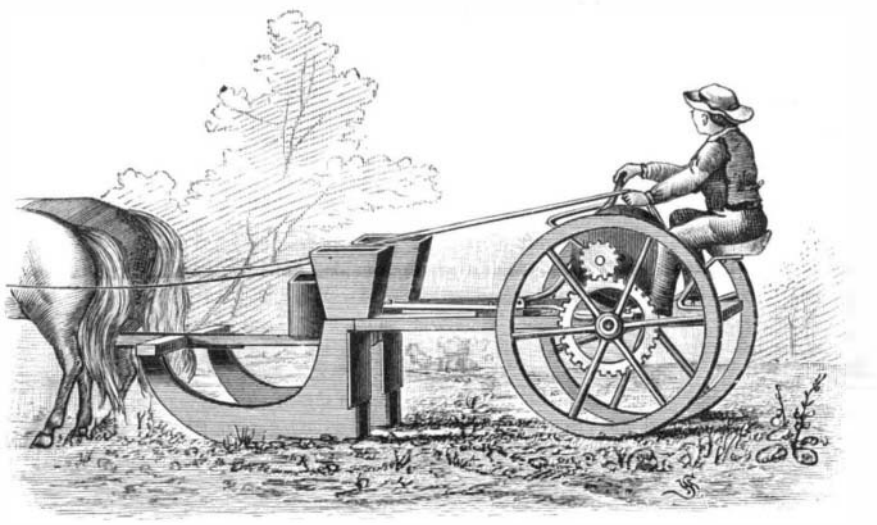
### The Doorway of Furnaces.

The *Locomotive* concludes that probably every man who owns or bas run a boiler has experienced a vast deal of trouble with the cast iron mouth pieces around the furnace doors. These pieces invariably warp, crack, and burn out in a short time, and the firebrick lining falls down, the cast iron front becomes burned, and where the boilers are set with the flusb front setting the portion of the shell which projects beyond the front tube sheet gets overheated, which generally results in its fracture, and in many cases the longitudinal seam where the head is attached to the shell is so severely strained that it begins to leak, and sometimes this leakage is very difficult to stop, owing to the joint being permanently strained. This warping and burning away of these castings may be prevented by simply slitting them back from the edge for about one-half their depth. The slots sbould be from one-half to one-fourth of an inch in width, and may be from eight to twelve inches apart over the furnace door. This width is necessary, as tbey close up gradually under the influence of the intense furnace heat.

### CHECK ROW CORN PLANTER.

To the wheels are secured gear wheels, with which mesh pinions placed upon the ends of a shaft revolving in bearings in supports attached to the frame. Upon the inner ends of the hubs of the pinions are formed annular grooves that receive the forked outer ends of two rods, whose inner ends are pivoted to a lever upon the opposite side of and equally distant from the pivoting point of the lever. This lever is pivoted to a support attached to the frame, and its rear end projects to such a position that it can be readily reached by the driver from his seat, and operated to throw the wheels into and out of gear.

To the middle of the shaft is attached a wide wheel, in the face of which is formed a cam groove to receive a pin attached to the end of a lever. The lever at its middle part is pivoted to a cross bar of the frame, and is pivoted at its forward end to the seed dropping slide, so that the slide will



BARRETT & FORSTER'S CHECK ROW CORN PLANTER.

be operated to drop the seed by the advance of the machine. To the center of the seed dropping slide is attached the rear end of an arm whose forward end enters a slot in a hopper, so that lime, plaster, sand, or other white substance may be dropped from the hopper to the ground. This hopper is attached to the center bars of the forward part of the frame, a little in front of the line of the seed hoppers, and in such a position that the white substance dropped from it will fall upon the ground midway between and in a line with the hills, so as to mark the cross rows and thus enable the driver to plant the corn in accurate check row. By means of a lever attached to a pawl engaging with a ratchet wheel on the pinion shaft, the driver is enabled to adjust the seed dropping mechanism when starting in at the side of the field and at any time when the cross rows get out of true.

This invention has been patented by Messrs. E. P. Barrett and J. A. Forster, of Holden, Mo.

### The Clock in Trinity's Tower.

The clock in Trinity Church tower in this city is the heaviest in America. The frame stands nine feet long, five feet high, and three feet wide, The main wheels are thirty inches in diameter. There are three wheels in the time train, and three each in the strike and the chime. The winding wheels are formed of solid castings thirty inches in diameter and two inches thick, and are driven by a "pinion and arbor." On this arbor is placed a jack, or another wheel, pinion and crank, and it takes 850 turns of this crank to wind each weight up. It requires 700 feet of three inch rope for the three cords, and over an hour for two men to wind the clock. The pendulum is eighteen feet long, and oscillates twenty-five times per minute. The dials are eight feet in diameter, although they look little more than half that size from Broadway. The three weights are about eight hundred, twelve hundred, and fifteen hundred pounds respectively. A large box is placed at the bottom of the well that holds about a bale of cotton waste, so that if a cord should break the cotton would check the concussion.

THAT time-honored association, the Massachusetts Charitable Mechanics, holds its fifteenth exhibition this year, at Boston, beginning September 10. See advertisement.

### Glass Bearings.

Bearings made of glass are now being experimented with in the rolling stock of railroads, in regard to their frictionless quality. This material is a hard, clear substance, and must wear down smooth and give a fine bearing surface for an axle to rest upon. It is a non-conductor of electricity, if not of heat, and the fine particles have as good a chance to work down the bearing of the axle to a running fit as in the grinding in of a valve seat for a brass valve, and much power is expected to be saved by converting the wearing of a journal into some other agency than by converting it into heat.

### How a Salt Well is Worked.

The stratum of salt having been once pierced, a saturated solution of the saline matter frequently rises in the boring to within eighty feet of the surface. This, however, cannot always be depended upon—and here center the increased difficulty and expense. When a few dozen feet have been drilled, a 6 or an 8 inch iron pipe is inserted as a "casing." Inside of this a 2 inch pipe—also of iron—is placed. The "casing bead" has two openings—one for the entrance of pure water from a neighboring spring into the larger pipe, at the lower end of which it becomes saturated with saline matter; the other at the end of the smaller pipe, to allow tbe expulsion of the brine. Of course, the wells become foul or leaky at times, and then resort is had to torpedoes of nitro-glycerine, which are sent down to the bottom of the "casing," and after them is sent an iron weight which secures the explosion. The rusting of the "casing" is the great enemy of the salt worker; and, when his engine cannot lift the mass of rusted iron, a "knife" cuts the rusted metal, and the engine tears it away piecemeal. But the salt wells are exempt from any danger of taking fire; and it is never necessary, as in the case of oil wells, to shoot off the "casing head" with a cannon ball.

After the brine has once reached the surface it is forced into large reservoirs, whence it is drawn off through "string" after "string" of "covers," until solar evaporation has left the coarser grades of salt. The "covers" or vats are usually 16x18 feet, and the product to each one per year is estimated at 150 bushels; while the product at Syracuse is only about half that quantity. It is also claimed, adds *The Age of Steel*, that the slope of the valley at Warsaw is peculiarly adapted to rapid evaporation by the sun. When the finer grades of salt are wanted, the brine is led from the reservoirs to an evaporating pan, where a gentle heat is applied. Similar treatment in another pan completes the process, and the residuum of salt is raked upon a sbelf at the side of the evaporator. After a slight draining it is taken to the bins, where a more thorough draining is allowed for a space of two or three weeks.

### SLIDE TROMBONE VALVE FOR CORNETS, ETC.

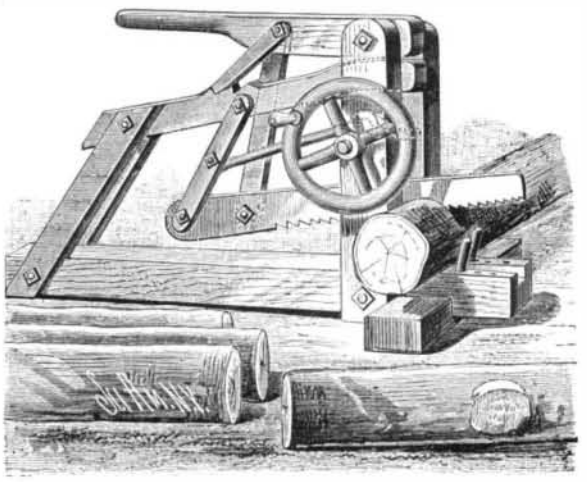
The body of the instrument between tbe mouth piece and bell is wholly severed once or more for the purpose of connecting with one or more extensions, in order that the tone may be changed by thus increasing the tubular length of the air passage. To make and break this connection at will a peculiar slide valve is interposed, in which one or more flanged and lipped plates, fixed to the body of the instrument, serve to guide one or more valve plates. Each plate carries two short tubes, one of which is telescoped at one end with the body of the instrument, and at its other end is secured in the plate, through which it communicates with the body when in its normal position; the second tube is wholly mounted on the sliding plate, and both ends open through the plate. Mounted on the fixed plate is an extension, both ends of which open through the plate. One end of the body opens through the fixed plate, and the other end may extend directly to the bell, or to the telescoping end of another slide valve. Each slide valve is provided with a poppet having a spring which raises the valve to its upper position, in which condition the air passage from the mouth piece to the bell is through the shortest tube connection. When a poppet is pressed down, the length of both the movable and fixed tubes is added to the air passage by a quick movement of the operator's finger. These interposed tubes may be of any suitable length, and any desired number of valves may be added to a single instrument.

Made after this plan there are three fixed parts, three sliding parts, and a telescoping joint, making eight pipe ends that are brought to connect in two different ways by pressing or releasing a single poppet. The telescoping joint prevents disturbing the vibrations in the instrument during the instant of sliding the valve. While only two very short and light tubes are carried by the slide valve, they serve to connect a tube of any desired length with the air passage, thereby preventing friction and requiring but a slight pressure of the finger to operate the valve.

Tbis invention has been patented by Mr. G. W. L Schweich, of Richmond, Missouri.

### DRAG SAW

On one end of the base are secured two standards in which is journaled a transverse shaft, upon one end of which is mounted a wheel provided with a crank handle. A top beam is held between the upper parts of these standards, and two inclined standards fastened to the rear end of the base. To the lower end of a connecting bar pivoted to the side of the top beam is pivoted the butt end of tbe saw that projects between the forward standards. This bar is connected by a rod with a crank on the shaft, so that by revolving the latter the saw will be reciprocated. Pivoted to the forward standards is a lever which is connected by a rod to tbe saw a short distance in front of tbe butt end. On the



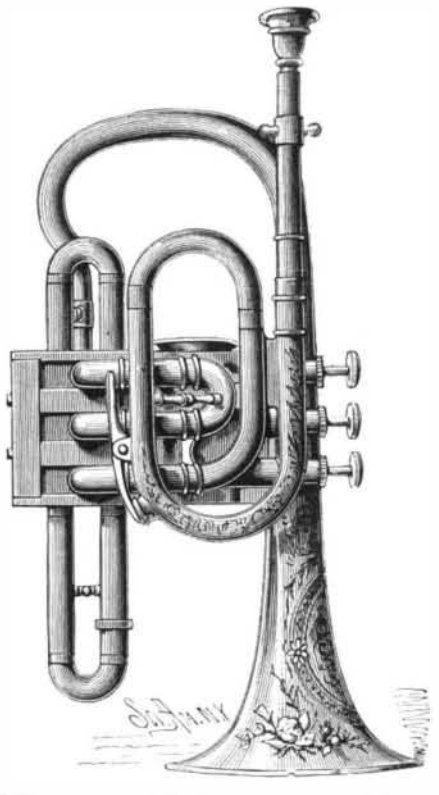
CRAWFORD'S DRAG SAW.

top edge of the top beam are formed teeth, against which rests the free end of a pawl pivoted to the lever. The front of the base is supported upon a transverse beam, and in the upper surface of tbis part of the base is a groove at the sides of which are apertures for receiving the pins for holding the log in place. The groove receives the edge of the saw after it has passed through the log. By means of the lever and pawl the saw can be raised and held in any desired position. By increasing the height of the rear standards so as to accommodate the lever, the saw can be reversed so as to project from the rear.

This invention has been patented by Mr. Edward F. Crawford, of Honey Bend, Ill.

### About Bricks.

An average day's work for a brick layer is 1,500 bricks on outside and inside walls; on facings and angles, and finishing around wood or stone work, not more than half of this number can be laid. To find the number of bricks in a wall, first determine the number of square feet of surface, and then multiply by 7 for a 4 inch wall, by 14 for an 8 inch wall, by 21 for a 12 inch wall, and by 28 for a 16 inch wall. For staining bricks red, melt one ounce of glue in one gallon of water; add a piece of alum the size of an egg, then one-half pound of Venetian red and one pound of Spanish brown. Try the color on the bricks before using, and



SCHWEICH'S SLIDE TROMBONE VALVE FOR CORNETS, ETC.

change to light or dark with the red or brown, using a yellow mineral for buff. For coloring black, heat asphaltum to a fluid state, and moderately heat true surface bricks and dip them. Or, make a hot mixture of linseed oil and asphalt, heat the bricks, and dip them. Tar and asphalt are also used for the same purpose. It is important that the bricks be sufficiently bot, and be held in the mixture to absorb the color to the depth of one sixteenth of an inch.—*The California Architect.*