread, as the same drops from the revolving hook and passes the same over the bobbin carrying the lower thread, which, passing through said loops in a direction opposite to the gimp, causes them to twist and to produce a stitch similar to that employed in making button holes by hand. The position of the cloth on the cloth plate is governed by a feeder which has a triple motion, viz., a vertical motion in the direction transversely to the cloth plate, or in the direction in which the cloth is fed while sewing; a similar motion in a direction at right angles to the latter motion, and a rotating motion. The first motion serves to feed the cloth in the ordinary manner; the second imparts to the cloth a lateral motion, causing the needle to pass down through the hole instead of through the cloth, and the third or revolving motion is employed to govern the motion of the cloth in sewing round the eye of the button hole. While sewing the straight edges of the button-hole the circular motion of the feeder is thrown out of gear. The various motions of the feeder are adjustable so that they can be accommodated to button-holes of different

sizes. If desired, the sewing machine can also be employed for ordinary or plain sewing. Emil Cajar, of No. 298 Hudson street, New York, is the inventor.

Spinning Jack.—This invention relates to an apparatus the object of which is to put friction upon the driving pulley of the jack by sliding the bolt partially upon it from the driver pulley and thereby to assist the spinner in winding the yarn upon the bobbins. This apparatus consists of a bell-crank cam lever, one arm of which is hinged to a longitudinally sliding rod which is subjected to the action of a spring, and the motion of which is governed by a regulating screw, in combination with the belt slipper and with a catch and rod acting on said catch, when the faller or coupling wire is applied in such a manner that, whenever the spinner applies the faller to the threads, the catch is sprung, and by the action of the spring rod the belt is shifted from the loose or the fast pulley, more or less, according to the position of the regulating screw; and when the carriage is pushed home it strikes the bell-crank cam lever and carries the spring rod back, thereby shifting the belt back upon the loose pulley and allowing the catch to drop behind the spring rod, ready for the next succeeding motion of the carriage. Ezra Dews, South Britain, Conn., is the inventor.

Self-acting Brake for Horse-powers.—This invention consists in having the bearings of the driving shaft of a horse power arranged in such a manner that they will slide in a direction transversely with the shaft, and having springs, or their equivalents, connected with said bearings in such a manner that they will have a tendency to press the band wheel, which is the driving shaft, in contact with the brake when the band is off from said wheel—the band, when on the wheel, keeping, by its tension, the wheel free from the brake, so that at any time when the band is cast off from the wheel the spring will throw the wheel in contact with the brake. William F. Rundell, Genoa, N. Y., is the inventor.

Apparatus for Drying Straw Boards.—This invention has for its object to dry straw boards and other articles of similar character. Straw boards have hitherto been dried by passing them in their green state around heated cylinders by means of strong canvas bands, which are made partly to encompass the cylinders. This invention consists in the use of stationary steam chests, against whose surfaces the articles to be dried are held by means of hinged pressers, consisting of frames whose bodies are composed of cloth or other suitable material, which shall be of an open texture, to admit the passage of vapor through it. William H. Severson, Cohoes, N. Y., is the inventor.

Fire-arm.—This invention consists in forming the breech-piece or cylinder of a fire-arm in two parts or sections, so arranged as to be opened or removed from each other for the insertion of metallic cartridges therein, or the removal of the waste cases therefrom; and when a revolving breech cylinder is used, so constructed and connected as to revolve together and as one piece—the metallic cartridges, when inserted within the chamber or chambers of the breech, extending across from one section to the other, with their fulminating rims in and between the contiguous ends of the same, and the striking hammer of the fire-arm being properly constructed and arranged to discharge the cartridges, as in ordinary fire-arms. Silas Crispin, No. 45 Worth street, New York City, is the inventor.

WORTH IMITATING.—The New Bedford and Taunton Railroad has an arrangement for preventing brakemen being knocked off the tops of the cars by bridges while riding backward. About thirty rods distant from every bridge crossing is a bar or joist twenty feet above the track, from which a number of laths or similar small strips of wood are suspended by short cords, hanging within three or four feet of the car roofs. Persons standing on the cars cannot pass these sticks without striking some of them, and their attention is thus called to the fact that they are rapidly approaching a bridge.

ONE good Havana cigar is found by Dr. Richardson to yield, when its smoke is condensed, a sufficient amount of poisonous matter to induce active convulsions in a rabbit, and six pipes of common shag tobacco will yield sufficient poison to destroy a rabbit in three minutes.