ENGINEERING INVENTIONS.

A car for inclines in mines has been patented by Mr. John Rosquist, of Park City, Utah Ter. There is provided a novel self-acting pawl attachment, whereby, if the rope or other appliance gives way, the pawl or pawls are made to automatically engage with locking racks on the track, to stop the car at any point.

A railway torpedo placer has been patented by Mr. Gilson W. Metcalfe, of Baltimore, Md. This invention relates to an improvement on a torpedo placer patented last year by the same patentee and Mr. M. F. Haber. It involves certain details of construction whereby the action of the wheel in placing a torpedo on a rail is made more certain and effective.

An automatic railway signal has been patented by Mr. Theophilus Arndt, of Florin, Pa. It provides for placing an extra rail at the side of one of the track rails, the extra rail being slightly higher and with sloping ends; there is an attachment to the locomotive, by which a lever is operated in passing over this extra rail, and thus the whistle is blown during the passage over the sloped rail.

MECHANICAL INVENTIONS.

A mandrel attachment for circular saws has been patented by Mr. Edward W. Johnson, of Waterbury, Conn. This invention provides for the fixing of a circular saw to a mandrel at any required angle, whether right or oblique, and enabling the operator to change the angle of the saw on the mandrel, so as to vary the width of the cut or groove to be made.

A screw driver has been patented by Messrs. George E. Gay and John H. Parsons, of Augusta, Me. The invention is an improvement on screw drivers in which the blade is fixed to the handle by a metallic plug in a transverse position, and has for its object to dispense with the flanges or screws in or upon such metallic plugs, thereby simplifying and cheapening the making of screw drivers.

A belt tightener has been patented by Mr. Frank Sager, of Pittsburg, Pa. In combination with screw threaded shafts and clamping rolls is a fixed and a movable cross bar, with an eye at each end, forming bearings for the shafts, the latter having collars and nuts at the ends of the eyes, and working in screw-threaded bevel-toothed nuts, operated by beveled cog wheels, a shaft, and a crank or handle.

AGRICULTURAL INVENTIONS.

A sulky plow has been patented by Mr. Benjamin S. Benson, of Baltimore, Md. This invention is designed to facilitate the more perfect guiding of the plow, and controlling the width of the furrow slice, which is effected by readily made adjustments of the various parts.

A sulky plow has been patented by Mr. Thomas T. Harrison, of Aubrey, Kas. This invention covers improvements on four former patents issued to the same patentee, and is for a manner of adapting plows to turn a square corner in passing around land, without it being necessary to raise the plows out of the ground.

An improved plow has been patented by Mr. Simeon A. Ware, of Danburg, Ga. The object of this invention is to promote convenience in adjusting plows and efficiency in operating them. A detachable landside is provided, in place of which a blade or cutter may be fixed to the side of the beam, to cut roots in the soil which would otherwise interfere with the working of the plow.

A pitman box connection for mowers and reapers has been patented by Mr. Charles Dixon, of Weedsport, N. Y. The invention provides for an improved construction to make a better working joint or fit of the socket portion of the box with the pin or ball which works therein, whenever, by irregularities from imperfect castings or otherwise, the same are liable to shake or jar and form an imperfect connection.

A horse hay rake has been patented by Mr. James M. Wishart, of Topeka, Kas. The teeth are attached to cross bars which form the head of the rake, one bar being under the upper or rear ends of the teeth, and one bar being over the teeth at a suitable distance forward of the rear ends to give sufficient space for the wheels on which the rake is supported to be located between said bars.

MISCELLANEOUS INVENTIONS.

A grain measuring machine has been patented by Mr. Joseph Nafziger, of Hopedale, Ill. This invention relates to a device adapted to be attached to and operated from the separator of a thrashing machine, for automatically measuring the grain as it is thrashed.

A stave and shingle sawing machine has been patented by Mr. William J. Henderson, of Naylor, Ga. The object of this invention is to promote convenience and accuracy in beveling and bilging staves, sawing shingles, laths, fruit crate slats, and other sawing.

A clamp for sheet holders has been patented by Messrs. Alfred P. Hayden and Francis Pickup, of Brooklyn, N. Y. This invention provides a device with peculiar construction and arrangement of parts for holding all kinds of loose sheets, as express receipts, check and note blanks, etc.

A flying target has been patented by Mr. James Jopling, of Ostkaloosa, Iowa. The object is to provide a target of a form to prevent the shot from flying off, which shall sail well in the air, not be liable to breakage on the field, and so a large number can be safely packed in a small space for transportation.

A cotton press has been patented by Mr. John C. Allen, of South Sulphur, Texas. It is a horizontal press, with reciprocating follower worked by power, and arranged to receive cotton from a chute descending from a floor above, the construction being such as to make a very effective press without heavy or expensive fittings.

A grate bar has been patented by Mr. John Mailer, of San Francisco, Cal. In this invention the grate bars are fixed, and without vibrating motion; there are tongues on both sides of the opposite plates of each bar, in a staggered position, and beveled downward and inward to the plates, to insure a large air inlet, and not allow the passage of the lugs by each other.

A spring motor has been patented by Mr. James A. Wright, of Rockingham, N. C. This motor provides means whereby an elastic cord or other spring may be stretched to its full length and its contractile force utilized in a small space for such purposes as running sewing machines, churns, pumps, scroll saws, or for propelling bicycles, etc.

A cock and tank for drawing fluids of varying temperatures has been patented by Mr. James Byrne, of Cleveland, O. The invention provides for the division of an urn or tank into two compartments, and a faucet with a single outlet connected with both compartments, but so the flow of the liquid from both may be gauged as desired.

A glove fastener has been patented by Mr. Amedee Trouttet, of New York city. This is a cheap, novel, and practical device by which a glove may be fastened quickly and easily without button hook or other aid. There is a sliding buckle or fastener, with hooks, and a strap attached to the flap of the glove with suitable holes or eyelets.

A stocking supporter has been patented by Mr. George N. Buck, of Mattoon, Ill. An attachment is provided consisting of a single wire bent back and forth upon itself to form a series of separate parallel loops, as an elastic strap adjuster, and terminating in a spring pin and eye, or keeper, by which to attach it to a stocking.

A nut lock has been patented by Mr. John W. Haley, of North Hartland, Vt. In a fish plate, with lugs on its outer surface, is a frame or check nut, the frame being provided with diagonally opposite lugs adapted to catch on the lugs of the fish plate and prevent the locking nut from turning, the nut lock being very easily applied, and firmly fixing the nut.

A dash board has been patented by Mr. William E. Minshall, of Minonk, Ill. This invention provides means for securing dasher frames to their feet without holes in the frames, also for repairing broken dasher frames, and for fixing the whip socket to the dasher, in a more solid and economical manner than by present methods.

An apparatus for adjusting the beat of pendulum clocks has been patented by Messrs. George H. Brown and Henry J. Welteroth, of Blossburg, Pa. The invention provides means for adjusting the verge or pallet relatively with the escapement and pendulum rod, so the clock may be set in perfect beat when resting on an unlevel surface or support.

A saw envelope has been patented by Mr. Frederick Schluchtner, of East New York, N. Y. A fastening strap is provided at one or both ends with a cross head to engage with slits in the envelope and fasten it in place upon a saw; in the side of the envelope is an aperture to display the figure indicating the number of teeth to an inch in the saw.

A cigar mould has been patented by Mr. Remsen Appleby, of New York city. This is an improvement on a former patent issued to the same patentee, intended to prevent the point of the cigar from being packed and badly drawn, and provides for the cutting off of the surplus tobacco without packing the point, while at the same time the tips are made secure and the work is accurate.

A rock dredge has been patented by Mr. Isaac Du Bose Seabrook, of St. Helena Island, S. C. This invention is intended to better accomplish the disintegration and recovery of the phosphate rock deposits of river bottoms than is at present possible, the device provided giving greater flexibility of action, thereby accommodating itself more perfectly to the irregularities of the river bed.

An easel has been patented by Mr. Delbert K. Woodward, of Lordstown, O. This invention relates to certain improvements on an easel for which a patent was granted last year to the same patentee. The easel frame has a short rear leg or legs attached to a cross bar near the center of the easel, and there is an adjustable shelf bracket, with several specially devised and ingeniously arranged parts.

A fire engine has been patented by Mr. William F. Baldwin, of Grayville, Ill. This invention has for its object to provide means whereby any number of cisterns may be adapted to receive the same pump and its operating gear, and the gear adapted to operate one or more pumps by hand or animal power, being much more economical and more quickly adapted to use than a portable engine.

A combined extension saw horse and scaffold has been patented by Mr. John W. Phillips, of Oakdale, Neb. An extension top piece and extensible legs are hinged to a hinged head block, and there are also intermediate extensible legs hinged to the top piece, so the saw horse can be lengthened or shortened, or made higher or lower, to adapt it for use for various purposes.

A velocipede has been patented by Mr. Christian F. Riley, of Philadelphia, Pa. This invention covers improvements in means of coupling the guiding or steering and driving axle of a hand crank velocipede with the reach or bed frame of the hind axle, and also devices for steering or guiding the driving wheels by the feet of the driver, the object being to make the machine simple, efficient, and durable.

A shingle sawing machine has been patented by Mr. Patrick O'Connor, of Tallman, Mich. The machine has a stationary frame and a rotary annular frame divided into compartments by stationary and hinged bars, and provided with stationary and with movable dogs operated by spring pressed jointed bars and cam guides, and adjustable tilting tables, the whole to facilitate the sawing of shingles and promote accuracy.

A hoisting apparatus has been patented by Mr. Pentecost J. Mitchell, of Dragoon Summit, Arizona Ter. The drum shaft is contrived to be lifted with its bearing at one end for disengaging the gear from the driving gear on the main vertical shaft to which the power is applied, and there is a friction brake device to control the lowering load when the gears are disconnected, the whole making an easily worked and safe machine.

Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

NEW BOOKS AND PUBLICATIONS.

THE TABOR STEAM ENGINE INDICATOR. By George H. Barrus, S.B. Ashcroft Manufacturing Company, Publisher.

This little book, arranged in pocket form, not only describes in detail the construction and manner of working the Tabor indicator, but, in well chosen terms, treats of the indicator in general. This useful device, revealing every idiosyncrasy of the steam engine and infallibly pointing to the proper remedy, should be used with judgment and skill, and each one of its peculiarities should be perfectly understood by the operator. The indicator diagram tells a complete and unvarnished story to those who are able to interpret it. The author has dealt with these questions from an eminently practical standpoint, and has succeeded in compiling one of the most accurate, concise, and plain expositions of the indicator we have seen.

A "Directory of the Iron and Steel Manufacturers of Great Britain" is published by our contemporary, the *Iron Trade Exchange*, London, being a careful compilation by its editor, Mr. Herbert W. Griffiths. The names and addresses of the manufacturers are given, the brands by which their goods are known, and the various kinds of products, in the iron, steel, tin plate, galvanized iron, and tube trades.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their identification.

(1) N. P. asks: What is the difference between crucible steel and cast steel, also what is the difference between common spring steel and spring cast steel, and how can the difference be told? Also about books treating on the general nature of steel and on spring making? A. Cast steel, such as is used for tools and similar purposes, is made from a particular grade of iron which is rolled into bars of one half inch by three inches, or thereabouts, and these are packed in an oven with charcoal dust and lime and kept at a red heat for seven or nine days. When they come out the bars are covered with blisters—hence the name "blister steel." They are as brittle as glass when cold, and are broken up into lumps of half a pound to one and a half pounds, and melted in plumbago or in fire clay crucibles—hence the name "crucible" steel—and poured into moulds of cast iron in convenient shapes for the afterward rolling or tilting (hammering). Other steel is also cast, as Bessemer, which is made from a certain mixture of irons in a cupola or "converter," and a blast of wind is sent through the melted iron, burning out the excess of carbon. When "converted," this steel is also cast in iron moulds, and so, in one sense, it is "cast" steel. But it differs materially from crucible cast steel, and is unfit for edge tools. Steel is also made from iron on the open hearth, and partakes largely of the qualities of Bessemer steel. To make a flat spring that will not set, crucible cast steel must be used and the spring must be heated and hardened and then drawn to a spring temper. Bessemer or open hearth steel will not harden or temper. Some of the most valuable practical papers on the nature and working of tseel will be found in the back volumes of the SCIENTIFIC AMERICAN SUPPLEMENT. The working of steel at the forge or the tempering bath can be learned only from the practical master—not from books.

(2) J. B. C. writes: If a man has a certain continuous work to perform which requires the power of ten horses, he naturally decides to get a ten horse