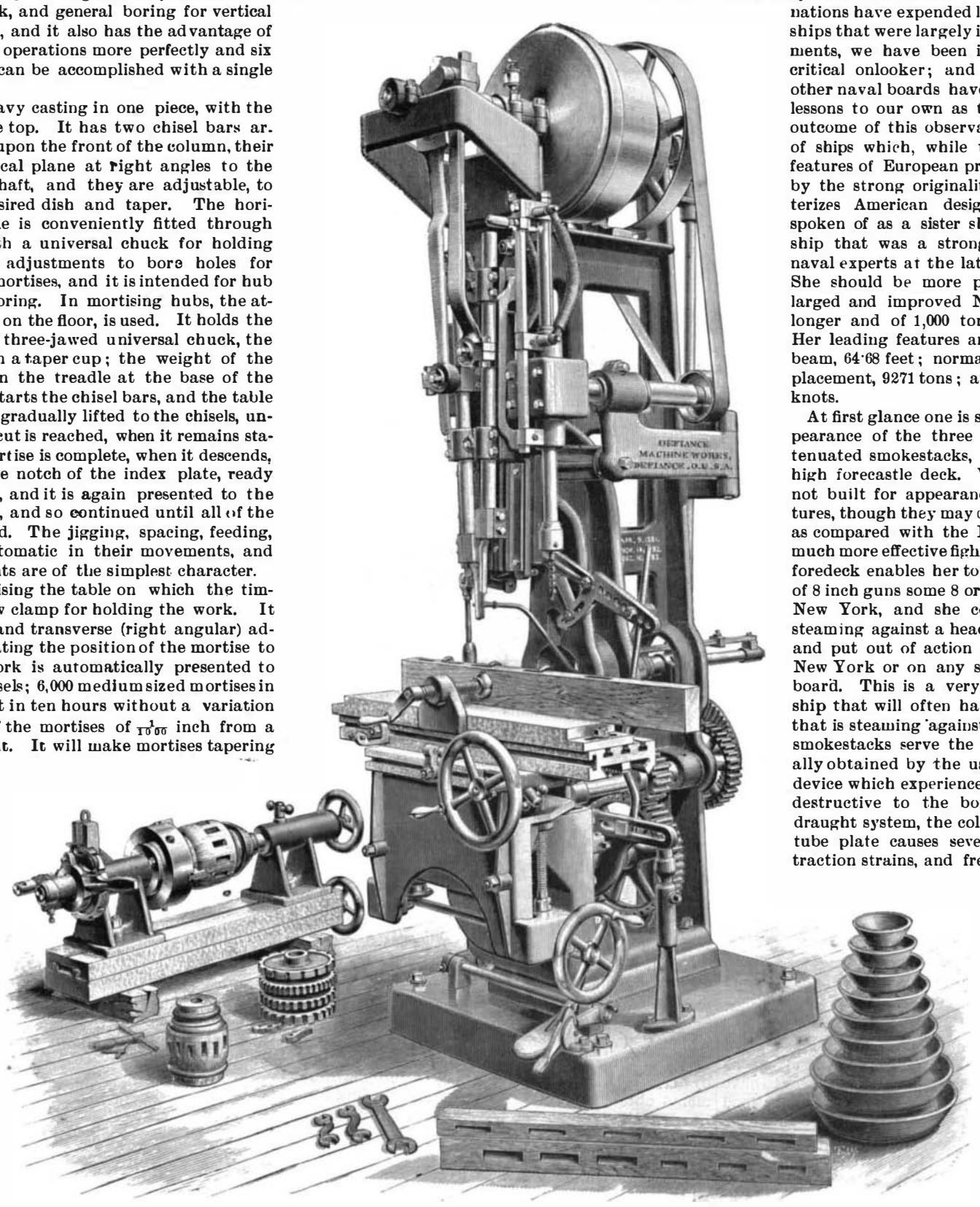
AN AUTOMATIC DOUBLE CHISEL MORTISING MACHINE.

This engraving represents an automatic double chisel mortising and boring machine, designed for automatically mortising hubs from the smallest sizes up to 11½ inches diameter, cutting the mortises straight or stagger at the rate of 400 hubs per day; it is equally well adapted for cutting mortises of the regular kind in hard or soft wood, from ⅛ to ½ inch wide, to 5 inches long, such as required in wagon, carriage, furniture and agricultural implement shops, and when not engaged in mortising, the boring spindles may be utilized as a regular boring machine. The machine is manufactured by the Defiance Machine Works, Defiance, Ohio. It will accomplish several distinct classes of work, hub mortising and regular carpenter mortising in straight work, and general boring for vertical and horizontal work, and it also has the advantage of effecting the several operations more perfectly and six times faster than it can be accomplished with a single chisel machine.

The frame is a heavy casting in one piece, with the driving power at the top. It has two chisel bars arranged side by side upon the front of the column, their axis being on a vertical plane at right angles to the axis of the main shaft, and they are adjustable, to give the mortises desired dish and taper. The horizontal boring spindle is conveniently fitted through the main frame, with a universal chuck for holding the auger, having adjustments to bore holes for straight or stagger mortises, and it is intended for hub work and general boring. In mortising hubs, the attachment, as shown on the floor, is used. It holds the hub at one end in a three-jawed universal chuck, the other end turning in a taper cup; the weight of the operator's foot upon the treadle at the base of the machine instantly starts the chisel bars, and the table carrying the hub is gradually lifted to the chisels, until the full depth of cut is reached, when it remains stationary until the mortise is complete, when it descends, the hub turning one notch of the index plate, ready for the next mortise, and it is again presented to the action of the chisels, and so continued until all of the mortises are finished. The jigging, spacing, feeding, etc., are entirely automatic in their movements, and all of the adjustments are of the simplest character.

For straight mortising the table on which the timber rests has a screw clamp for holding the work. It has a longitudinal and transverse (right angular) adjustment, for regulating the position of the mortise to be made, and the work is automatically presented to the action of the chisels; 6,000 medium sized mortises in soft wood can be cut in ten hours without a variation in the dimensions of the mortises of $\frac{1}{1000}$ inch from a specific measurement. It will make mortises tapering in either direction or parallel, as desired, or tapering at one end and perpendicular to the surface at the other end. No painstaking, difficult and uncertain jigging of a carriage is required, and no reversing of chisels.

The vertical boring apparatus is contained within an iron case completely covering the gears and so constructed that the center of the auger is always exactly in line with the center of the chisels, so that the object after being bored has only to be moved horizontally to bring in proper place under the chisels to receive the mortises. The boring spindle has a radial adjustment for boring holes to any angle. The friction drive pulley is 18 inches diameter, 5 inches face, speed 400 rotations per minute.



AN AUTOMATIC DOUBLE CHISEL MORTISING MACHINE.

Tears a Safety Valve to Emotion.

Tears have their functional duty to accomplish, like every other fluid of the body, and the lachrymal gland is not placed behind the eye simply to fill space or to give expression to emotion. The chemical properties of tears consist of phosphate of lime and soda, making them very salty, but never bitter. Their action on the eye is very beneficial, and here consists their prescribed duty of the body, washing thoroughly that sensitive organ, which allows no foreign fluid to do the same work. Nothing cleanses the eye like a good, salty shower bath, and medical art has followed nature's law in this respect, advocating the invigorating solution for any distressed condition of the optics. Tears do not weaken the sight, but improve it. They act as a tonic to the muscular vision, keeping the eye soft and limpid, and it will be noticed that women in whose eyes sympathetic tears gather quickly have brighter, tenderer orbs than others. When the pupils are hard and cold, the world attributes it to one's disposition, which is a mere figure of speech, implying the lack of balmy tears that are to the cornea what salve is to the skin or nourishment to the blood.

The effect of tears on the skin about the eyes, however, is intensely irritating and inflaming. They keep the epidermis in a dark, puffy condition, and in legends only do weeping women preserve the beauty of their great, white lids. The reason some women weep more easily than others, and all more readily than the sterner sex, has not its difference in the strength of the tear gland, but in the possession of a more delicate nerve system. The nerve fibers about the glands vibrate more easily, causing a downpour from the watery sac. Men are not nearly so sensitive to emotion; their sympathetic nature—the term is used in a medical sense—is less developed, and the eye gland is, therefore, protected from shocks. Consequently, a man should thank the formation of his nerve nature when he contemptuously scores tears as a woman's practice. Why facial distortions should be the usual accompaniment to the sobbing of the gentler sex there seems no satisfactory solution. It may be that the nerves, which lead to the muscles as wires to marionettes, twitch and pull them in this fashion while they are at work emptying the tear glands of their contents. That the copious shedding of tears "which breaks the ice-bound fetters of the heart" is a healthy action, all physicians assert. In some cases it is even thought to avert insanity. Even here the reason is scientific, for it is a sign of relaxation of the brain nerves from a tenseness that was congestion. Between man and monkey there is this essential difference of tears. An ape cannot weep, not so much because its emotional powers are undeveloped as the fact that the lachrymal gland was omitted in his optical make-up. So long as this differentiating quality between man and his primeval ancestors persists, we may laugh at the theory of Darwin, so far as it reflects upon our family tree; scorn all innuendoes of "missing links;" and see our handkerchief as the sign and symbol of man's chieftainship in creation.—Philadelphia Times.

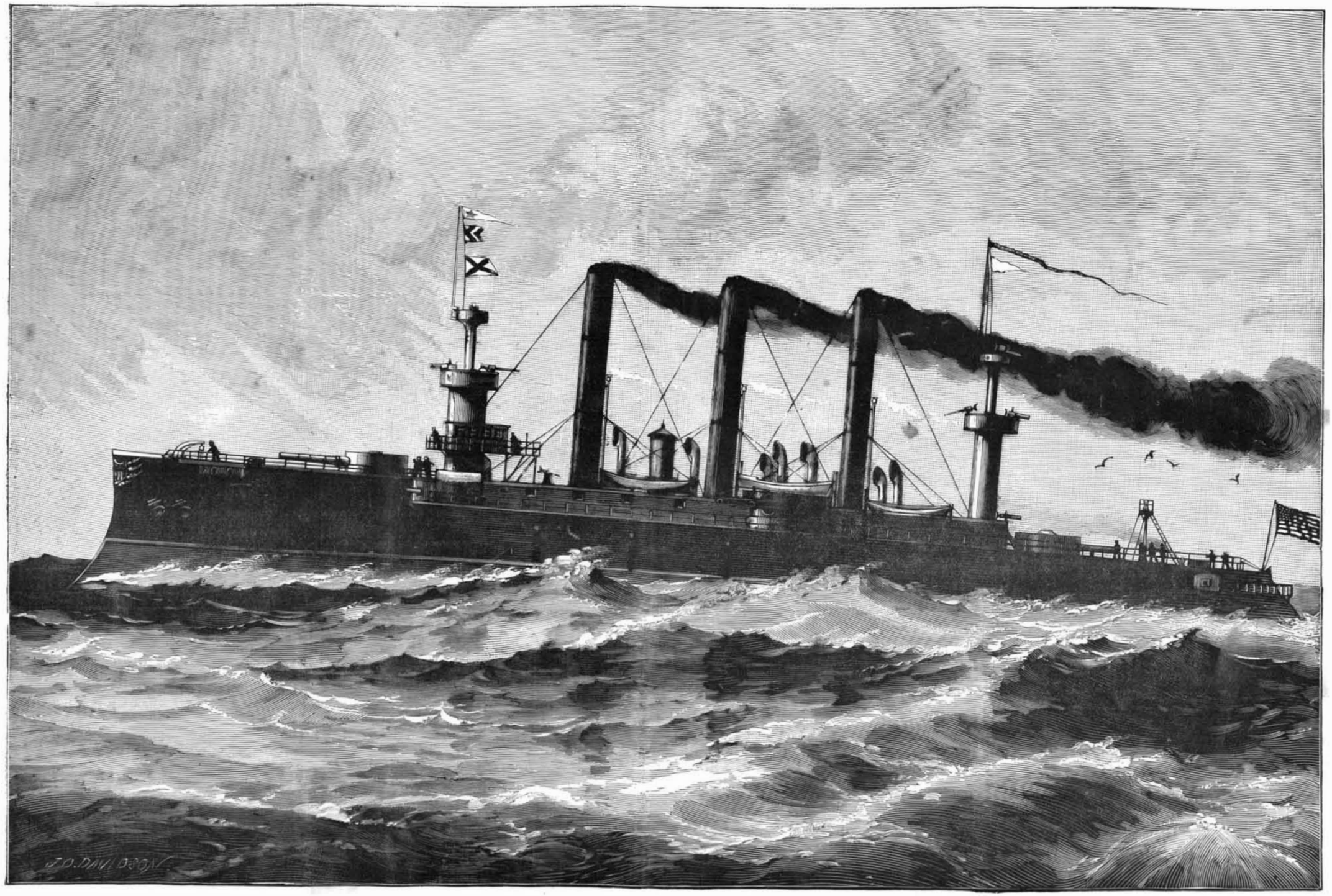
THE LAUNCH OF THE ARMORED CRUISER BROOKLYN.

On the afternoon of the 2d inst. there was launched from the Cramp's shipyard one of the most perfect and thoroughly up-to date cruisers of modern times. In the building up of our new navy, the United States government have reaped much benefit from the fact that they were a little late in starting. While other nations have expended large appropriations on ships that were largely in the nature of experiments, we have been in the position of the critical onlooker; and the costly failures of other naval boards have been valuable object lessons to our own as to what to avoid. The outcome of this observation is seen in a class of ships which, while they embody the best features of European practice, are yet marked by the strong originality which ever characterizes American design. The Brooklyn is spoken of as a sister ship to the New York, a ship that was a strong favorite among the naval experts at the late naval review at Kiel. She should be more properly called an enlarged and improved New York, being 14 feet longer and of 1,000 tons more displacement. Her leading features are: Length, 400½ feet; beam, 64·68 feet; normal draught, 24 feet; displacement, 9271 tons; and calculated speed, 20 knots.

At first glance one is struck with the odd appearance of the three unusually tall and attenuated smokestacks, and the exceptionally high forecastle deck. Warships, however, are not built for appearance; and these two features, though they may detract from her beauty as compared with the New York, make her a much more effective fighting machine. The high foredeck enables her to carry her forward pair of 8 inch guns some 8 or 10 feet higher than the New York, and she could fight them when steaming against a head sea that would flood and put out of action the same guns on the New York or on any ship with a lower freeboard. This is a very valuable feature in a ship that will often have to chase an enemy that is steaming against the wind. The lofty smokestacks serve the purpose which is usually obtained by the use of forced draught, a device which experience has proved to be very destructive to the boilers. In the forced draught system, the cold air impinging on the tube plate causes severe expansion and contraction strains, and frequently starts leakage at the tube ends. There is no such difficulty attaching to natural draught, and experience in the English mercantile marine has shown that as good results can be obtained by lengthening the smokestacks as by the employment of the forced draught system. The armament will consist of eight 8 inch rifles in barbettes of 8 inch steel armor; twelve 5 inch rapid fire guns, protected by 4 inch steel armor; twelve 6 pounder rapid fire guns, and four machine guns. A complete steel protective deck, from 3 inches to 6 inches in thickness, will cover the ship from stem to stern.

The Brooklyn will carry five torpedo tubes, one in the bow and two on either broadside. Her total coal capacity will be 1,753 tons, and her normal capacity at normal displacement, 900 tons. She will have a full speed radius of action of 1,758 knots, and a 10 knot radius of action of 6,088 knots.

THE St. Louis is steadily improving on her previous performances in the Atlantic service. She left New York Wednesday, September 25, passing Sandy Hook at 1:30 P.M., and arrived off the Needles, Isle of Wight, at 7:35 A.M. on the following Wednesday, the time of passage being 6 days, 13 hours, 25 minutes. The record is held by the Hamburg-American liner Furst Bismarck, and stands as 6 days, 10 hours, and 35 minutes.



THE ARMORED CRUISER BROOKLYN, LAUNCHED AT PHILADELPHIA, OCTOBER 2, 1895.

Waltzing Mice.

The following description of some very curious and interesting Japanese animals is communicated to Natural Science, London, August, by Edgar R. Waite, of the Museum at Sydney, Australia. The editor remarks in a note that the creatures have already been described in technical zoological journals more than once, though not until within two or three years. The general public, however, is quite uninformed regarding them, so that this popular account cannot fail to be interesting:

"Whatever th late war may have done toward increasing our knowledg of Japan and things Japanese, it was the means of introducing to me an interesting domestic animal, the subject of this article.

"The mice were obtained from Mr. Haley, of this city [Sydney], who received them from Japan. The original pair and nearly all the offspring for several generations are white, variegated with black, disposed about the head, nape, and root of the tail. The exceptions are reversions to the color of the wild brown mouse, and two instances in which the black is replaced by faint buff; the irides of these are pink, whereas those of the other mice are dark.

"At first, a visitor probably regards the mice as mere color varieties of the common white race. A moment's observation reveals the peculiarities of the breed, and attention is riveted by their strange performances. Early in life they exhibit the tendency which has earned for them the name above applied. When a mouseling leaves the nest its gait consists of an evident attempt to proceed in a straight line; this is frustrated by a tremulous movement of the head, which is nervously shaken from side to side. Shortly, a tendency is exhibited to turn; this develops into a rotatory motion, performed with extraordinary rapidity, which constitutes the peculiarity of the waltzing mouse.

"The ordinary routine of daily life is constantly interrupted by this mad disposition to whirl, frequently indulged in for several minutes, and, with an occasional stoppage of a few seconds, continued for hours. The floor of one of Mr. Haley's cages being somewhat rough, the mice actually reduced their feet to stumps before it was noticed. Like ordinary mice, they sleep during the day, but apparently waltz the whole night long. If, however, they are disturbed during daylight, they leave their bed and work off some surplus energy.

"The rotation is so rapid that all individuality of head and tail is lost to the eye, only a confused ball of black and white being recognizable. Very often they spin in couples, revolving head to tail at such a speed that an unbroken ring only is perceived. It is remarkable that they keep perfectly together; this may be attributed to their similarity in size and not to any special faculty they may possess. An upright peg forms a favorite pivot, but even without this guide they would not, in several minutes, cover an area larger than a dinner plate, and they easily spin under a tumbler. Sometimes three or four mice run together; the extra ones then form an outer circle, but as the evident desire is to rotate rather than revolve, more than two seldom work well. An individual generally spins in one direction only, and the majority turn to the left, only a small proportion going 'with the clock.'

"A waltzing mouse may be placed on the ground without fear of its escaping. Should it attempt to do so, it will not proceed far before being seized with a paroxysm, which it will be necessary to work off before further progress can be attempted. These mice may also be kept in a paper box, which would not detain a wild mouse an hour; the process of gnawing the walls of their prison will be so frequently interrupted by the necessity of practicing their infirmity that little damage can be done. As with all truly domestic mice, however, no determined effort to escape, such as characterizes the wild mouse, is ever attempted, and at most such efforts are to be regarded as an inherited habit rather than a real desire for liberty, for domestic mice do not readily leave when their cages are left open.

"The feature of the breed may be due to cerebral derangement, but that the trait is, at the present day, purely hereditary and not acquired by the individual, is shown by the fact that, as soon as they arrive at an age when other mice begin to run, these begin to waltz.

"They may be compared to tumbler pigeons, and the analogy is close, allowing for differences between an aerial and a terrestrial performance. The plane of motion is, however, quite different, as exemplified by Indian ground tumblers, which, when placed on the ground, turn head over heels. In both cases the affection is the result of perpetuation by heredity of an affliction which would have insured the destruction of a wild race."

A PETROLEUM TRICYCLE.

The accompanying engravings illustrate a motor tricycle which has been made for experimental purposes, and has run considerable distances, by Mr. J. H. Knight, of Farnham, Eng. Mr. Knight has been one of the pioneers in the construction of oil engines, but for this motor cycle he at present uses a gasolene engine, although in a few months he expects to be running with an oil engine. The engraving—from a photograph—shows the general arrangement of the carriage or motor tricycle, and the annexed diagram shows the arrangement of the engine and intermediate driving gear.

We are indebted to the Engineer, London, for our illustrations and the following particulars: The engine runs constantly. On the crank shaft are two

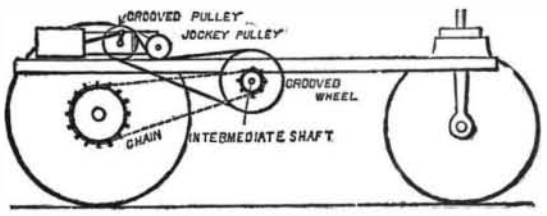


DIAGRAM OF GEARING.

corresponding grooved wheels, and on the intermediate shaft are two grooved wheels. These provide the change of speed. The pulleys and wheels are coupled by loose ropes, and these ropes are tightened by the jockey pulleys. The three levers seen in the photograph are for the two speeds and the brake. The outer levers with the toothed quadrants are the levers for working the two jockey pulleys; the center one is the brake.

The carriage weighs in running order about 1,075 lb. The gasolene engine is on the Otto cycle, and has a piston 3¼ in. diameter and 4½ in. stroke, developing rather over three-quarter brake horse power at 500 revolutions. The driving wheels, or rather the hind wheels—for one wheel only is a driver—are 3 ft. diameter, and the steering wheel 2 ft. 6 in. All have 1½ in. solid rubber tires. Two speeds are arranged for, corresponding to about 3½ and 7½ miles per hour. No

A PETROLEUM TRICYCLE.

arrangement for reversing is used or thought necessary. The cooling water for the engine cylinder is contained in a tank under the seat, and a current of air is drawn by the exhaust over the water, and cools it to a considerable extent. We are informed that the motor cycle is almost silent in running, and that horses take no notice of it.

With one person on it, it will run 7½ miles per hour on fairly level roads, and has run at from 8 to 9 miles per hour for short distances. With two passengers the speed is somewhat less.

The Pressure of a Gun Blast.

Recently, with a view to the practical determination of the effect of a blast from heavy gun firing over a protective plate, Commodore Sampson had a series of experiments made at the Indian Head Proving Ground which are described in the American Engineer and Railroad Journal.

The Indian Head experiments were interesting and are the first of the kind ever held. Lieutenant Mason, the officer in charge of the proving ground, conducted them. An 8 inch gun was employed. Under its muzzle was placed a 7 inch armor plate, which was 8 square feet and weighed about 8 tons. The center of the plate was 20 inches in front of the muzzle and about 4 feet below it. Over the plate and nearly parallel with it was secured a 1 inch wrought iron plate, 74 inches long by 68·5 inches wide. It weighed about ⅔ of a ton and was supported at each corner with a 2 inch armor bolt screwed into the corner holes in the back of the 7 inch plate below. The corner holes in the bottom of the plate were not directly below the holes in the corners of the wrought iron plate. Consequently, they were bent to bring their upper ends into the proper position. The center line down the length of the 1 inch plate was parallel with the axis of the bore of the gun, prolonged 0 25 of an inch to the right and 24 inches below, the surface of the plate being inclined 1 degree with the horizontal, the same as the gun. The muzzle of the gun projected from the rear of the 1 inch blast plate 17 5 inches. Two rounds were fired. In the first round the charge of powder was 100 pounds, the muzzle velocity 2,018 foot seconds and the pressure 16 tons. The elevation of the gun was 1 degree. The wrought iron 1 inch plate was bent downward at right angles to the line of fire along its central traverse line, the center of the plate being forced down by the blast 3·93 inches. A slight rotary movement to the left was also given to the plate. The 7 inch armor was not moved at all. In the second round the charge of powder was 107 pounds, the muzzle velocity 2,000 foot seconds and the pressure and elevation the same as in the preceding round. The blast plate was in the position produced by the first round. The effect of the second blast was merely an augmentation of that of the first fire. The lower plate was not moved in the least. After the second round the support of the right hand rear corner retained nearly its original position. The other three bolts had twisted to the right nearly 45 degrees. The second round crushed the plate downward about 7 inches, making the extreme deflection about 10 inches.

Berry Culture.

Winter protection is an absolute necessity for growing small fruits successfully in a northern climate. It should be practiced in every locality where the temperature reaches zero or below. With the high cultivation now practiced, a large and tender growth is stimulated; hence the greater necessity to maintain as uniform a temperature as possible throughout the winter. Even in localities where plants show no injury, and among those considered most hardy, the vitality is often affected, and the succeeding crop very much reduced.

The best winter protection for blackberries, raspberries and grapes consists in laying them down and covering lightly with earth. All old canes and weak new growth should be cut out and burned soon after fruiting, leaving only strong, vigorous plants. If plants have been well mulched in summer with green clover, clean straw or coarse manure, as they should be, less earth is required by using this mulching.

In laying plants down (the rows running north and south), commence at the north end, remove the earth from the north side of the hill about four inches deep, gather the branches in close form with a wide fork, raising it toward the top of the bush, and press gently to the north, at the same time placing the foot firmly on the base of the hill, and press hard toward the north.

If the ground is hard, or bushes old, a second man may use a potato fork instead of the foot, inserting same deeply, close to south side of hill, and press over slowly, bending the bush in the root until nearly flat on the ground. The bush is then held down with a wide fork until properly covered. The top of the succeeding hill should rest near the base of the preceding hill, thus making a continuous covering. This process is an important one, but is easily acquired with a little practice. In the spring remove the earth carefully with a fork and slowly raise the bush.

With hardy varieties, and in mild winters, sufficient protection may be had by laying down and covering the tips only. Grapes being more flexible, are laid down without removal of earth near the vine.

There is no more important work on the fruit farm or garden than winter protection, and there is no work more generally neglected. Let it be done thoroughly, after frosts have come and before winter sets in. Strawberries grow rapidly in October, and make many weak plants. Remove all runners starting this month, allowing four or five inches square space for each plant. This is necessary for best fruit.—M. A. Thayer, in Country Gentleman.