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IMPROVED SHEARS FOR CUTTING BAR IRON.

The ordinary method of cutting bar iron or railroad rails is by means of the cold chisel and hammer, a tedious and at best inaccurate operation, involving the labor of three men and no small expenditure of time. It is hardly necessary to point out that an efficient device for the same purpose would possess considerable economical value; and for this reason, in addition to that of its producing superior work, its substitution for hand labor may be urged.

The subject of our illustration is a power shears, of the size adapted to cut round iron of all sizes up to two inches. It is also provided with blades to cut flat iron as large as one by four inches, and square iron up to one and one half inches, without alteration. The machine is well adapted for the use of chain or bolt makers, and for general machine shop work. Smaller shears are made for lighter work, and larger ones for cutting up old rails and scrap for rolling mills. The size herewith represented, which cuts 2 inch iron, weighs only 2,000 lbs., and occupies a space of 3 by 5 feet on the floor. A hand machine weighing but 470 lbs., worked by two men, we are informed, has repeatedly cut off rails of seventy-two inches sectional area, requiring 360,000 lbs. pressure.

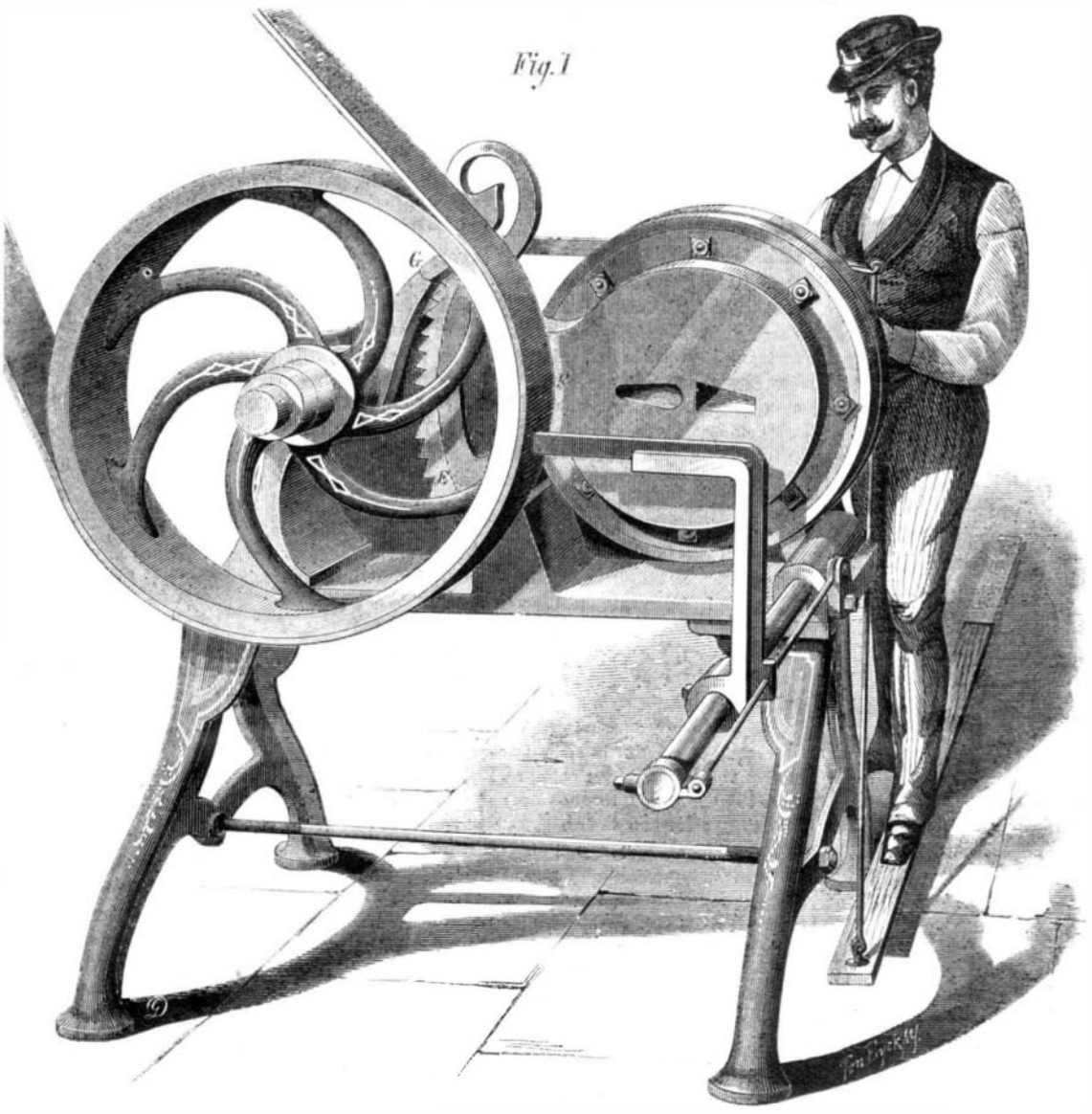
The pressure required to shear off two inch round iron will average 157,000 lbs., and the means whereby so much force is concentrated in so little space, and so much strain resisted by so little weight of cast iron, involves two principles in mechanical construction. The first principle consists in fastening the blades, A, B, and C, of the shears within the circumference, C', of its bearing of oscillation, in such manner that the largest bar to be cut is placed close to the axis or actual center of the shears. This is claimed to secure the shortest possible unit of leverage for the resistance, and at the same time the resistance or strain on the machine is located so near the center as to allow the iron, which must support said strain, to be distributed in a circle. Second, since the work is intermittent, a fly wheel may be advantageously used. And since the power that may be accumulated in fly wheels is proportional to the square of the velocity of their rims, the weights being equal, a good speed to the wheel is the first requisite.

The shears shown has a three feet wheel, weighing 630 lbs., with eight inches face, running 120 turns a minute. As two inch iron cannot be handled to cut chain links faster than 15 or 18 times a minute, the power of the wheel may be multiplied about 8 times, by such mechanism as will give the shears blade 15 strokes to the wheel's 120 turns.

In this machine the power of the fly wheel is communicated directly to the moving arm of the shears, by means of an eccentric, D, on the hub of said wheel, driving a pawl, which engages teeth in a circular arc, E, at the outer end of the shear arm, F, thus raising said shear arm one tooth at each revolution of the wheel, an attendant pawl, G, supporting the arm by each tooth as it rises. A stop dog, H, which may be fastened between any two teeth, on arriving beneath the pawls, disengages them, and the shear arm drops back to its normal position, where it is received on a cushion, I, to avoid noise.

Thus, by dividing the angle, through which the shears must move to cut two inch iron, into 8 teeth, and by placing said teeth far enough from center so that each tooth may be thick enough to bear its load with safety, the whole problem, the inventor claims, is solved with light parts, and almost no power wasted in friction. The eccentric is so proportioned to the teeth that the fly wheel is at work only one quarter of each turn, leaving three quarters of the working time and all the time between work for it to accumulate power. The body of the machine has a trunnion projecting from its face, on which is a circular flange, behind which a collar, J, takes a facial bearing. The moving arm, F, containing one pair of steel shear blades, B, has its bearing of oscillation on the circumference of the flange, and is secured so that the blades work in facial contact with the opposite blades, A, C, by means of bolts and the collar. When the pawls are thrown out by the stop dog, the lever holds them out, so that the shears is still, with its mouth open to receive iron, until it is purposely started. This may be done by either the hand or foot of the operator. This is a point of great value to prevent accidents in cutting rails and other heavy iron, as it allows any desired time to get the bar in place, and (when started) cuts it off as quickly as those shears do that keep the jaw always in motion.

Fig. 1



STEVENS' IRON-CUTTING SHEARS.

Fig. 2

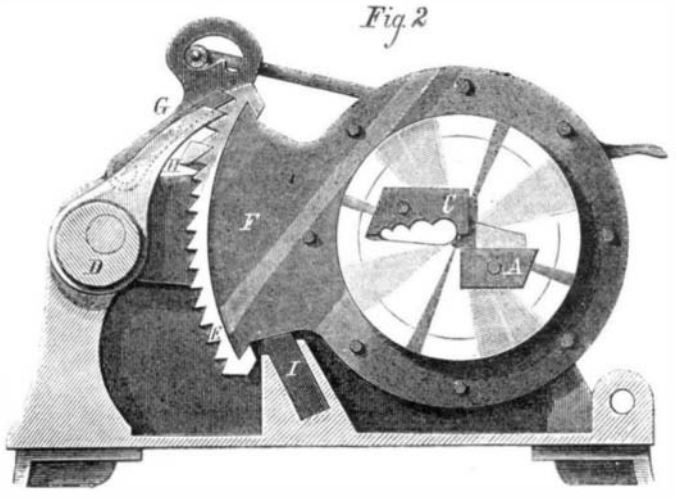
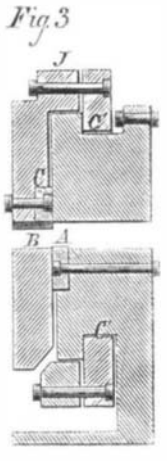


Fig. 3



For bolt and chain makers, a gage is supplied, that regulates the length of the piece cut, with precision. And this gage has a very ingenious mechanism, whereby the very act of pushing the bar against it starts the machine. The notches made in the blades for cutting round iron are so arranged as to cut the smallest iron at the farthest point from center, thus requiring only the motion of one tooth. Allowing a little time for the arm to fall, the shears will cut 100 pieces of one half inch iron, 75 pieces of three quarter, 50 pieces of one inch, or 15 pieces of two inch iron in one minute, while the fly wheel continues at the speed of 120 turns per minute. Its great firmness causes the blades to wear a long time. An opening from the joint allows the scale and rust to fall out.

These machines, we are informed, have proved by use to be very efficient, reliable, and extremely cheap, as their first cost is not one half that of other shears capable of the same grade and amount of work. The principal features of these shears are soon to be adapted to a combined shears and punch for boiler plate work. The device has been patented in the United States, Canada, Great Britain, France, Belgium, and Austria.

For further information, address the inventor and manufacturer, W. X. Stevens, East Brookfield, Mass.

A Railway on the Sea Bottom.

Dr. Lacomme's project might, perhaps, be termed more fittingly a marine railway, or a rail way for the marines. He proposes to lay a submarine line of rails at the bottom of the Straits of Dover between England and France, upon which a weighted chariot or platform is to run, and upon this platform is to be placed a submarine boat, composed of galvanized iron, and hermetically sealed, propelled by compressed air.

Steel Rails.

We had a conversation with the president of one of our largest railroads the other day, in which he said, speaking of the relative merits of steel over iron rails, that he believed that it was better economy for any railroad doing a large traffic to pay the present price for steel rails than to lay down iron, even if the latter were delivered free of cost. We thought at the time that the assertion was pretty strong; but on inquiry among other practical railroad men, they confirmed the first gentleman's assertion.

A recent number of the *Railroad Gazette* contained an engraving representing the wear on a steel rail, laid down in 1865, on the single main track in Clark street, Chicago, where nearly all the trains of the Chicago, Rock Island, and Pacific and the Lake Shore and Michigan Southern railroads passed over it, and where engines were constantly shifting. Iron rails in similar positions were renewed as often as once in six months, the steel rails having outworn sixteen of the iron rails. The steel rail was gradually worn down on one side, but there was no splintering, as in iron rails.

It will be observed, on reference to the list of Canadian patents published in these columns weekly, that the number of patentees is largely increasing. The last week's issue numbered forty-eight. In the corresponding week of last year, only half this number was issued.