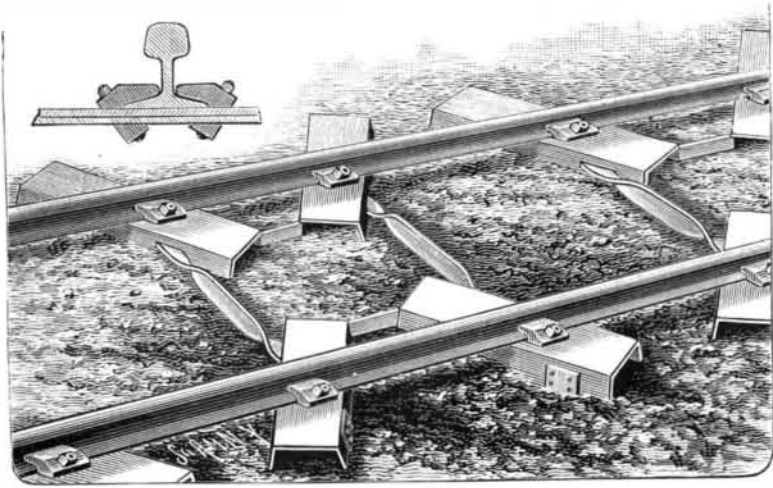


RAILROAD SLEEPERS ARRANGED IN PAIRS.

The illustration represents a novel construction of railway sleepers designed to hold the rails so that they cannot spread or be forced out of parallel alignment, the sleeper being made of light material and designed to box in ballast. It is made of four members placed at an angle to each other, and so arranged that they have the same relation one to the other as if the sleeper were composed of two members extending across the track and centrally crossing each other. Each of the four members has a depending flange flaring slightly outward, embedded in the ballast, and the inner ends of each pair on a side are united by strips bent to extend parallel with the flanges, to which the strips are bolted. The members opposite each other on opposite sides of the track are connected by tie rods, twisted to a vertical position in their cen-



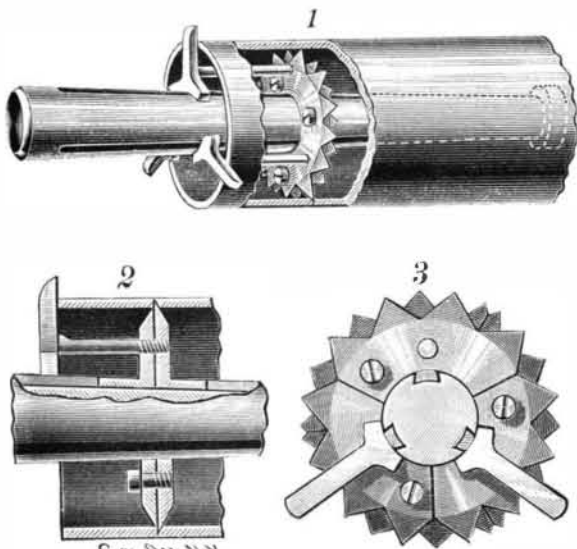
EWING & BOCKUS' RAILROAD SLEEPER.

tral portion, but extending horizontally through perforations in the members, on the outer flanges of which the ends of the tie rods are bent down and bolted in place. The rails are held in position on the upper surface of the members by clips, as shown in the small sectional view, bolts extending diagonally through the clips and through the outer surface of the members and the tie rods.

Further information relative to this invention may be obtained of the patentees, Messrs. Charles H. Ewing and Charles G. Bockus, Ninth and Green Station of Philadelphia and Reading Railroad, Philadelphia, Pa.

AN IMPROVED PIPE OR FLUE CUTTER.

The device shown in the illustration may be readily applied, and is designed to quickly cut a pipe or flue at any desired point. Fig. 1 is a perspective view, partly



WARREN'S PIPE OR FLUE CUTTER.

broken away, to show the application of the device, and Figs. 2 and 3 are sectional views. The device is made with a tapering bar in which are longitudinal dovetailed grooves, adapted to receive correspondingly shaped flanges of two series of segmental cutter sections, each having at its periphery teeth placed alternately. The cutter sections of one set overlap those of the adjacent set, and they are fastened together by suitable screws. The cutter sections are also held by a bolt with a head having its lower end in the shape of a segment of a circle, and adapted to rest on the central bar, the head being adapted to engage the outer edge of the tube to be cut, as shown in Fig. 2, while holding the cutter sections in place at the proper distance therefrom. On the small end of the central bar is screwed a nut to prevent the cutter sections from sliding out of the longitudinal grooves, and the consequent liability of their being mislaid or lost. When the parts are adjusted to cut a tube, the operator strikes with a hammer on the large end of the central bar, the inward movement of which forces the

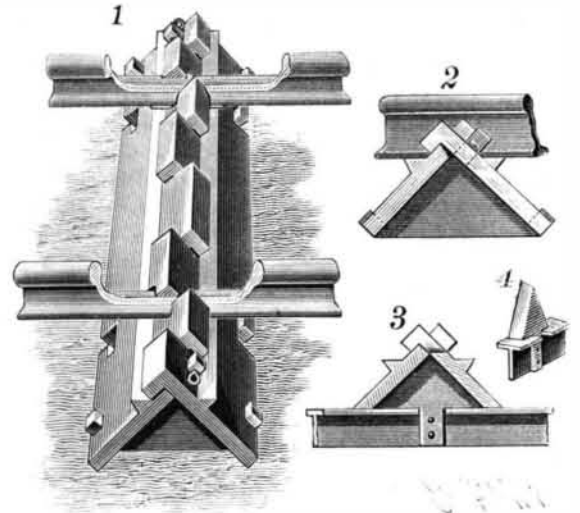
cutter sections outward, so that the operation is effected by a few strokes.

Further information relative to this invention may be obtained of Mr. Joseph Warren, No. 150 Norman Avenue, Greenpoint, Brooklyn, N. Y.

AN IMPROVED METALLIC RAILWAY TIE.

The railway tie shown in the illustration is designed to possess a certain degree of elasticity, to prevent injury to rolling stock, while it may, if desired, be made to hold the rail without the use of separate bolts. It has been patented by Mr. Joseph J. Callahan, of Newburg, N. Y. Fig. 1 is a perspective view of this tie supporting two rails, which are partially broken away to show the construction of the tie plates; Fig. 2 is an end view of the tie and one rail; Fig. 3 is a sectional view of one end of the tie and a track beam on a trestle or bridge, Fig. 4 showing the anchor and beam. The two metal plates which together compose the tie are locked together at their edges to stand at an angle to each other, the locking being effected by projections on the upper edge of each plate, while a space is formed in and between the projecting lips the size of the thickness of the flange of the rail, but giving room for its expansion and contraction without material displacement of the plates. The grip on the rail is as in a vise, the locking lugs grasping the rail with increasing force, according to the weight coming upon the rail. Flanges are formed in the plates at the rail seats, to furnish wide supports for the rails. In setting the ties, after the plates are locked and placed they are wholly or partially

so the device will be ready for operation. As a car comes down over the rails its forward wheels strike the spring pressed lever, when the pitman releases the bell crank from the lever pivoted in the rack, as shown in the illustration, and the spring on the transverse shaft raises the blocks in position to engage the car wheels.

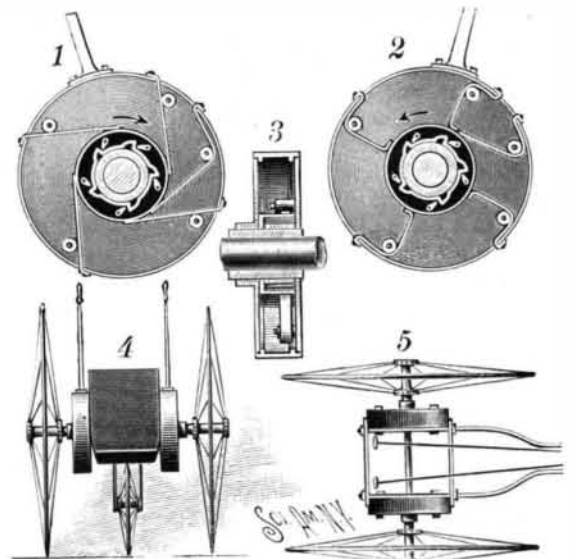


CALLAHAN'S METALLIC RAILWAY TIE.

When the blocks are in elevated position they do not prevent a car from running in the opposite direction, as a crank on the transverse shaft is connected by a rod with a lever on the inner side of the rail, and adapted to be struck by a car wheel running in the reverse direction before it reaches the blocks, thereby depressing the blocks and bringing them into a position parallel with the rails.

AN IMPROVED VELOCIPEDE.

In the machine shown in the illustration the driving mechanism is designed to be simple in construction and



MARTIN'S VELOCIPEDE.

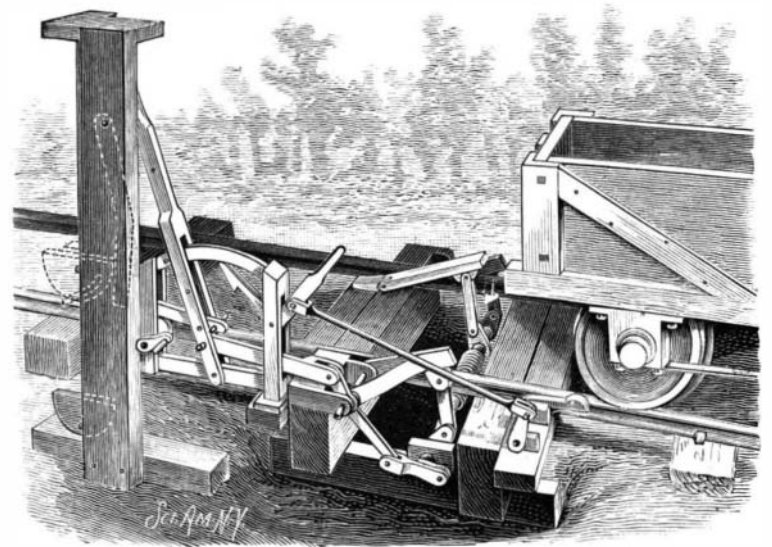
positive in operation, to propel the machine at a high speed with a minimum outlay of power. It has been patented by Mr. Frank Martin, of Fort Douglas, Salt Lake City, Utah. Fig. 4 is a front view of the machine and Fig. 5 is a plan view of its front portion, with the seat removed. Upon the hub of each of the large wheels are attached two spaced disks, and upon the periphery of the disks a collar is held to slide, covering the space between the disk plates, as shown in the sectional view, Fig. 3. A box collar is loosely mounted on the hub between the disks, and within this collar a ratchet casting is attached to the outer face of the hub,

A DEVICE TO BLOCK CARS ON A GRADE.

The illustration represents a device which may be automatically set or tripped by the passage of cars over it, and which may also be operated by hand, being especially intended to block or trig mining cars running on a grade. It has been patented by Mr. Andrew Deets, of Plymouth, Pa.

At a convenient point is a pair of extra thick ties resting upon a base support, forming a recess beneath the rails in which is mounted a transverse shaft carrying a spiral spring, one end of which is fixed to the shaft and the other end to one of the ties, whereby cranks on the shaft are held normally in elevated position just outside the rails. Pivoted to the outer ends of the cranks are connecting rods which are pivoted at their upper ends to the ears of blocks arranged adjacent to the rails, the blocks being braced and pivoted at one end to short shafts mounted in plates bolted to one of the ties, so that when their free ends are raised they will engage the wheels of a car on the rails. Fixed to one end of the transverse shaft is a crank connected by means of a lever and rods with a lever pivoted in a rack, and having a pin to engage the hook of a bell crank lever. This lever is pivoted at its elbow between two members of the rack, and has at its forward end a hook, while its rear portion is connected by a pitman with a crank on a shaft in bearings on a tie, the inner end of the shaft having a spring-pressed lever extending parallel with the rail, and normally held in position to be engaged by a car wheel.

A vertically sliding block is mounted on adjacent vertical supports, on the inner side of which is pivoted a bent arm, a rod extending from which is adapted to engage one of the levers, the vertically sliding block being adapted to lock the device so that it cannot be automatically worked or release the lock



DEETS' CAR BLOCK.

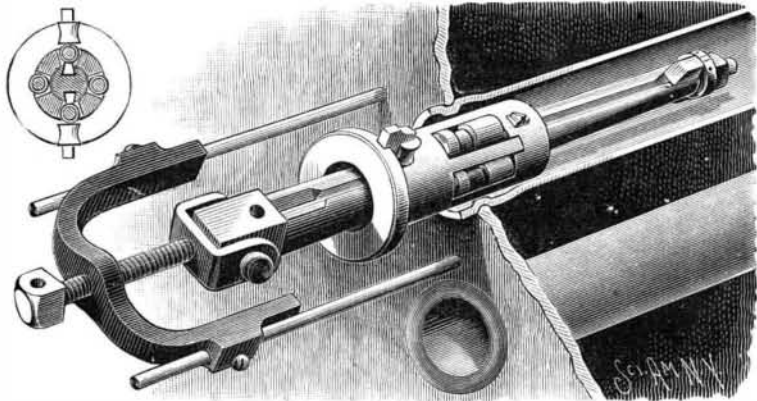
pawls pivoted in one side of the collar being adapted to engage the ratchet teeth. Between the peripheries of the disks and the outer surface of the box collar are placed a series of spaced friction rollers. Four straps, each attached by one end to the box collar, are carried outward in contact with the friction rollers, their outer ends being attached to the sliding collar covering the peripheries of the disk plates. These straps are brought into operation by the back stroke of a lever attached to the outer surface of the collar, and extending within convenient reach from the rider's seat. A return strap is also attached to the outer surface of the box collar and the sliding collar, and is made to contact with a friction roller on the side opposite that with which the other straps contact with their rollers. One of these boxes containing driving mechanism is located at each side of the rider's seat, each provided with an upwardly extending lever. Fig. 1 is a sectional view through the driving mechanism, illustrating the position of the parts at the termination of the forward stroke of the lever, Fig. 2 showing their position at the termination of the rear stroke, the pawls engaging the ratchet teeth at each backward stroke, and slipping over them on the forward or recover stroke.

THE HUDSON RIVER BRIDGE.

An important move in the direction of the bridging of the Hudson River at the city of New York was taken during the past week. The New York and New Jersey Bridge Commissioners, a body of five representatives of the State of New York, appointed for this purpose, received a report from Messrs. Thomas C. Clarke, their chief consulting engineer, and Charles B. Brush, assistant engineer, designating a place for the bridge and the general location of its connections and approaches. The commissioners, by chapter 233 of the laws of the State of New York for 1890, have the power to locate the bridge and approaches, and this has now been done. The project next awaits the action of the Federal authorities. The navigation of the waters of the Hudson River is under the control of the United States. It rests with the Secretary of War to determine the span, location of piers, height, and character of the bridge. The army engineers in charge of the matter have as yet given in no report, so that nothing can be done in the way of designing the bridge. Informally it has been announced that a height of 150 feet will be acceptable to the War Department. This is used as a basis in determining the grades of the route as laid out. It is to be one mile distant from any site already granted to a bridge.

We give a map, showing the points so far determined. The bridge is to cross the Hudson River between the lines of 70th and 71st Streets in the city of New York. The river is here 3,100 feet wide, not materially different as regards depth, character of bottom, etc., from other parts. At points further south the height would have to be increased, necessitating steeper grades for the approaches, and the width of the river would be excessive. The bridge enters the city at between 70th and 71st Streets, meets the approaches. The roadway is carried on an iron and steel viaduct, curving to the south, and running about 100 feet west of the west line of 11th Avenue, and then on the line of 38th Street to the proposed Union station between 38th and 39th Streets and Broadway and 8th Avenue. The main roadway will here have descended from the elevation of the bridge to 65 feet above high water mark. This will leave it 13 feet above the street, giving a basement for a freight depot. This plan gives a station 260 by 1,300 feet area, with room for twenty tracks and platforms. For the viaduct 100 feet right of way is required, and on the line selected there are now no valuable buildings.

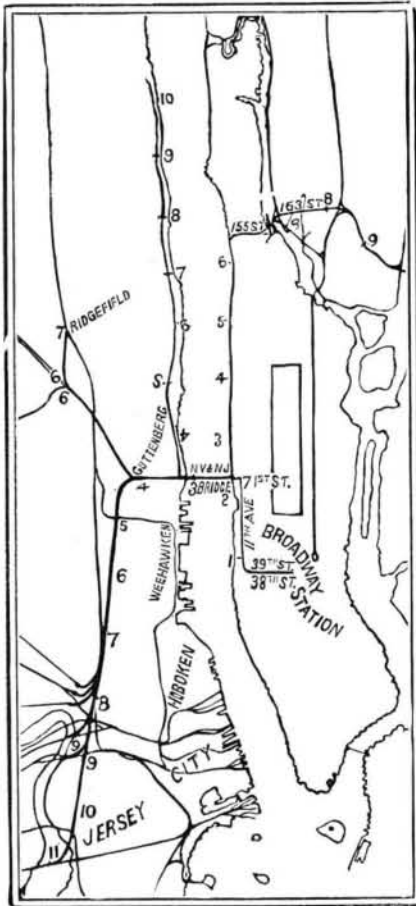
On the bridge proper it is proposed to arrange for



HYLAND'S PIPE CUTTER, BEADER AND EXPANDER.

six tracks—two passenger, two freight, and two rapid transit. The viaduct is to carry eight tracks. The greatest grade required by this plan is 40 feet to the mile. The New Jersey railroads on the west end would be connected through the Palisade ridge partly by tunnel, partly by cuttings in the way shown on the map. In New York City connection would be made with the different roads now centering there. In all there are fifteen lines of railroad to be linked together by the bridge.

It is proposed to have both bridge and viaduct floor-
ed over and to lay the tracks in stone ballast, thus se-
curing a perfect road bed. A speed of forty miles an
hour can be maintained on the contemplated structure.
As a sample of the connections the case of the Pennsylv-
ania Railroad may be taken. From its proposed point
of connection with this line to the Union depot the
running time will at the above rate be 13½ minutes.
At present, to cover the distance from the same point



MAP OF NEW YORK, WITH SITE OF PROPOSED BRIDGE.

to the foot of Cortlandt Street, 20 minutes are requir-
ed. It will be seen that for down-town connections
there will be little saving in time. For up-town points
and for through business with the New England States
the bridge will be of extreme importance.

To reach the New England lines, a roadway part
viaduct and part surface road is to be carried along
the east bank of the Hudson River to about 155th
Street. Thence by cut and tunnel it is to go across the
island and cross the Harlem River, and connect on the
further side with the tracks of the New Haven and
Harlem roads at 163d Street. The distance from the
Union station to this point is eight miles, only two
miles greater than the distance from the Grand Cen-
tral depot. It will be seen that this brings the western
dock front of the city for about three miles in direct
communication with all roads west of the Hud-
son River as well as with the New England territory. In-
cidentally it is proposed to run a special line up the
west shore of the Hudson River opposite and bring that
long-neglected region into communication with the
city.

The high ground over the river will give great facil-
ities for coal and grain delivery by gravity.

The plan, it will be seen, is of far-reaching scope, and
embodies much that does not appear at first sight.
The eminent engineers upon whose report the com-
mission acted deserve much credit for their work. It is
probable that a cantilever bridge will be selected. The

work is to be executed by
the New York and New
Jersey Bridge Company.
It has State charters from
the States of New York
and New Jersey, and the
Federal authorities will un-
doubtedly take action on
the matter in a short time.

A PIPE CUTTER, BEADER, AND EXPANDER.

The accompanying illus-
tration represents a combi-
nation tool, patented by
Mr. Joseph Hyland, for
readily and quickly cutting
pipes or tubes, expanding

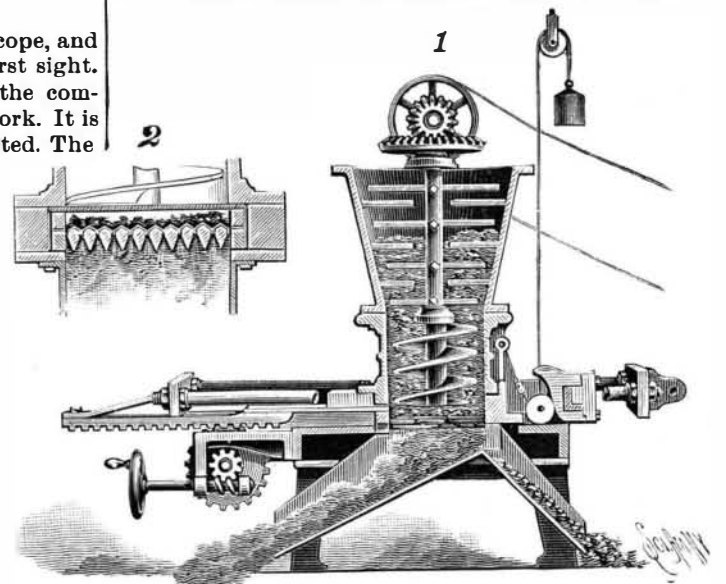
them, and forming a bead thereon, as desired. A taper-
ing spindle has longitudinal dovetails on opposite
sides, and on its large end is a head adapted to be
turned by a suitable tool, the spindle passing loosely
through a cylinder containing a series of expanding
rollers, each having an annular recess, while the cyl-
inder has on one end a slightly dished flange. When
the spindle is passed through the cylinder, all the
rollers move simultaneously outward as the spindle in-
creases in diameter. Inner cutters which can be readily

removed and replaced are fitted to slide in radial
grooves near one end of the cylinder, the cutters being
moved outward as the spindle is passed in, while the
turning of the spindle carries with it the cylinder and
cutters. In order to form a bead on the end of the
pipe, grooved rollers are employed, as shown in section
in the small view, these rollers turning on radial shafts
in brackets on the inner face of the dished flange on
the end of the cylinder. To cut off the end of a pipe
projecting too far beyond the outer face of the boiler,
the brackets carrying the beading rollers are removed
and circular cutting tools inserted in their place, to be
operated by the turning and pushing inward of the
spindle. In order to conveniently turn and gauge the
spindle, a U-shaped arm is held on its head, in the
middle part of which is mounted to turn one end of a
screw rod screwing in a U-shaped frame having at its
outer end a head adapted to be turned by a wrench or
ratchet or other suitable tool. In the legs of the
frame rods are fitted to slide, to be adjusted against
the boiler plate and fastened in any desired position
by set screws. A collar on the small end of the spindle
prevents the head from sliding off and the cutting
tools and dummy knives from being displaced.

Further information relative to this invention may be
obtained of Messrs. Hyland & Mason, Charlevoix, Mich.

A PUG MILL FOR BRICK MAKERS.

The illustration represents a mill specially designed
to remove all stones or lumpy matter which may pass
the feed screw, and thus produce a clay of high quality
for making bricks. It has been patented by Mr. Paul
Stoerger, of No. 140 Wells Street, Chicago, Ill. Below
the feed screw and its casing is a chamber whose bot-
tom consists of longitudinally extending grate bars,
the tops of which are slightly beveled, as shown in the
transverse section, Fig. 2, similar bevels being also
formed on the under side. These grate bars are placed
a suitable distance apart to permit the fine clay to pass
through the grate bars into a chute leading to one end
of the machine, as shown in Fig. 1, the rear end of the
frame of the grate bars discharging into a chute ex-
tending in an opposite direction for carrying off stones,
lumpy matter, etc. A scraper with V-shaped notches
and downwardly extending lugs adapted to pass be-
tween the grate bars is secured to side bars which sup-
port a cover plate adapted to close the lower end of the
feed screw casing when the scraper is passed over the
grate bars. A longitudinal rack secured to the under
side of the cover plate or the frame of the scraper is
arranged to mesh with a gear wheel on a transverse
shaft on the main frame, and, by means of a hand
wheel on a short shaft carrying a worm wheel, a slid-
ing movement is given to the longitudinal rack to
move the scraper and cover plate forward and back-
ward. When the scraper is to be operated by power,
the side bars are connected by a transverse beam with
side rods connected with another beam adapted for
connection with machinery capable of imparting a
reciprocating movement. These side rods are also
connected with a beam supporting cams adapted to
press on friction rollers on the outside of a door form-
ing the rear end of the chamber under the feed screw,
while a rope connected with one of the bearings for
the friction rollers extends upward and passes over a
pulley, where it supports a weight, so that the door
opens automatically when the cams slide away from
the friction rollers. In operation, when stones or
lumpy matter are left on the grate bars, the scraper is



STOERGER'S PUG MILL.

pushed forward to force them down the chute provided
therefor, the door leading to this chute then opening
automatically, while the cover plate covers part of the
casing under the feed screw, so that no fresh material
can pass downward until the scraper has been returned
to its normal position.

A CORRESPONDENT thinks that a fortune awaits the
inventor who can produce a machine for filling, weigh-
ing, and sewing salt "pockets" at the mill.