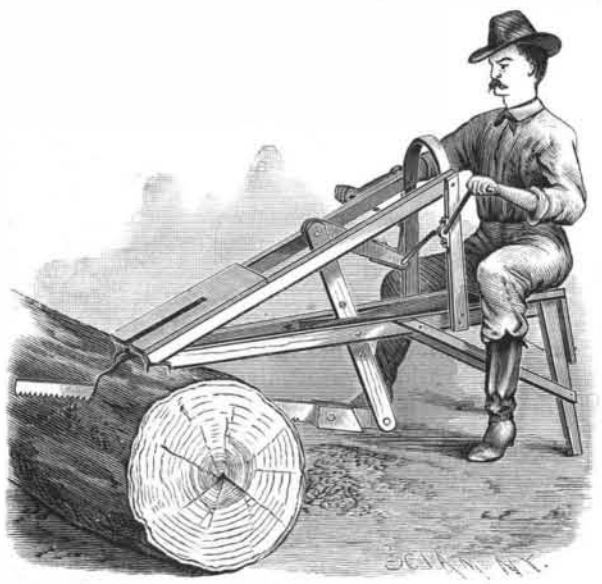
## IMPROVED DRAG SAW.

The simple drag saw here illustrated is the invention of Messrs. Mervin and George E. Coxe, of Great Valley, N. Y. The rear end of the bed frame is supported by legs. On the frame are standards, connected by inclined braces with the front of the frame. The front ends of these braces support a guide formed with a



COXE'S IMPROVED DRAG SAW.

longitudinal slot, and to the under side of the ends of the braces are secured pointed spikes or clamps. The upper ends of the standards are united by a curved brace. On the side edges of the two beams of the frame are held metallic guide plates, through which and through the beams passes a shaft, on which oscillates a lever, connected at its upper end by a link with a crank shaft journaled in the standards and provided at each end with a handle. The lower end of the lever is pivotally attached to the holder carrying the saw blade. The machine is placed in position, as shown in the engraving, and the spikes are firmly embedded in the log, with the saw resting in the slot of the guide. The frame is thus held in a horizontal position at one end by the log and at the other by its legs. The operator seats himself on a platform on the rear end of the frame, and by turning the handles imparts a forward and backward motion to the saw. The pivotal connection of the saw holder with the lever permits the saw to adjust itself to the cut in the log. The throw of the lever can be increased or diminished by placing the pin on which it is fulcrumed in any one of the holes formed in the lever.

## LOVELL'S NAIL MAKING MACHINE.

Our engraving represents a new machine for the manufacture of French nails. The machine forms four nails at each revolution, and will, therefore, do four times the work if run at the same speed as the older type of machine. Power is supplied through a lay shaft at one end of the machine. This shaft is provided with a crank in its middle, working in a slot at the end of a balance lever placed lengthwise underneath the main frame, and pivoted in the center of the machine. This lever works the cutting off and the pointing dies, while the heading dies are actuated by two other levers with vertical pivots, worked from vertical shafts geared by bevel wheels to the lay shaft. The slot in the bottom lever is slightly wider than the head of the crank, so as to produce a short pause at either extremity of its oscillation, and give the heading lever time to form the head before the nail is released.

The wire which is to be worked up into nails is placed in coils on two wooden reels, free to revolve on vertical spindles, and passes first through two revolving wire straighteners, which receive rotary motion by belts from the overhead shaft, and, at the same time, a horizontal to and fro motion by the heading lever on that side. This horizontal motion prevents them cutting the wire during those intervals when the wire is at rest. The linear speed of the straighteners is half that of the forward motion of the wire, and since each straightener in turn moves outward when the wire is at rest, and inward when the wire travels, the relative speed of wire and straightener is maintained, both on the outward and inward stroke; in other words, each inch of wire passing through the straightener is operated upon by the revolving dies to the same amount. After passing the straightener, the wire is led through a stationary clip, which allows it to travel forward, but prevents it being drawn back by the action of the straightener. It then passes through another clip, acting in the same direction, but connected with the heading lever by toothed racks and segments in such a way as to draw forward at each stroke the length of wire requisite for the formation of two nails. After this amount of wire is pushed into position in a slot formed in the central block shown in our illustration, it is separated by a cutting die, worked from the rocking lever below the frame, and the short piece left is gripped by two fingers and drawn down into another slot, where the operation of forming the double nail actually takes place. The points are formed by the pressure of pointing dies worked from the rocking lever by means of a knee joint. One of the dies is stationary, being fixed in the block and placed in the center of the slot above referred to, while the other is fixed to a crosshead sliding between the frames, and receiving to and fro motion from the knee joint. There is a slight pause after each stroke, as already explained.

The dies are cylinders of steel, with triangular and tapering slots in their end faces, so that when they are closed up there is left on each side of the center a pyramidical cavity corresponding to the point of the nail. The material squeezed away from the wire flows laterally, that is, in this case, vertically upward and downward, forming a barb, which either falls off before the nail is released, or is easily removed afterward in the process of cleaning the nails in revolving barrels. The crossheads, carrying the pointing dies, are provided with steel faces, and when the knee joint is straight, they gripe the wire firmly, so as to prevent it shifting longitudinally under the pressure of the heading dies, which next come into play. As soon as the heading die recedes, the knee joint is lifted, the crosshead is withdrawn, and the two nails fall out, while a new length of wire is drawn down into the slot to undergo the same process. During the time that the wire is fed into the machine on one side of the central block, two nails are formed on the other, and so the operation is kept up alternately, the total number of nails produced per minute equaling four times the number of revolutions made by the lay shaft per minute. According to the size of machine, the speed varies from three hundred revolutions to one hundred revolutions, and the number of nails from twelve hundred to four hundred per minute. These are the limits given for nails which vary in size from 1 in. long, No. 17 B. W. G., to 5 in. long, No. 5 B. W. G. We have been favored by Herr A. Fix, a nail maker in Germany, with the following figures relating to the performance of the German and French machines employed by him:

OLD TYPE MACHINES OF FRENCH MAKE.

| Length of nail. Inch. | Gauge of wire. B. W. G. | Nails produced per minute. |
|---|---|---|
| ¼ to 1 | 26 to 18 | 285 |
| ½ " 2 | 17 " 12 | 230 |
| ⅝ " 3½ | 13 " 10 | 150 |
| ¾ " 4¾ | 8 " 4 | 100 |
| 2 " 8 | 6 " 00 | 70 |

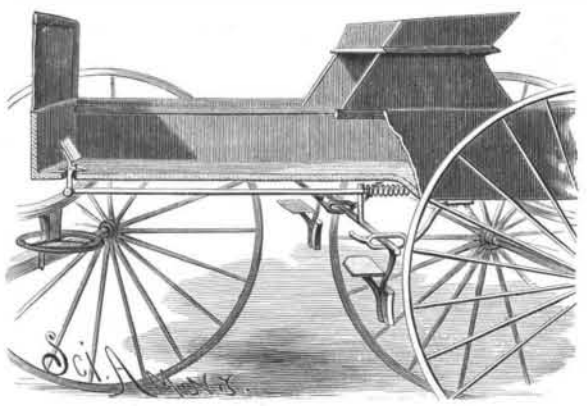
OLD TYPE MACHINES OF GERMAN MAKE.

| Length of nail. Inch. | Gauge of wire. B. W. G. | Nails produced per minute. |
|---|---|---|
| 2¾ | 16 to 12 | 160 |
| 4 | 13 " 10 | 130 |
| 5 | 12 " 7 | 110 |
| 8 | 7 " 2 | 85 |
| 12 | 2 " 00 | 45 |

There are some recent improvements made in German machines which enable these to turn out 25 per cent more than is given in the above table; but even when taking these improvements into account, it will be seen that if we consider the figures given by Herr Fix as fair averages for the usual practice in the manufacture of French nails, the Lovell machine is a very decided improvement upon machines hitherto employed in that industry.—*Industries.*

## IMPROVED VEHICLE BRAKE.

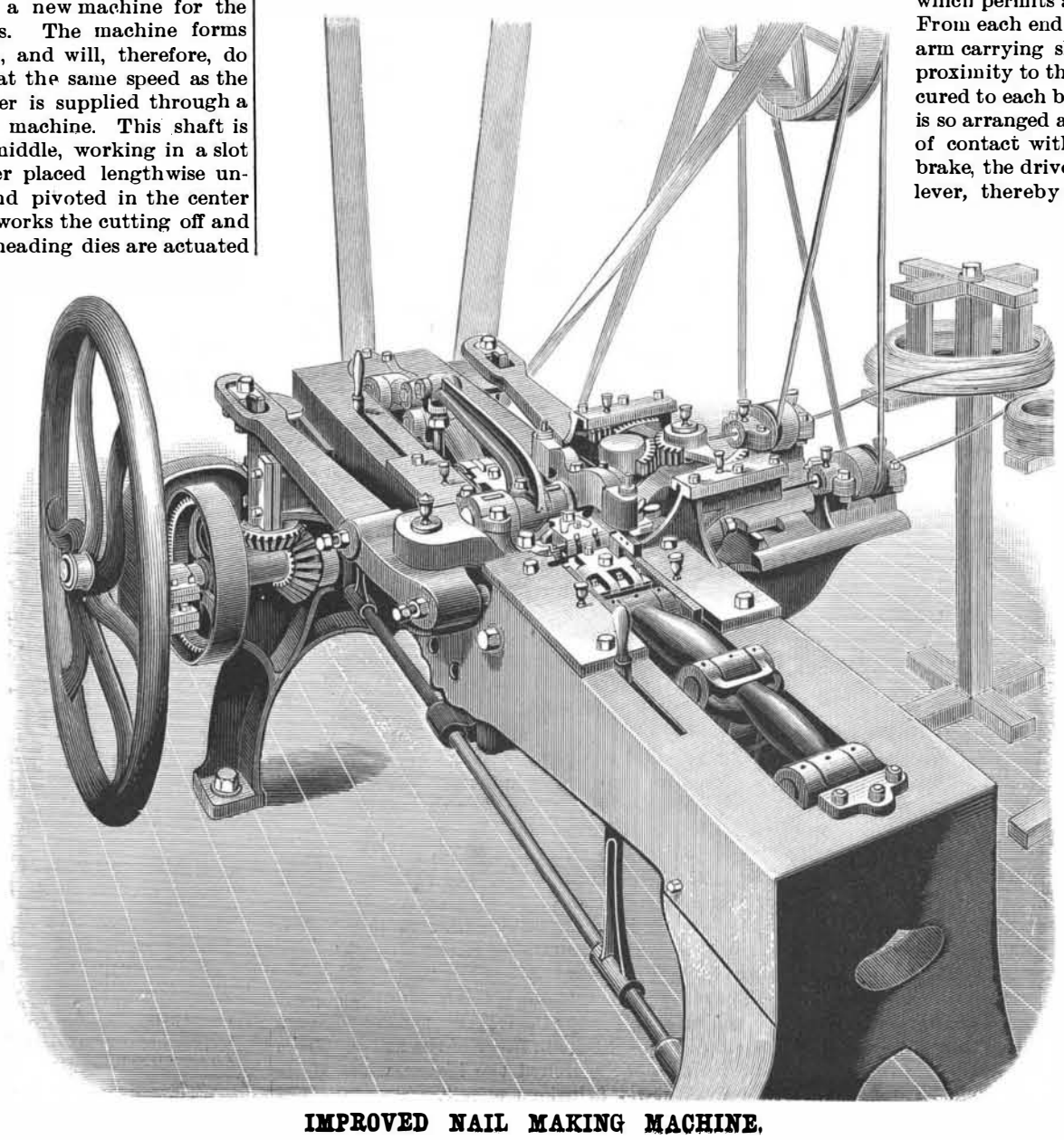
In the forward part of the bottom of the wagon body is a slot through which projects a foot lever pivoted to



IRWIN'S IMPROVED VEHICLE BRAKE.

the body. The lower end of the lever extends a short distance below the bottom, and is pivoted to a horizontal rod which extends toward the rear, and rigidly joins a vertical arm secured to a transverse rod held in brackets on each side of the box. Each bracket is formed with a horizontal elongated slot, which permits a lateral motion of the rod. From each end of the rod extends a brake arm carrying shoes which are held in close proximity to the rear wheels. A step is secured to each brake arm, and a push spring is so arranged as to hold the brake shoes out of contact with the wheels. To apply the brake, the driver presses his foot against the lever, thereby moving the transverse rod toward the rear, and bringing the shoes against the wheels. This movement compresses the spring, which forces the shoes away from the wheels when the lever is released. It will be seen that the entire construction of this brake is very simple, as only the two brackets are used to support the rod and its brake arms.

This invention has been patented by Mr. John H. Irwin, of 2105 Walnut Street, Philadelphia, Pa.



IMPROVED NAIL MAKING MACHINE.

THE crystals of spodumene brought to view by the excavations in the Etta tin mine in Pennington County, Dakota, are believed to be without a rival in respect to size. According to the report made on this subject by Professor Blake, it appears that one of these crystals is thirty-six feet in length in a straight line, and from one to three feet in thickness. The cleavage is smooth and straight, but the lateral and terminal planes are described as being obscure.