IMPROVED METAL CUTTING AND PUNCHING MACHINE.

The novel apparatus which forms the subject of the annexed illustration differs from machines designed or like employment in that, instead of consisting of a single movable jaw (the upper one), which acts in connection with a rigid bed, it is virtually a huge pair of shears, in which both of the blades partake of the motion. In order to communicate power to the arms of the shears, there is an ingenious and quite novel mechanical combination which, together with a solidly built frame, completes the device.

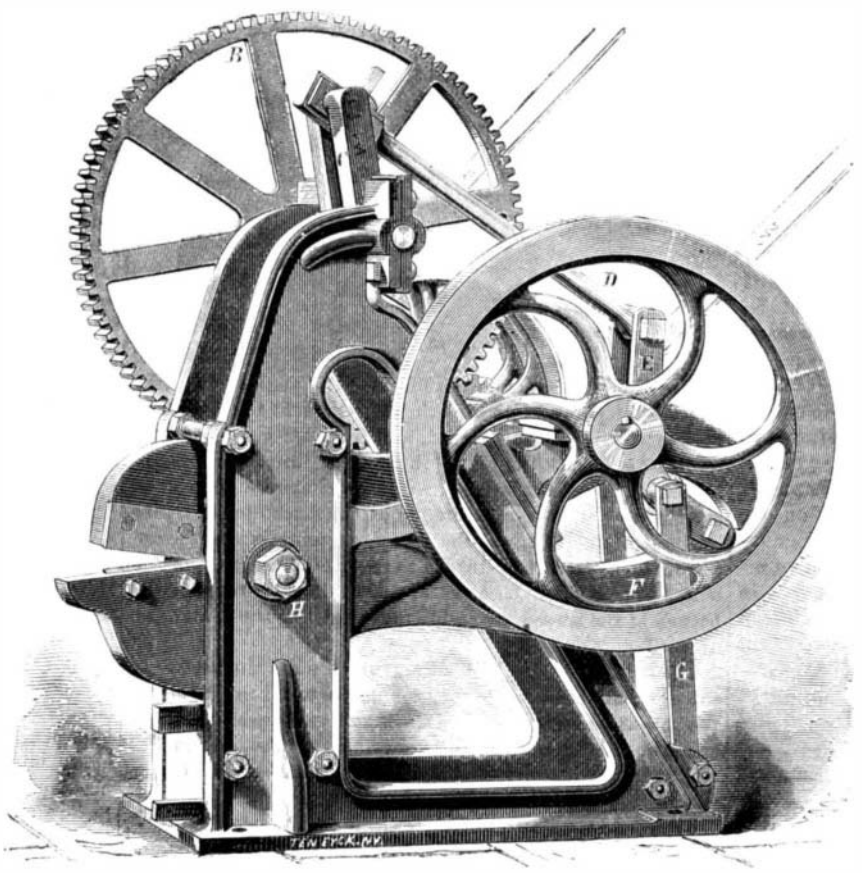
Power is applied to a belt pulley on the opposite end of the shaft which carries the fly wheel, A. Also on said shaft is a pinion, which engages with the large gear wheel, B, and thus, rotating the crank at C, moves back and forth the connecting rod, D. The latter is pivoted in the upper end of a double curved bar, E. The lower extremity of said bar is also pivoted to the lower shear arm, F. The upper shear arm passes through the bar, and within the latter and immediately below the arm is a roller upon which the curved portion of the arm rests. The pivot pin which secures the roller also holds the upper end of the bar, G, the lower extremity of which is pivoted to the frame.

The arms of the shears do not cross, but are provided with projections, which lap, and through which the pin, H, passes. By this arrangement, opening the arms forces the cutting edges together.

In operation the to-and-fro motion of rod, D, is communicated to curved bar, E. When the latter is thrown outward or to the right, its roller, acting against the curved portion of the upper shear arm, raises the same, while the lower end of the bar necessarily forces downward the lower shear arm, F. It is hardly necessary to explain that the combination of bars, E and G, with the shear arms, is calculated to admit of the application of very strong and uniform force to the jaws of the shears.

But little power is required to operate the machine, and its work is rapidly accomplished. It is stated that an apparatus weighing 1,700 pounds will cut bar iron one inch thick by three inches wide. The jaws, instead of carrying cutter blades, may be constructed to hold a punch and die, thus rendering the machine available for punching, as well as cutting, purposes. The device is also constructed to be operated by hand power, in which case the gearing as described is suitably modified.

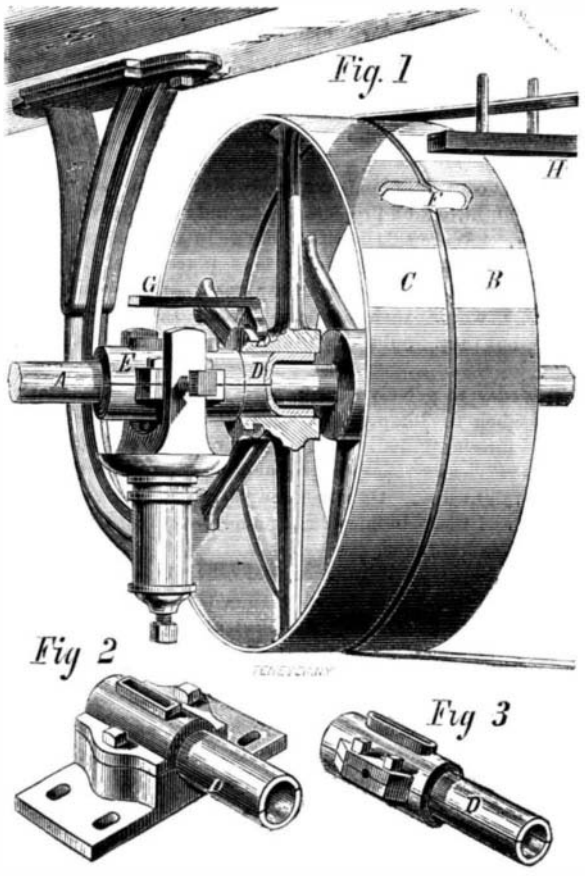
For further particulars regarding rights, purchase of machines, etc., address Mr. H. C. Richardson, 59 and 61 Grand street, Brooklyn (E. D.), N. Y. Patent allowed through the Scientific American Patent Agency.



REYNOLDS' METAL CUTTING AND PUNCHING MACHINE.

HOLDEN'S IMPROVED LOOSE PULLEY.

The essential feature of the improved loose pulley represented in the annexed engraving is that it, with the belt, remains in a state of rest except during the few seconds when the belt is shifted from loose to fast pulley. By this arrangement the belt revolves only when actually in use, and hence the wear of the same, together with the expenditure of lubricating material, otherwise required for the bearing, is saved.



A, Fig. 1, is the driving shaft, and B, the fast pulley. The loose pulley, C, is mounted on a bearing, D, projecting from a box, E, supported by the hanger. Through this bearing and box, the driving shaft passes. As shown through the portion broken away at F, the adjacent edges of the peripheries of the two pulleys are beveled, so that, when it is desired to shift the belt from loose to fast pulley, both pulleys may be caused to revolve together by forcing the pulley, C, slightly toward the pulley, B, by means of the shipper, G. After the belt is shifted, pulley, C, is drawn back on its bearing, and again comes to a state of rest. In shifting the belt from fast to loose pulley, the latter is not moved, as the belt is carried over by means of the ordinary shipper, H. The bearing and hub of the loose pulley are clearly shown in section in Fig. 1. Fig. 2 is a pillow block with a projection to receive the loose pulley, and Fig. 3 is a box and bearing, the same as in Fig. 1, shown removed from the hanger.

Patented May 5, 1874, by Messrs. W. H. Holden and T. C. Sheldon. For further particulars address W. H. Holden & Co., Box 327, Fitchburg, Mass.

The Music Stool Battery.

Land and Water publishes the following item, but declines responsibility for its truth by vaguely ascribing it to "a local paper."

"A valuable invention has just been patented by a post office official. It is an improvement in turret ships, the principal feature being that the battery rises and falls. Like many other inventions and discoveries, this one had its origin in accident. The inventor was out shooting one day, and both barrels of his gun went off simultaneously, the rebound causing him to spin round with considerable velocity. When he turned home he happened to sit on the music stool, and this piece of furniture also spun round in the well known manner. The movement reminded this clever official of his earlier spin. He was a gentleman capable of putting two and two together. Therefore he fastened his double barreled gun to his rotary piano stool, and banged away in his back garden, obtaining eventually a result which places him in the enviable position of being able to treat with two governments for the sale of his patent, for both England and Russia are anxious to become possessed of the rising and falling battery of this sharp post office official."

This invention bears a striking resemblance to the revolving cannon mentioned by Mr. Orpheus C. Kerr. That valuable weapon was pivoted in the middle and loaded at both ends, and, when fired, revolved with astonishing rapidity, causing promiscuous slaughter in both armies. It was intended to test the gun before a congressional committee; but as the individual deputed to fire it mentioned that he had a large family dependent upon him for support, the trial was indefinitely postponed.

Action of Earth and other Substances on Organic Matter.

At a recent meeting of the Chemical Society, a paper on the action of earth on organic nitrogen, by E. C. Stanford, was read, in which the author gave details of his experiments on mixtures of earth and decomposing animal matter. From these it appears that the earth is but an indifferent dryer, the mixture continuously losing nitrogen, which is evolved as ammonia principally; the earth also does not act as an oxidizer, and no nitrification take place. Dr. Frankland stated that when decomposition was in the direction of putrifaction, ammonia was always produced from the nitrogenous matter, but much nitrogen also escapes in the elemental form. The action of charcoal is very different; seaweed charcoal mixed with excrementitious matters and allowed to dry is found to retain almost the whole of the nitrogen. These facts are of interest to sewage economists and the advocates of the dry earth system.

Four Hundred Miles in a Balloon.

Professor Donaldson, the aeronaut, recently accomplished a very successful voyage in his new balloon "Barnum." Starting from the Hippodrome in this city, in the afternoon at 4 o'clock, the final landing was made the next day at 6 P. M., near Saratoga, N. Y. The party consisted of five persons, Donaldson and four reporters of the daily journals. Stops were made at various places on the route. The journey lasted 26 hours, during which time about 400 miles was traveled. The highest altitude reached was 9,000 feet.

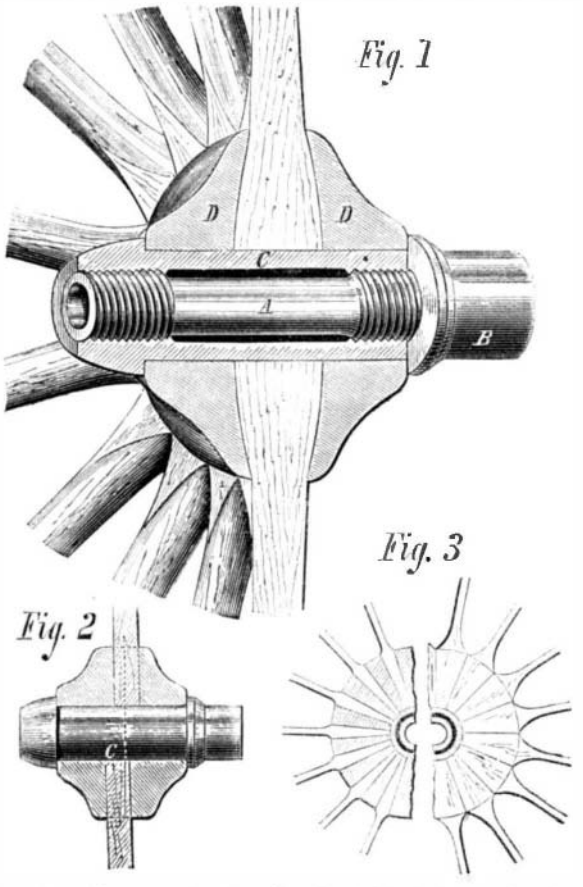
The Requisites for Good Mortar.

To obtain a good mortar, says Graham Smith, as much depends on the character of the ingredients and the manner of mixing them as on the goodness of the lime itself. It does not necessarily follow that, because a lime is good, the quality of the mortar will be good also. The best lime ever burnt would be spoilt by the custom, common among some builders, to mix with it alluvial soil and rubbish taken from the foundation pits of intended buildings. The sand should be hard, sharp, gritty, and, for engineering purposes, not too fine; it should be perfectly free from all organic matter, and with no particular smell. Good sand for mortar may be rubbed between the hands without soiling them. The water should also be free from all organic matter, and on this account should never be taken from stagnant ponds. The presence of salt in sand and water is not found to impair the ultimate strength of most mortars; nevertheless, it causes the work to "nitrate," or, as it is commonly termed, "saltpeter," which consists of white frothy blotches appearing on the face of the structure. It also renders the mortar liable to moisture, and for these reasons should never be present in mortar intended for architectural purposes, although for dock walls and sea works it may generally be used with advantage and economy.

Sand is used to increase the resistance of mortar to crushing, to lessen the amount of shrinking, and to reduce the bulk of the more costly material, lime. Water is the agent by which a combination is effected, and, as sand does not increase in volume by moisture, it necessarily follows that no more of the aqueous element should be employed than is absolutely necessary to fill the interstices between the sand, and render the whole into a paste convenient for use; and the greater strictness with which this is adhered to the more compact and durable will be the mortar.

DAVIS' IMPROVED HUB.

The invention, engravings of which in section we herewith present, is a simple and novel form of hub, composed of few parts, which may be quickly adjusted together so as firmly to retain the spokes. In Fig. 1, A is an inner metal tube forming the axle box and having a head at B. C is a larger and outer tube, into which tube A is screwed, as clearly shown. The middle portion of the hub consists of two collars, D, fitted on the tube head, at B, and binding the spokes between them. The spokes may be made large at the parts clamped between the collars, so as to fill the whole intermediate space, as shown to the right of Fig. 3, or the ends may be constructed smaller to enter grooves or mortises formed in the faces of the collars, as indicated at the left of



the same figure and in Fig. 2. The tube, A, is cored out on its middle portion to form an oil space, and the ends which form the axle bearings are cast in chills to render them hard, smooth, and durable.

The plain form of collar, the inventor states, will prefera