

**CAR TRUCK FRAME DRILLING MACHINE.**

We illustrate herewith a special tool manufactured by Messrs. W. B. Bement & Son, of Philadelphia, Pa., for drilling at one operation the different holes required in car truck frames. The frame to be drilled is laid upon the table shown, and held there in position, the table, with the frame plate upon it, being then fed up to the drills. This table can be raised either automatically or by hand through the gearing shown. The drills are mounted on an upper frame, at the standard distance apart, and are driven by gearing from the coned pulleys. The drill spindles slide in the vertical holders, which are tubular, and they can be locked in any desired position by the set screws at the ends of the holders. The drill spindles can be adjusted on the cross frame to different distances apart so as to suit different patterns of car frames. The tool is well designed; and where a number of frames have to be drilled to one pattern, it is a very useful one, and capable of turning out a great deal of work.—*Engineering.*

**The Moon and the Weather.**

A writer in *Blackwood's Magazine* derides the popular error that the moon produces any effect upon the weather, as follows:

The notion that the moon exerts an influence on the weather is so deeply rooted that, notwithstanding all the attacks which have been made against it, it continues to retain its hold upon us. And yet there never was a popular superstition more without a basis than this one. If the moon really did possess any power over the weather, that power would be exercised in one of these ways: by reflection of the sun's rays, by attraction, or by emanation. No other form of action is conceivable.

Now, as the brightest light of a full moon is never equal in intensity or quality to that which is reflected towards us by a white cloud on a summer day, it can scarcely be pretended that the weather is affected by such a cause. That the moon does exert attraction on us is manifest—we can see it working in the tides; but though it can move water it is most unlikely that it can do the same to air, for the specific gravity of the atmosphere is so small that there is nothing to be attracted. Laplace calculated that the joint attraction of the sun and moon together could not stir the atmosphere at a quicker rate than five miles a day. As for lunar emanations, not a sign of them has ever been discovered. The idea of an influence being produced by the moon is, therefore, based on no recognizable cause whatever. Furthermore, it is now distinctly shown that no variations in weather at all really occur at the moment of the changes of quarter, any more than at ordinary times. Since the establishment of meteorological stations all over the earth, it has been proved by millions of observations that there is no simultaneousness whatever between the supposed cause and the supposed effect. The whole story is fancy and superstition, which has been handed to us uncontradicted, and which we have accepted as true because our forefathers believed it. The moon exercises no more influence than herrings do on the government of Switzerland.

**The Largest Machine Belt.**

The New York Belting and Packing Company have recently made a rubber belt, 331 feet long and 4 feet wide, weighing 2 tons, for use in the New York Central and Hudson River Railroad Company's elevator at foot of 60th street, North river, in this city. The driving power to be carried by this belt is estimated at 500 horses. It is believed to be the largest belt ever made.

**Wooden Spoons.**

In a work describing the present condition of the domestic industries of Russia, M. Weschniakoff states that not less than thirty millions of wooden spoons are annually made in that country, the industry having its great center in the district of Semenow. Poplar, aspen, maple, and box are the woods used for this purpose, and the cost of the spoons varies from about \$5 to \$20 per thousand.

**SWIMMING A HORSE.**—On reaching deep water, the rider should relieve the horse of his weight, by sliding into the water beside the horse, grasping the mane near the withers with one hand, thus requiring the horse simply to tow the rider, the latter assisting him in this, by using his legs and free arm in the same way as in swimming. In crossing rivers with rapid currents, the rider should take the down stream side of the horse.

**Manganese.**

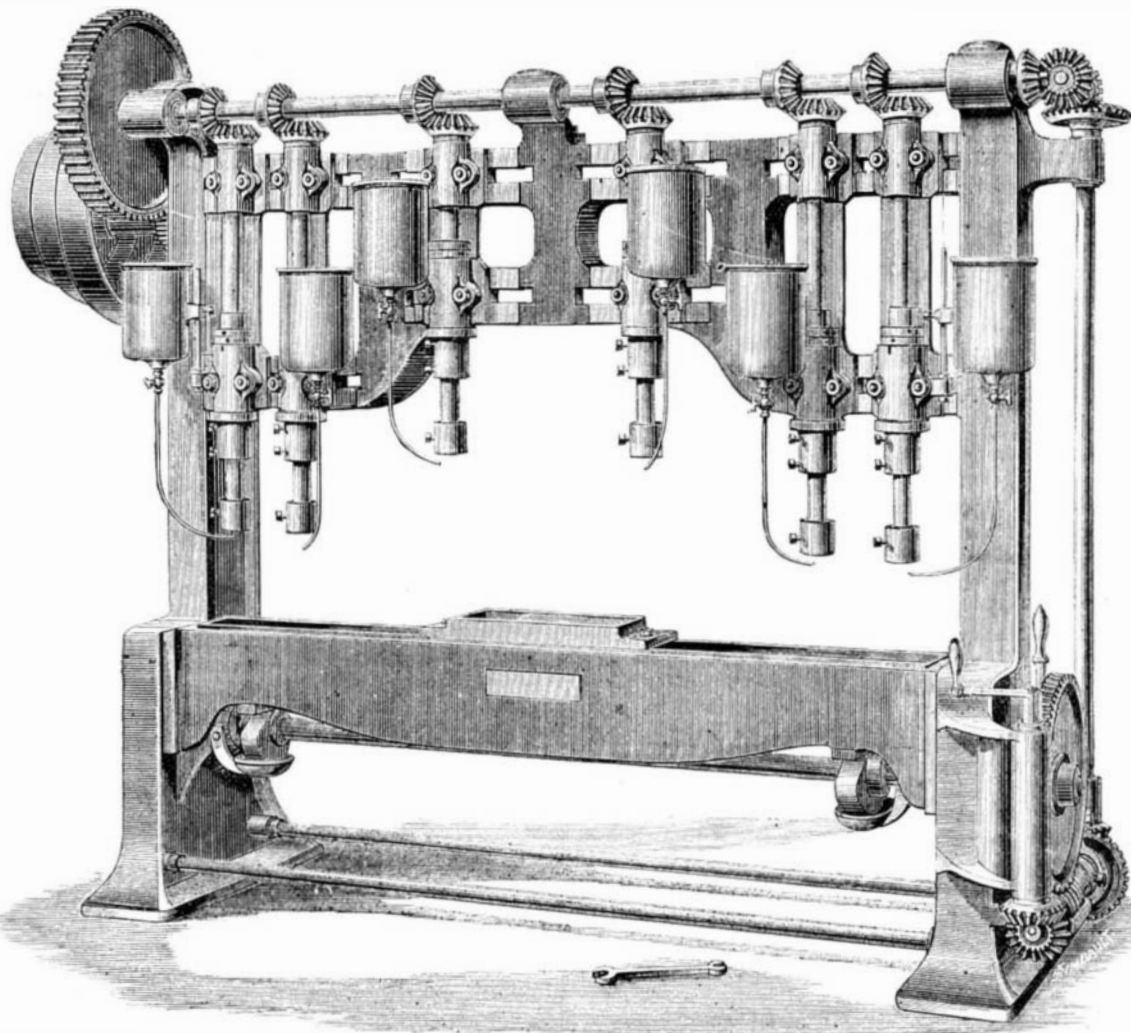
The important studies made of late years in chemical science have given manganese great importance in many arts and industries, and 50,000 tons per annum are now imported into Great Britain, although a considerable quantity is raised from her own soil. It is used largely in the manufacture of bleaching salts (chloride of lime), in glass making, in the preparation of Condy's fluid (permanganate of potash), a disinfectant which, when mixed with water, sets free ozone in perceptible quantities; and in the manufacture of steel, it is

reader may solve for himself the neat mechanical problem which the device affords.

The construction is as follows: A is the standard; B is a grooved pulley rotated in the direction of the arrows by the crank, the end of the handle of which is shown below and to the right. C is a large balance wheel, loose on the shaft of B. D is a grooved stationary pulley formed on or attached to the standard; and E (dotted lines) is a small pulley outside the balance wheel, but attached to the end of an auxiliary shaft which supports the star-shaped piece, which

may be a saw or other implement which it is desired to revolve rapidly. The order of mechanism on the line of the central shaft is, first, the crank handle; second, the standard; third, stationary pulley; fourth, driving pulley; fifth, loose balance wheel; sixth, and on auxiliary shaft, small pulley; seventh, standard; eighth, driven pulley.

On the balance wheel and near the rim are secured three small pulleys as shown. There is also a tightening pulley attached to said wheel by an arm near the center. The belt or chain is then rove as follows: Beginning on the driving pulley, B, then over the first small pulley of the three on the balance wheel, then down and over the small central pulley, E, then up and over the third pulley on the balance wheel, down and around the stationary pulley, back up to the middle pulley on the balance wheel, down around the driving pulley to the place of beginning, the belt being endless. The proportion between the driver and driven pulley is as 1 to 12; that is, the former in one revolution would produce twelve turns of the latter if simply belted or geared thereto; but by this device one revolution of the crank handle determines eighty-four revolutions of the driver pulley, so that the gearing augments the speed just sevenfold, without requiring

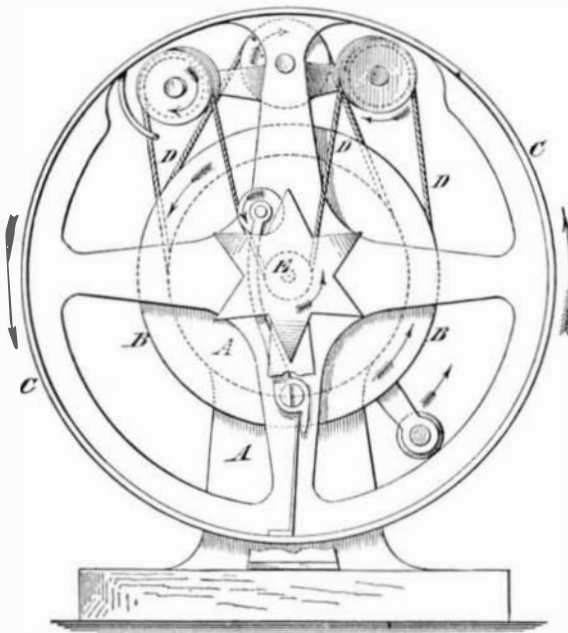
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rapidly becoming an ingredient of the highest importance.

The principal supply comes from Spain and Portugal, where it is found near the surface—seldom deeper than 90 feet. It generally occurs in pockets, and is of very uncertain occurrence, the miners proceeding generally by a kind of instinct rather than by any scientific rule. The ore is picked out from the pieces of rock with which it is mingled, washed, and sorted as to quality; then it is carried, generally in baskets on mules' backs, to the nearest railway or seaport. The miners, sorters, and washers are but poorly paid, even for Spain; and the discovery of manganese deposits in California, Virginia, and New Zealand is likely to limit the demand for this very useful metal in Spain and Portugal. Experiments are, however, being made in Belgium for the purpose of bringing it into use for making illuminating gas, for which it is likely to be extremely valuable.

**A NEW GEARING.**

There is now on exhibition at the Centennial Exposition,



in Machinery Hall, an exceedingly ingenious and novel mode of gearing, which will doubtless find many utilizations in cases where a high speed in revolutions is required, but where any extended system of cog wheels or other multiplying gear is neither desirable nor economical. The invention is illustrated herewith, and we purposely omit the calculations relating to the speed transmitted in order that the

any more room than would be occupied by the simplest mechanism. Theoretically, and friction neglected, there is apparently no limit to the number of revolutions which might be produced by properly proportioning the different pulleys. Of course the device can be used with gearing in lieu of belting. How the combination produces the sevenfold augmentation, and what must be the proportions of pulleys leading thereto, we leave our readers to puzzle over. The specimen at the Centennial is located at C 8, pillars 62 and 63. The inventor is Mr. Jonas Hinkley, of Norwalk, Ohio.

**SUCCESS OF THE HELL GATE EXPLOSION.**

The great mine at Hell Gate has been exploded. Soundings over the reef are not yet finished as we go to press, so that the present depth of water cannot definitely be stated; but judging from the extent of the visible result of the blast and from the fact that a large Sound steamer has already passed fifty feet nearer the shore than ever before, it is probable that the work is a grand success. Despite the assurances of General Newton, the effects of the concussion of the 52,000 lbs. of explosives were greatly feared, and for miles around windows and doors were thrown open, while people abandoned the houses near the mine. At precisely 2.51 P. M., the finger of General Newton's little daughter pressed the key, and the current exploded a torpedo which in turn broke the sustaining cord of a heavy pin-studded plate. As this fell, battery connection with the mine was established. Then a hundred vast fountains leaped into the air at once. Above these pure white columns, perhaps sixty feet in height, shot a mass of dense black smoke mingled with flying mud and timbers. The explosion lasted three seconds. The concussion was very slight, but was perceptible at Springfield, Mass. Throughout New York city a dull rumble and muffled boom were noticed but no shaking of the earth was remarked.

We can add our hearty congratulations to those which General Newton is receiving from all quarters. The credit of the plan, however, belongs to A. W. Von Schmidt, who destroyed Blossom Rock, San Francisco. After the U.S. engineers had exhausted their resources in devising means to remove this formidable obstruction, Mr. Von Schmidt proposed substantially the same system of coffer dam and tunnels employed at Hell Gate; and he staked his fortune on success, for he asked no pay until the dangerous reef had given place to 24 feet of water. On the 23d of April, 1870, the 43,000 lbs. of gunpowder packed in the submerged tunnels and headings was fired, and Blossom Rock ceased to exist. The country is indebted to Mr. Von Schmidt's genius for the magnificent results obtained both at San Francisco and Hell Gate: to General Newton, for the engineering skill with which seven years of continuous and most arduous labor have been brought to a grand and befitting end.