### TAPER SLEEVE PULLEY AND WHEEL FASTENER.

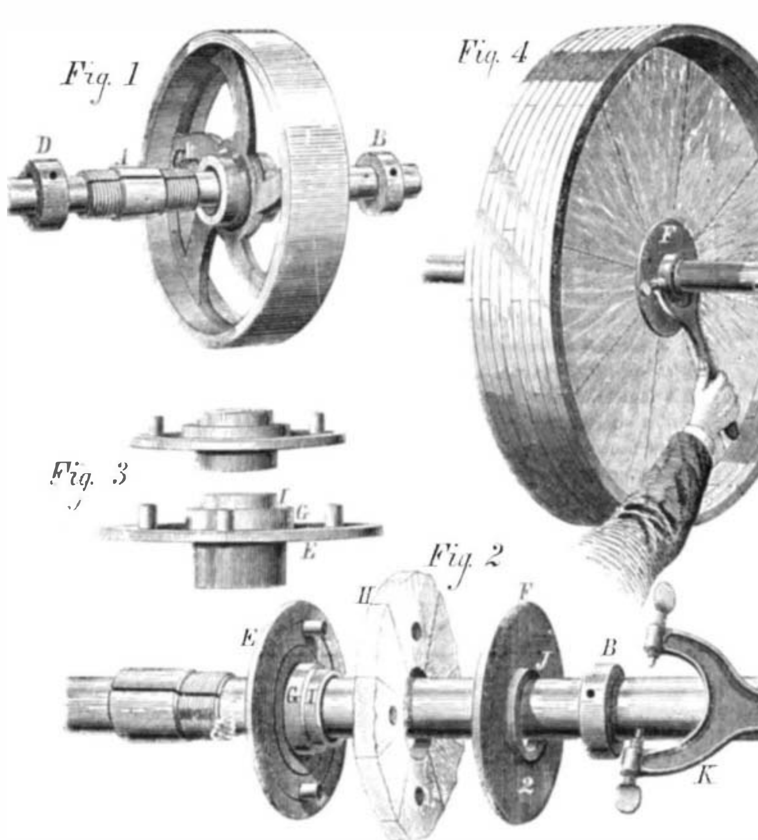
Our engraving illustrates a simple device for fastening pulleys and wheels upon shafts, perfectly concentrically with the latter. It possesses the merit of simplicity, and seems to be a valuable improvement, equally as well adapted for wooden pulleys as for those of metal. We also represent the improved wood and iron pulley, obtained by the use of the fastener and its attachments.

The appliance is shown in connection with a metal pulley in Fig. 1. A is the holder, made of truncated conical form, with a cylindrical bore and split open from end to end. This travels upon the shaft and extends through the hub in the opposite side of which it is met by a nut, B, which screws upon the thread cut on the smaller end, C, of the sleeve. The nut draws the holder as far into the hub as possible, besides contracting it against the shaft, thus securing it to the latter as well as to the hub, and thereby fastening both hub and shaft tightly together. The hub is bored slightly tapering to fit the holder. As the pulley in Fig. 1 is supposed to be a very heavy one, the larger extremity of holder, A, has a right hand screw thread, and is provided with a nut, D, fitting the same. The object of the latter is to crowd the pulley off the sleeve without necessitating the use of a hammer or sledge. In moderately heavy and light pulleys, this last mentioned thread and nut are dispensed with (see Fig. 2), a few blows on the hub with a wooden mallet being sufficient to start the wheel off the sleeve in case it should stick after loosening the nut, B.

Where the device is to be used in connection with a wooden pulley or with one having no hub, an artificial hub is made by means of a pair of annular plates, E and F, Figs. 2, 3, and 4. The shoulder, G, on plate, E, is the centering shoulder or bearing on which the web of the pulley, shown (with the outer portion broken away) at H, fits. This shoulder is of the same size or diameter in all sizes of flanges, or for large and small shafts. This will be evident from Fig. 3, which also shows that where greater power is necessary a corresponding bearing for the sleeve is given in the length of the hub.

The portion, I, Fig. 2, is a centering shoulder for the aperture or female flange, J, and projects far enough through the web of the wooden pulley to enter the latter. The parts being brought together, the nut is set up on the holder, as already described, by means of the wrench, K. This instrument, it will be seen, is adjustable through the whole range of ordinary line shafting. The final operation of setting up, with the wooden pulley in position, is represented in Fig. 4. The pulley consists of eight segmental pieces, in each of which the grain of the wood is in a radial line from center to circumference. In smaller pulleys the flanges have only two pins; but in larger ones, four of the latter, as shown in Fig. 3, are employed. That the irons may be absolutely interchangeable, the same number of holes is bored in all wooden parts, whether all are to be used or not. The pulley, thus made of wood and iron, is claimed to combine the maximum of strength with the minimum of weight. There are no keys or key seats to mar the hubs or shafting, no set screws; while the pulley is readily detached and applied to another shaft when desired.

Patented through the Scientific American Patent Agency, by Augustus Newell, of Chicago, Ill., Feb. 6, 1872. For further particulars address the manufacturers. A. B. Cook & Co., corner 13th and Peach streets, Erie, Pa. [See advertisement on another page.]

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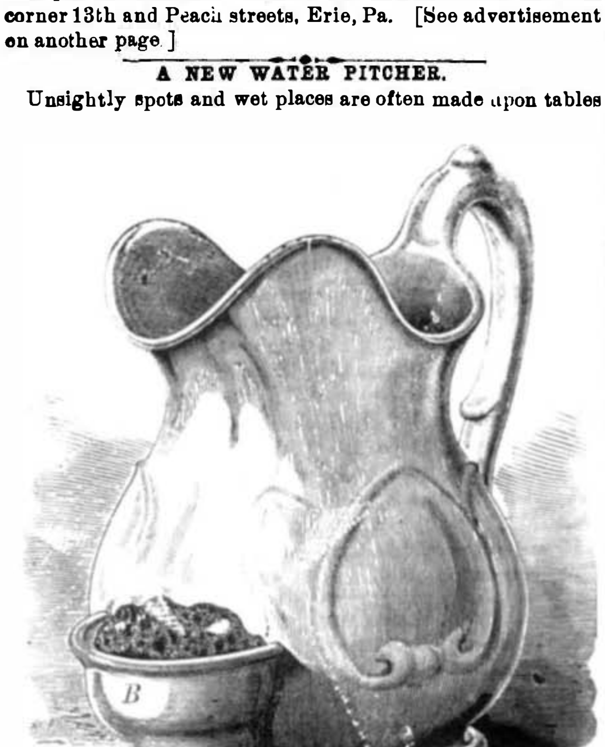
### A NEW WATER PITCHER.

Unsightly spots and wet places are often made upon tables



upon which pitchers of drinking water are placed, owing to the water, dripping from the spout, condensing on the cold exterior and running down, or becoming accidentally spilled in filling glasses.

The device herewith illustrated consists in forming around the base of the pitcher a gutter or channel, A, which communicates with a cup at B, in which a sponge is kept. The latter not only catches the water which may drip from the spout above, but also takes up such as may flow down the sides and accumulate in the gutter. When the sponge becomes soaked it is simply necessary to remove it, squeeze it dry, and replace it. From its position, it is always handy to absorb water which may be accidentally spilled, thus saving the employment of napkins for that purpose. If desired at any time, the sponge can be entirely removed and the pitcher used as an ordinary similar vessel. The gutter below gives it an enlarged base, and thus, in a measure, lessens the danger of upsetting. The invention might also be applied to receptacles for chemical solutions, the spilling of which would cause stains or corrosions.

Patented through the Scientific American Patent Agency. April 28, 1874. For further particulars address the inventor, Mr. J. B. Cox, Mount Laurel, Burlington county, N. J.

### Sea Weeds.

At this season, when many of our readers are looking for health and recreation at the seaside, a few hints may be found useful concerning the gathering and preservation of *algæ* or seaweeds. They rank among the most beautiful natural objects, while the work of collection and mounting are delightful occupations for the leisure hour.

The best time to collect is when the tide has just commenced to flow, after the lowest ebb, as the seaweeds are then floated in, in good condition. All specimens should be either red, green, purple, black, or olive; no others are worth preservation.

Mounting is done by immersing a piece of paper just below the surface of the water, and supporting it by the left hand; the alga is then placed on the paper and kept in its place by the left thumb, while the right hand is employed in spreading out the branches with a bone knitting needle or a camel's hair pencil. If the branches are too numerous, which will be readily ascertained by lifting the specimen out of the water for a moment, pruning should be freely resorted to, as much of its beauty will depend upon the distinctness of the branching. Pruning is best performed by cutting off erect and alternate branches, by means of a sharp-pointed pair of scissors, close to their junction with the main stem.

When the specimen is laid out, the paper should be raised gradually in a slightly sloping direction, care being taken to prevent the branches from running together. The delicate species are much improved in appearance by re-immersing their extremities before entirely withdrawing them from the water. The papers should then be laid flat upon coarse bibulous paper, only long enough to absorb superfluous moisture. If placed in an oblique direction, the branches are liable to run together.

They should be then removed and placed upon a sheet of thick white blotting paper, and a piece of washed and pressed calico placed over each specimen, and then another layer of thin blotting paper above the calico. Several of these layers are pressed in the ordinary way, light pressure only being used at first. The papers, but not the calico, may be removed in six hours, and afterwards changed every twenty-four hours until dry. If the calico be not washed, it frequently adheres to the algæ, and if the calico be wrinkled it produces corresponding marks on the paper.

The most convenient sizes of paper to use are those made by cutting a sheet of paper, of demy size, into 16, 12, or 4 equal pieces. Ordinary drawing paper answers the purpose very well. For the herbarium, each species should be mounted on a separate sheet of demy or cartridge size. Toned paper shows off the specimens well, a neutral tint answering best for the olive, pink for the red, and green for the green series.

### Equine Mechanics.

From recent calculations by H. Fritz, of Zurich, Switzerland, it appears that the useful work performed, per day of ten hours, at speeds of from 2·9 to 9·7 feet per second, for horses attached to agricultural implements, is as follows: Single horse to mower, 27,324,000 foot pounds; two horses to mower (each), 17,496,000 foot pounds; same to combined reaper and mower, 23,760,000 foot pounds; single horse to reaper without automatic binder, 30,132,000 foot pounds; two horses to similar implement, 20,979,000 foot pounds; and finally, two horses to reaper with automatic binder, 23,960,750 foot pounds. This, on the average, gives about 23,000,000 foot pounds to the horse, or some 638 foot pounds per second.

The fact of the animal's gait, it appears, must also be taken into consideration, as, at a walk, the body is supported always by at least two members, while, at a trot or gallop, there is an instant when the horse is suspended in the air, to accomplish which the entire weight must be overcome. M. Sanson, who has also lately carried on some investigations into the subject, says that, in order to gallop or trot, the animal develops an average energy of about 0·1 the weight of its body; while it walks, this is reduced to 0·05. On weighing over a thousand horses, the above author finds that the average weight of animals, varying from 4 8 to 5·4 feet in hight, is about 1,201·2 pounds. Hence the necessary effort for a horse to displace his own weight, at a walk, is 1201 2 × ·05 = 60·1 lbs.; at a trot, 1,201·2 × 0 1 = 120·1 lbs. At an average walking speed of 3 2 feet per second, the horse accomplishes, therefore, per day of ten hours, 60 1 × 115,200 = 6,923,520 foot pounds, or, at a trotting speed of 7 feet per second, per day of four hours, 120 1 × 100,800 = 22,106,080 foot pounds. Consequently, to produce a useful labor of 23,000,000 foot pounds, the horse must, when walking, develop a total power of 29,523,520 foot pounds, and, when trotting, of 35,106,680 foot pounds.

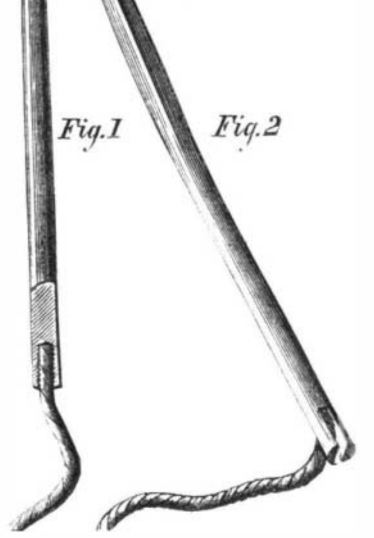
AMONG the objects which attracted the greatest attention at a recent soirée of the Civil Engineers, London, was the Whitworth steel cylinder cover for Her Majesty's ship Rover, having a diameter of 6 feet 4 inches, a depth of 4 feet 9¼ inches, and a thickness of 1¾ inches. Its weight is three tuns, and tensile strength 44 tuns to the square inch, the elongation of the metal extending to 27 per cent before breaking.

### A NOVEL NEEDLE.

The novelty in the needle represented in our illustration consists in a hole drilled longitudinally into the head of the implement for a distance of about one quarter of an inch. The interior of this orifice is screw-threaded, so that a wire, sinew, or thread may be screwed into the hole, and thus securely attached in the manner shown in Fig. 1. For heavy work, such as sewing canvas or leather, where a palm thimble is used, the usual ears may be formed on the end of the needle, as in Fig. 2, to prevent the thread from cutting.

For surgeons' use, this invention is claimed to be especially valuable, as it allows of the employment of a smaller needle and of a single thread, thus avoiding the pain often caused to the patient, through the enlarging of the orifice made by the needle, by the passage of the double strand. The finest silk thread, we are informed, may be used, with no other preparation than waxing the end.

Patented March 31, 1874. For further particulars address




Mrs. Ella N. Gaillard, care of H. S. Abbot, 7 and F streets, Washington, D. C.