

separate seats for each row of boards, and without requiring the boards to be set edewise into the pile.

APPARATUS FOR CONDENSING FUMES.—Albert F. Schneider, St. Louis, Mo. This apparatus comprises a cooling chamber having a flue inlet at one end and a discharge at the other end, a perforated horizontal partition near the bottom on which pipes are mounted edewise, spraying nozzles delivering into the chamber, and means for collecting the condensed material beneath the perforated partition. It is designed to condense and collect the fumes, gases and dust of shaft, roasting and reverberatory furnaces, and is especially adapted to furnaces used in silver, lead, gold and copper ore smelting and milling works, and in refineries treating the metal products and by-products.

ACCOUNT KEEPING DEVICE.—William W. Maxwell, Champaign, Ill. This device consists of a number of movable files mounted in a suitable frame, each file having an index arm, while account sheets made in the form of endless belts are held to turn on the middle portions of the files. The device is designed for use by banks and large mercantile firms, to take the place in a great measure of journal, ledger and balance books, enabling the bookkeeper to make his entries easily and quickly and readily prove the accuracy of his work.

REIN HOLDER.—George W. Thompson, Sag Harbor, N. Y. This device is designed to hold the reins in such a manner that the horse cannot easily throw his tail over them. The device has a base with a recess to receive the hip strap, a wedge-shaped slide being dovetailed into the recess, the outer portion of the slide having a curved horn or guide. By this improvement the reins when slack are prevented from dropping down over the horse's sides. The device is readily fastened to the hip straps of the harness.

HORSE COLLAR.—William Murt, Fountain City, Wis. This collar is designed to preserve its shape at all times, and is adapted to be readily opened and closed at the throat, having a flexible top which serves as a hinge to conveniently swing the sides apart. The stuffed sides of the collar have each a plug fastened in their lower ends, the inner ends of the plugs being beveled and curved rods secured flatwise upon them and extending upward in the middle of the stuffing.

SHAFT TUG.—John A. Lesh, Markelsville, Pa. An inner loop is fitted and movable in the main loop of this tug, there being side guides in the main loop alongside the inner loop and a connecting piece at the bottom extending through the inner loop. This construction prevents any twisting of the inner loop and relieves both loops of wear, while the back strap may be connected with the main loop without forming any protuberance at the back of the latter.

SNAP HOOK.—Samuel Brown, Quincy, Ohio. The hook proper, according to this invention, has a bifurcated nose portion, within which is pivoted and works a hook-shaped latch, also provided with a closing nose piece and backwardly extended saddle-like projection having a snapping or catching lip for engagement with the shank of the hook proper. The improvement dispenses with a spring for closing the latch, and there is no liability of the snap hook being opened either by its own play or movement or that of the usual ring or fastening held by it.

ROAD CART.—Alexander D. Curry, Istachatta, Fla. This invention provides a connection between the axle and thills, which permits the thills to rock without communicating any of the motion to the axle or the rigid portion of the connection, providing also a novel form of supports which can be quickly and easily adjusted. The construction affords a cheap and simple easy running cart, designed to entirely avoid horse motion.

FENCE POST AND HOLDER.—George W. Schofield, Jacksonville, Ill. The holder is tubular, preferably of earthenware, and with a base flange forming a support for a metal post, having a two-part lower end, both extremities of which project outward in opposite directions under the lower edge of the holder. The improvement is designed to afford a post of great strength and stability, especially adapted for corner or end posts, on which the pull or strain comes when tightening up the wires of wire fences.

COLLAR BUTTON.—David O. Parks, Denver, Col. Two spaced disks are connected together by a shank, a collar-receiving stud projecting from the outer disk, to which disk is hinged a plate adapted to be swung up in front of the stud to hold a collar on. It is a simple form of button, easily attached to the neck band, and not readily pushed or pulled out, by means of which the collar may be readily secured in place without pushing a button through the button holes of the collar.

LAMP HANGER.—George Albee, Susquehanna, Pa. This is a simple device for suspending electric lamps or lanterns, to be manipulated by a suspension rope. It comprises a pulley block, with a suspension loop pivoted upon and depending from the axis of the pulley, a lamp-supporting hook engaging the lower end of the loop, in connection with a releasing lever pivoted on the shank of the hook and an operating cord or cable.

DENTAL PLUGGER.—Henry R. Kline, Ashtabula, Ohio. The hammer tube of this device has the usual hammer and pneumatic connections, and there are projecting stay rings secured to the hammer tube, a tubular socket sliding in the stay rings and having shoulders to engage them, in connection with a fastening device to fix the plugger in the socket. The device is adapted to hold any of the usual hand pluggers, and is so constructed that the air tube cannot accidentally close to interfere with the working of the hammer. It has a pair of air bulbs, so that sufficient force may be given to the hammer by a slight pressure of the foot.

DENTAL SEPARATOR.—Benjamin Simone, Charleston, S. C. This is a device for forcibly separating two adjacent teeth to give access to cavities difficult to reach. It consists of two pairs of gripping

claws to clutch the adjacent teeth to be separated, and two right and left screw shafts geared together by cog wheels, the shafts being tapped through the shanks of the claws, and when rotated forcibly separating the teeth.

GAME BOARD.—John S. Williams, Trenton, N. J. This board has three circular walls connected by straight walls, the circular walls each having an inward opening on the common inclosure. The game is played with white and black marbles, put together in one circle, and to be separated and rolled into the other two circles, the white marbles into one and the black ones into the other, by simply tipping the board, without touching the marbles.

DISINFECTING DEVICE.—John W. Bowlerbank, Jersey City, N. J. A receptacle is provided with a depending metallic drip tube and inner rubber lining tube, the metallic tube being compressed transversely, thereby compressing the rubber tube and forming its bore into a narrow slit through which the liquid is adapted to drip. The device is inexpensive and designed to exactly control the dropping escape of the fluid to places where contagious exhalations may escape.

DESIGN FOR BICYCLER'S BAG.—Stephen B. Gilhuly, Long Branch, N. J. This bag has the form of a truncated scalene triangle, the wide and narrow ends being parallel, and the angle of the lower edge being considerably greater than that of the upper edge, while all the lines are straight.

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(4626) M. asks: 1. Does the Mississippi River run up hill, as it is said that its mouth is three miles higher than its source? A. Water never runs up hill. The Mississippi a thousand miles from its mouth is about 300 feet above the sea level for the difference of the two latitudes. The spheroidal form of the sea level is fixed by gravity, and all water above that level gravitates toward the sea or down hill, although it may be running farther from the earth's center. 2. If the earth in going around the sun in its orbit makes one day in a year without turning, how many times does it turn on its axis to make 365 days? A. The days, as ordinarily reckoned, are solar days of 365 1/4 in 1 year, but 366 1/4 revolutions on its axis. 3. If you increase the speed of the crosshead of an engine so that it is no longer on the point where it changes its direction than it would have been if it had not changed, does it stop any more in one case than in the other? A. Reciprocating motion stops at the end of the stroke, under any possible speed. 4. As it is farther over a half circle than across the base, why does it not take more board to make a tight fence over than across? A. If the boards are vertical, the chord or straight line is at right angles to their edges, and their width is their measure. While on the vertical curve the measure is at an angle equal to the angle of the curve, which is greater than the chord measure. This is readily demonstrated by a diagram. 5. When the earth cooled down when't the climate tropical at the poles a long time before it became frigid? A. The polar regions are supposed to have been tropical in the early geological ages, when the sea was warm and rain prevailed at the poles, or possibly the polar axis may have gradually changed its position.

(4627) F. K. W. writes: Suppose that to a car having four wheels we apply four brake shoes, but not with pressure enough to slide any wheel. Also

to another car of same kind under same conditions we apply two shoes, with force enough to slide two wheels dead. Which will stop quicker? Will not the car with wheels sliding be stopped just as quick as the distance covered by the inertia of the car's motion? In other words, two wheels running loose against two locked, the loose wheels will have no propelling power, will they? A. The car with the four brakes will stop the car quicker. There is less friction in a sliding wheel than with a rolling wheel held by a brake, up to near its sliding resistance. The relation of the momentum of the car and the sliding friction of its wheels is an uncertain amount, depending upon the condition of the surface of the track and wheels.

(4628) S. A. D.—Luminous paint can be applied to cardboard without any previous preparation. SUPPLEMENT No. 497 contains an article on luminous paint.

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