

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.

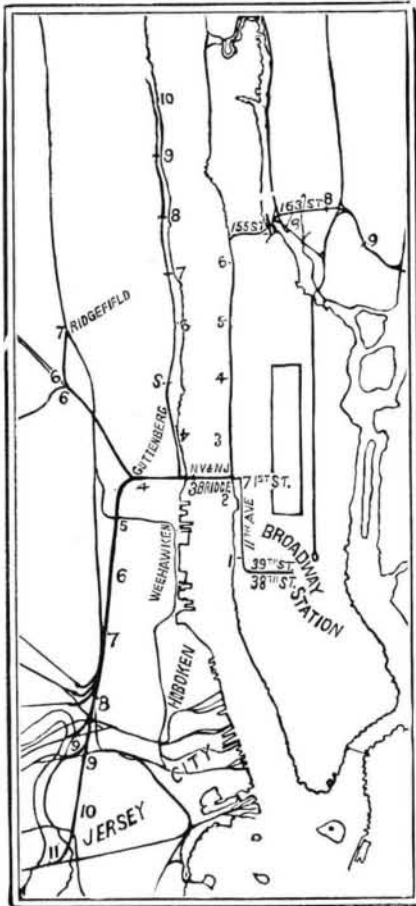
THE HUDSON RIVER BRIDGE.

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

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 Central 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 Hudson River as well as with the New England territory. Incidentally 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 facilit- ies 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

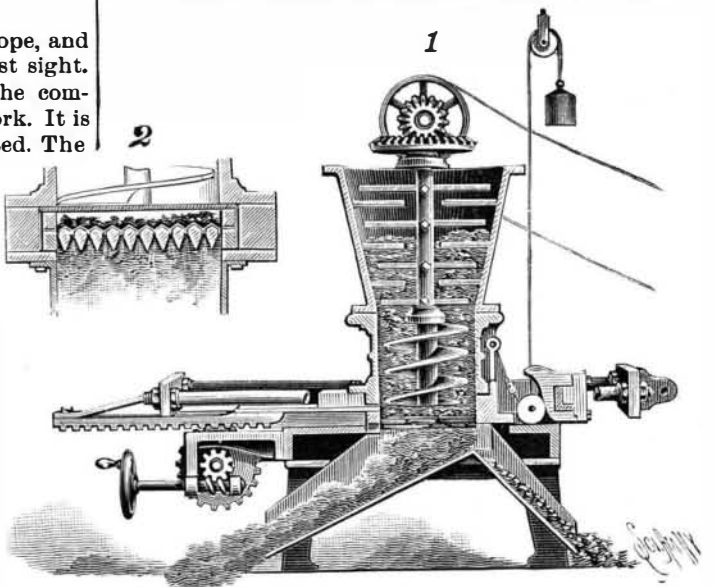
them, and forming a bead thereon, as desired. A taper- ing spindle has longitudinal dovetails on opposite sides, and on its large end is a head adapted to be turned by a suitable tool, the spindle passing loosely through a cylinder containing a series of expanding rollers, each having an annular recess, 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.

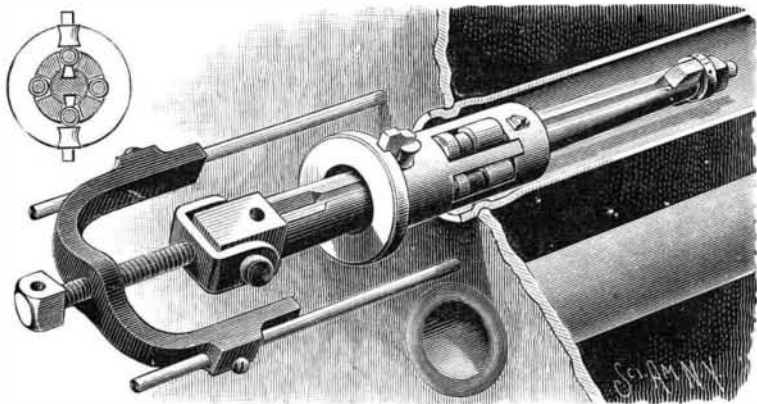
The illustration represents a mill specially designed to remove all stones or lumpy matter which may pass the feed screw, and thus produce a clay of high quality for making bricks. It has been patented by Mr. Paul Stoerger, of No. 140 Wells Street, Chicago, Ill. Below the feed screw and its casing is 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.



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.