

3,800 maximum horse-power, can drive her at a speed of 20½ miles an hour. The maximum in size and accommodations is reached in the "C. W. Morse," of the People's Line, which is 427 feet over all, 90 feet over the guards, and contains 450 staterooms. The dining room will accommodate at one time 300 people. She is driven by a walking-beam engine with a cylinder 81 inches in diameter by 12 feet stroke, and her maximum speed is 20½ miles per hour.

In the above necessarily brief story of the development of the Hudson River steamboat, we have endeavored to bring out the salient points of the increase in size, speed, and accommodation of one of the most remarkable and successful types of vessel in the world to-day. It would be well in closing to refer to the phenomenal speeds which were achieved by these vessels over half a century ago, and draw attention to the fact that their record passages were usually made when wind and tide were favorable. The swiftest of the present-day boats would undoubtedly exceed the earlier speeds, though by no very great margin; and it must be remembered that, under existing conditions, they are run under a fixed schedule, generally under a reduced steam pressure, and are operated at several miles less speed than the maximum of which they are capable.

THE AMERICAN WALKING-BEAM ENGINE.

(Concluded from page 223.)

board side being the steam pipe, and the other the exhaust. Each of these pipes carries a separate rocking shaft, which is operated by its own eccentric. The motion of each rocking shaft is communicated to two vertical lifting rods, which operate the valves by means of two cams called "wipers." The eccentric rods are formed with hooks at their outer ends, which engage a pin in the arms of the rocking shafts. They are thrown out of gear by means of the slotted vertical rods through which the eccentric rods work, one of which will be seen in the engraving. These vertical rods are known as strippers, and they are operated by the levers which will be noticed attached to the rocking shaft on the steam pipe. When it is desired to start or reverse the engine, the eccentrics are thrown out of gear, and the valves are worked by a steam starting and reversing engine, which is controlled by the vertical lever seen near the steam pipe. If it is desired, the valves can be operated by the vertical starting bar shown in the engraving.

The handwheel on the small vertical standard in front of the exhaust pipe opens the steam valve for the starting engine, and the wheels which are seen on the other two standards are for operating the injection valve and for turning the surface condenser into a jet condenser, if at any time it should be desired to do so. The surface condenser is located in front of the steam cylinder and below the main deck. Behind the steam cylinder and also below the main deck is the air pump, which is operated by connecting rods from the walking beam. The gear shown attached to the front face of the gallow's frame, above the cylinder, is a hand winch, for lifting the cylinder head.

The paddle wheels are of what is known as the vertical or feathering type, in which the buckets are made to enter and leave the water in a nearly perpendicular position. The old type, with fixed radial buckets, is extravagant and uncomfortable; extravagant because it wastes power in forcing water downward when the buckets strike, and lifting it when they leave the water; and uncomfortable because it sets up a violent vibration throughout the whole vessel. The feathering paddle wheel is smoother and more efficient in its action, and its efficiency is from 12 to 15 per cent greater than the older type. Its construction is as follows: Bolted to heavy timbers just above the guards is a large

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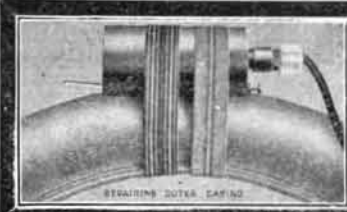
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pin carrying a loose flanged ring, to which are pivotally attached a set of connecting rods. At their outer ends these rods are pivotally connected to rocking arms fastened to the back of the buckets, the buckets themselves being pivotally attached to the rigid spokes of the paddle wheel. The pin and loose ring are placed eccentrically to the crankshaft, and the ring is rotated in its proper relation to the paddle wheel by attaching one of the connecting rods rigidly to it. The eccentricity of the ring is so adjusted that the buckets shall always enter and leave the water in a perpendicular position, thus securing a true feathering action. The wheels are 30 feet in diameter.

Steam is supplied by four steam boilers, of the lobster-return flue type, each 11 feet wide, 9 feet 3 inches diameter of shell, and 33 feet long, with steam domes 87 inches diameter and 10 feet 6 inches high. Forced draft is supplied by two large Dimpfel blowers, driven by independent engines. The steam pressure is 55 pounds to the square inch, and the total horse-power is 3,800.

RECENTLY PATENTED INVENTIONS. Pertaining to Apparel.

ADJUSTABLE PATTERN.—M. BOGUSHEFSKY, New York, N. Y. This invention consists in the construction and combination of parts, whereby the different edges of the pattern may be moved outwardly or inwardly substantially in parallelism, without varying the relative proportions or the general shape of the pattern. Attachments are employed for varying the style of the garment, rendering one pattern useful for cutting different forms of garments.

PNEUMATIC HEEL-CUSHION.—W. L. GORDON, Deal, N. J. The cushion is such as worn at the heel of the shoe on the inside in order to cushion the heel in walking. The cushion has an improved form which increases its elasticity in action, and a further object is to provide improved means for holding the cushion in position.

Electrical Devices.

TELPHER SYSTEM.—B. T. HITCH, Allen, Md. In this case the invention relates to telpher systems and is particularly applicable to rural mail delivering routes in which the delivery points are relatively far apart. It may be used also as a parcel delivering system or for any purpose in which the rapid transportation of light matter is desirable.

HEAD-GEAR FOR SUPPORTING LIGHTS.—D. E. TAYLOR, Willimantic, Conn. The gear is for use by surgeons, dentists, and opticians, and supports an electric light and delivers the rays directly upon the object under inspection. The main feature involves a spring metal band, adapted to extend over the head from the front to the back, and be retained in position by resilient engagement with the forehead and back of the head.

Of Interest to Farmers.

BEEHIVE.—P. WEAVER, Fort Worth, Texas. The object among others here is to provide a hive of concrete or cement whose walls will be thick enough to exclude heat and cold, and whose interior will be large enough to receive any desired form of honey frames and which will afford at its entrance ventilating means, cleaning out means, and means for the passage of the bees into and out of the hive.

PEA-HULLER.—W. L. HAY, Franklin, Tenn. The intention of this inventor is to provide a device of comparatively simple construction in which the hulling of picked peas or of peas on the vines may be accomplished by merely shifting the concave and feeding the peas through the device in the direction most suitable for their proper treatment.

DEVICE FOR TEACHING MILKING.—P. J. DEVRIES, Hull, Iowa. The purpose of the improvement is to provide a device that simulates the udder and teats of a cow pending therefrom, together with other details that afford means for practicing the removal of water from the artificial udder by a proper compression of the teats, and thus acquire the art of milking quickly and safely.

Of General Interest.

SOLDER FOR ALUMINIUM.—J. F. GUGENBUHL, 22 Rue de Bagnoles, Paris, France. This solder is not easily broken and it readily resists the action of acid and water. It may be used for soldering pieces of pure aluminium or of the alloys thereof, or for soldering aluminium upon copper, zinc, steel and other metals, regardless of the general shape and thickness of the parts.

BUTTER AND LARD CUTTER.—C. H. CARLSON, Iron Mountain, Mich. The invention is an improvement in self measuring lard and butter scoops for use in taking lard and butter out of barrels, tubs, or other receptacles. The blades may be made of different sizes to measure different quantities of the material,

and the blades or other portions of the device may be of any suitable metal or material.

DISPLAY-STAND.—J. TOWLE, Oremont, Ga. The invention pertains to stands for postal cards and similar articles, and more particularly to one having a number of leaves or partitions movably supported upon a suitable standard, and having the surfaces perforated to permit clips for holding the cards or other articles to be inserted at a number of points and in different positions.

METHOD FOR PROTECTING GROWING PLANTS AND VEGETABLES.—E. R. DRAKE, De Land, Fla. In this case the improved method of growing plants consists, first, in protecting the plant-bed on its several sides, but leaving the same open and exposed above; next, when the plants have grown to a considerable height, raising the protecting parts correspondingly, and also shading the plants along the sides and overhead.

Railways and Their Accessories.

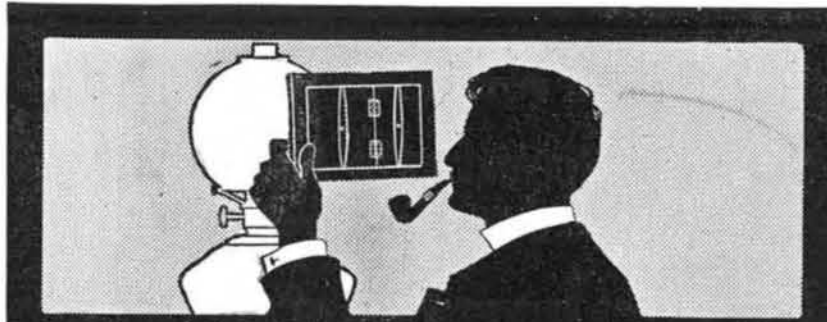
SEAL.—R. A. EDGAR, Iola, Kan. The device is especially intended for sealing railway cars and the like, and the initials of the railroad or the firm using the seal may be embossed on the annular space between the dished portion and the periphery of the disks. The leaden seal may be impressed with the station number or other suitable designation showing where the seal is placed.

RAILWAY-TIE AND RAIL-CLAMP.—W. C. NEEL, Lakin, Kan. The aim of the invention is to produce a tie, having an improved form, and particularly adapted to be constructed of metal. A further object is to produce a clamp to be used in connection with a metal tie, and which will operate effectively to hold the rail in position without the use of spikes or similar fastening devices.

CAR-DOOR OPERATOR.—F. F. UNCRICH and C. L. SEELEY, Galion, Ohio. The invention relates more particularly to a car having a plurality of doors, a controlling member, operable from various points of the car for simultaneously opening and closing the doors, and connections between the members and the doors, parts of the connections being adapted to be inoperably disposed so that the controlling member can be rendered inoperative with respect to any one of the doors.

Pertaining to Recreation.

PUZZLE.—R. D. CLOVER, Weston, Colo. The present object is to provide a puzzle with an outer run way and inner run way surrounding goals, with gates in the run ways and goals, so disposed that considerable skill is required to roll balls from the run ways through the gates



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and inner run ways to dispose the balls in the respective goals.

GAME APPARATUS.—W. H. CORNFORD, Mornington, Victoria, Australia. The invention consists in the construction and arrangement of parts constituting a game apparatus. A board or table is provided upon which are placed miniature forts, men, castles, and numerous objects. Toy shooters are provided fitted with spring mechanism adapted to project peas, shots, or pellets through ports from the four corners of the board against the forts, men, and flags.

Pertaining to Vehicles.

DETACHABLE RIM FOR PNEUMATIC OR OTHER TIRES.—M. A. LEMERCIER, 112 Rue de Richelieu, Paris, France. In this patent the invention has reference to a detachable rim which allows a complete pneumatic tire fully inflated, or a solid India rubber tire, mounted on said detachable rim to be attached to or detached from the wheel of a vehicle with great rapidity.

CASING FOR PNEUMATIC TIRES.—J. H. SEIBERLING, Jonesboro, Ind. The casing is arranged to permit its convenient or ready application on either single clench or double clench style of wooden rim, it being provided for this purpose with separable abutting edges and single exterior locking ribs arranged at equal distances from the edges, the portion of the casing extending from the base of each rib to the corresponding edge gradually diminishing in thickness and forming a pliable non-clenching closing flange.

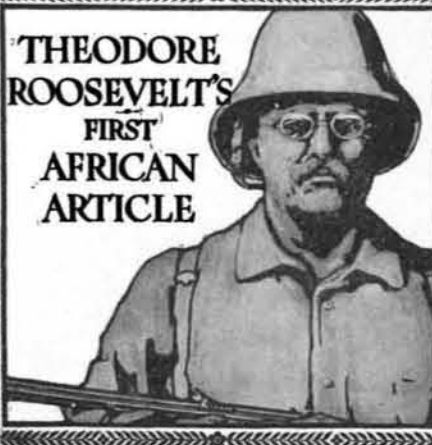
VEHICLE-WHEEL.—W. L. HOWARD, Trenton, N. J. The invention relates more particularly to the mechanism for rigidly locking the rim in place yet permitting of its ready removal. It is particularly adapted for vehicle wheels having pneumatic tires carried by the rims, the object being to facilitate the removal of the rim and tire and the substitution of a new rim and tire in case of puncture or other injury.

SPEED-GAGE.—O. D. MUNN and J. K. BRACHVOGEL, New York, N. Y. The invention is particularly useful in connection with devices intended for measuring the speed of railroad trains, automobiles, and the like. An object is to provide a gage by means of which the speed of moving bodies can be measured with accuracy, and which is insensitive to shocks and concussions. A circulating fluid medium is employed, which is sensitive to extremely slight changes in the degree of velocity of the moving body.

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describes the start of the famous expedition—the wonderful railway journey through a country that was like a “great zoological garden,” the black tribesmen of his caravan, his outfit, guns, tents, his first hunting experiences, etc., etc. The illustrations from photographs by Kermit Roosevelt and other members of the party.

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