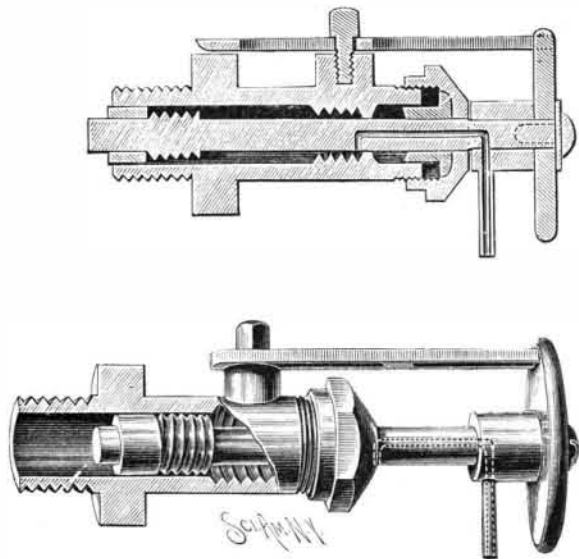


AN IMPROVED GAUGE COCK.

The illustration represents a gauge cock which may be packed at any time when in use and under boiler pressure, with which no valve or seat is used, and which requires neither lever, crank, nor weight for its operation. It has been patented by Mr. Marshall J. McCarter, of



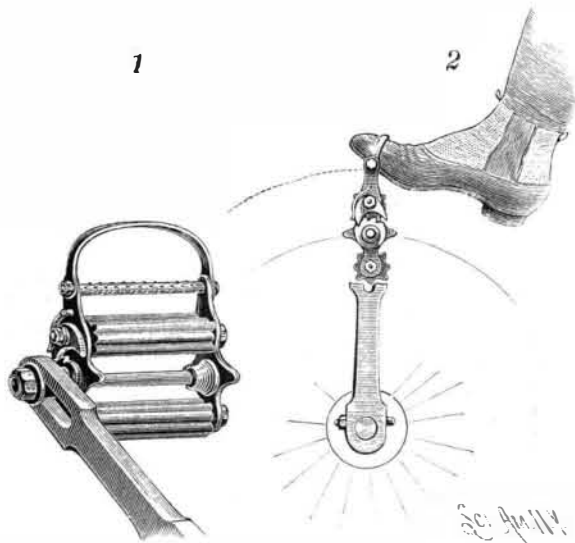
McCARTER'S GAUGE COCK.

Norristown, Pa. The casing or barrel of the device has at one end an exterior thread adapted to screw into the shell of the boiler, or be connected with a pipe therefrom, and a piston sliding loosely in the bore of the barrel is held on a rod passing through a stuffing box in the outer end of the barrel, the rod being provided with a suitable handle. In this rod is a bore having one end adapted to open into the bore of the barrel, the other end of the bore connecting at all times with the outside.

The two figures are side views of the device, partly in section, and when the piston is in the position shown in the lower figure, both ends of the bore in the rod are connected with the outside, as represented by dotted lines, so that steam or water passing the piston cannot pass to the outside, on account of the stuffing box packing the rod tightly. On the handle is a guide, through a slot in which passes a screw screwing into a lug on the casing, the guide preventing rod and piston from turning, and limiting their inward and outward movement. A thread is formed on the rod near the piston, adapted to engage a thread in the bore near its outer end. When the gauge cock is applied on the boiler, the steam or water under pressure forces the piston out to the position shown in the lower figure, no steam or water then escaping; but when the handle is moved inward until its hub strikes against the stuffing box, as shown in the upper figure, the bore in the rod then forms a passage between the interior and the exterior, and the engineer or fireman can see whether steam or water escapes, the piston being again forced outward when the handle is released. When it is desired to repack the barrel, the screw is removed from the slot in the guide, and the handle is turned to bring the thread on the rod in engagement with the thread in the barrel near its outer end, thus shutting off communication between the interior and the stuffing box, when the gland can be conveniently removed and the stuffing box repacked, without annoyance from leaking steam or water.

AN IMPROVED BICYCLE TREADLE.

The illustration represents a bicycle treadle designed to lighten the labor of running a machine, and especi-



CUSHMAN'S BICYCLE TREADLE.

ally to facilitate the work of hill climbing, its construction being such as to increase the leverage upon the crank arms on the downward stroke, when, also, the pedals and the cranks are tied together, the improvement being adapted for attachment to any pedal now in use.

It is a patented invention of Mr. George W. Cushman, of No. 159 Eighth Avenue, New York City. A ratchet wheel is attached to the crank spindle upon which the pedal turns, between the inner side plate of the pedal and the face of the crank arm, and the pedal has auxiliary side plates of greater length than usual, these side plates permitting the use of two foot-rest bars at each side of the crank spindle. Upon one of the side plates of each pedal is pivoted a spring-pressed pawl adapted for engagement with the ratchet wheel, as shown in Fig. 1, the pawl slipping over the ratchet during the upward movement of the pedals, but engaging the ratchet in their downward movement, thus preventing the pedals from revolving and tying them to the crank arms during a portion of the stroke. The operator is also, by this arrangement, enabled to press downward with greater force upon the forward outer foot rest, the leverage being increased by the distance from the crank spindle to the outer foot-rest bar, as represented by the curved lines in Fig. 2. By this improvement, also, the rider is enabled more readily to overcome a dead center, and should the pedal be accidentally dropped, its increased length facilitates its more ready recovery.

Fifty Miles per Hour.

A correspondent asks if there is a train in the United States that has a scheduled time of 50 miles per hour or more, for 50 miles or over; and to the inquiry we answer, yes, there is; and though we know of but one, there may be others. Train No. 19 on the New York division of the Pennsylvania leaves Jersey City at 4:13 and arrives at Philadelphia at 6:05, making two stops; the distance is 89.76 miles, though it is usually called 90 miles. The running time of this train, including the time consumed in the stops, is 112 minutes, which is almost 48 miles per hour; it runs from Jersey City to Trenton without a stop, the distance being 55.75 miles, in 64 minutes, the arriving time being 5:17, which is a speed of about 52 miles per hour. There are several other trains that make this run from Jersey City to Philadelphia in about 2 hours, the majority exceeding 2 hours by from 2 to 10 minutes; the limited, making no stops at all, makes it in 1 hour and 59 minutes, or 7 minutes more than No. 19, which makes two stops, while No. 43, also making two stops, uses 1 hour and 57 minutes. Trains frequently exceed 60 miles per hour, and it is likely that it is necessary for the above trains to do so daily to make their schedule time, though the one train noted above is the only one that we know of where the schedule time is 50 miles per hour for a long distance. Some 10 years ago, the statement was made that engines were in process of construction for both the Pennsylvania and the Bound Brook route that would enable the schedule time to be made 60 miles per hour, the assertion being made that both roads would have trains in the near future that would make the 90 miles in 90 minutes. They have not yet been placed on the schedule.

The B. and O. has several trains whose schedule time between Washington and Baltimore is 45 minutes, which is 40 miles at the rate of 54 miles per hour. The fastest schedule time for any distance that we know of is on the B. and O., where the time of the "Royal Blue" is, for a distance of a little over 3 miles, at the rate of 72 miles per hour, and it is made too.—*The Railway Conductor.*

A New Insulating Material.

A new insulating material for telegraphic or other electric lines is thus given by the *Revue Industrielle*: It is composed of a mixture of gelatine (specially made), resin oil, oxidized linseed oil, resin and paraffin. It is cheap and contains no sulphur. The proportions of the mixture are: Glove glue (*colle de gant*), 1,000 parts; resin oil, 100 parts; oxidized linseed oil, 500 parts; colophane, 150 parts; paraffin, 250 parts. The glue is prepared by taking the refuse clippings of gloves, and soaking them in cold water for one night. The next day they are strained and washed in several waters until the water is clear. In an iron boiler there are then placed 1,000 parts of water, five parts of carbonate of soda, and dry glove skin 250 parts. This is boiled for six consecutive hours, the water being renewed as it evaporates. The whole boiling mass is next run over a sieve, across which steam is passed to prevent the gelatine coagulating. The boiling solution is received by a wooden tub, through which a current of warm air is passed for one hour. The residue left in the sieve is boiled up with water for three hours, and when filtered can be used again for dissolving the glue, but this time with only 200 parts of glove skin. The gelatinous solution is put into a boiler with the olein or oleic acid used in candle manufacture in the proportion of gelatinous solution, 1,000 parts; olein, eighty parts. This is boiled for half an hour, after which ten parts of caustic potash solution (fifty parts water) is added. The boiling is maintained for an hour, so as to saponify the olein and form a soapy pulp. The glove glue

being prepared, resin oil, linseed, colophane and paraffin are added in the proportions above stated; the whole is boiled until homogeneous. This boiling generally lasts about four or five hours.

A VELOCIPEDE OPERATED BY HAND LEVERS.

The illustration represents a vehicle patented by Mr. Clarence P. Hoyt, the use of which is calculated to expand the chest and develop the muscles of the arms, while it is designed to be a very strong, durable, and easily managed machine. The main frame consists of two vertical bars, through which passes the axle, and two upwardly and rearwardly extending bars, which may be made integral with the vertical bars, the backbone being connected at one end to the tops of the vertical bars, while its other end carries a caster wheel. The backwardly extending bars of the frame have bearings for a crankshaft on which is keyed a sprocket wheel, a chain from which engages a small sprocket wheel on the main axle. Just outside the vertical bars of the main frame, two vertical lever bars are fulcrumed on the axle, a handle piece being secured to the connected upper ends of the lever bars, while a rod extends rearwardly from their lower ends to a pivoted lever bar, from which a connecting rod extends to wrist pins on arms of the crank shaft, whereby, on reciprocating the levers by means of the handle piece, the crank shaft is turned and motion is communicated to the main axle to propel the machine. Extending forward from the caster wheel bracket, on each side, is a rod passing through a slotted arm secured to the underside of a pivoted pedal, the rods carrying stops in advance of the slotted arms, and the forward ends of the rods being connected to the forward ends of the



HOYT'S VELOCIPEDE.

pedals by spiral springs. With this arrangement, the depressing of a pedal draws upon one of the rods and turns the caster wheel, pressure on the right hand pedal guiding the vehicle to the right, while the depressing of the left hand pedal turns the vehicle to the left.

Further information relative to this invention may be obtained by addressing the patentee, box No. 536, Golden, Col.

Precious Metals Mined in 1890.

The annual report of Wells, Fargo & Co. of precious metals produced during 1890 in the States and Territories west of the Missouri River, including British Columbia, shows: Gold, \$32,156,916; silver, \$62,930,831; copper, \$20,569,092; lead, \$11,509,571. California produced in gold, \$9,896,851, silver \$186,263; Nevada, gold, \$2,693,884, silver, \$6,546,652; Oregon, gold, \$965,000, silver, \$71,000; Washington, gold, \$194,000, silver, \$85,000; Idaho, gold, \$3,595,333, silver, \$10,229,167; Montana, gold, \$2,764,116, silver, \$12,050,339; Colorado gold, \$4,210,961, silver, \$13,064,486; Utah, gold, \$88,798, silver, \$12,170,377; New Mexico, gold, \$376,034, silver, \$1,282,951; Arizona, gold, \$1,150,486, silver, \$6,446,863; Dakota, gold, \$3,045,560; Texas, silver, \$249,423; British Columbia, gold, \$361,555; Mexico, gold, \$12,689,000, silver, \$415,645,000.

THERE is no doubt but the form of a roof has much to do with the draught of a chimney. The flat roof offers no resistance to the passage of air, but as the pitch is increased, the current is more and more disturbed, until with a high-pitched and many-gabled roof it is broken into innumerable eddies, some of which are sure to curl down and force the smoke and gases in the flue into the rooms below. Chimneys on such roofs should be built higher than ordinarily.