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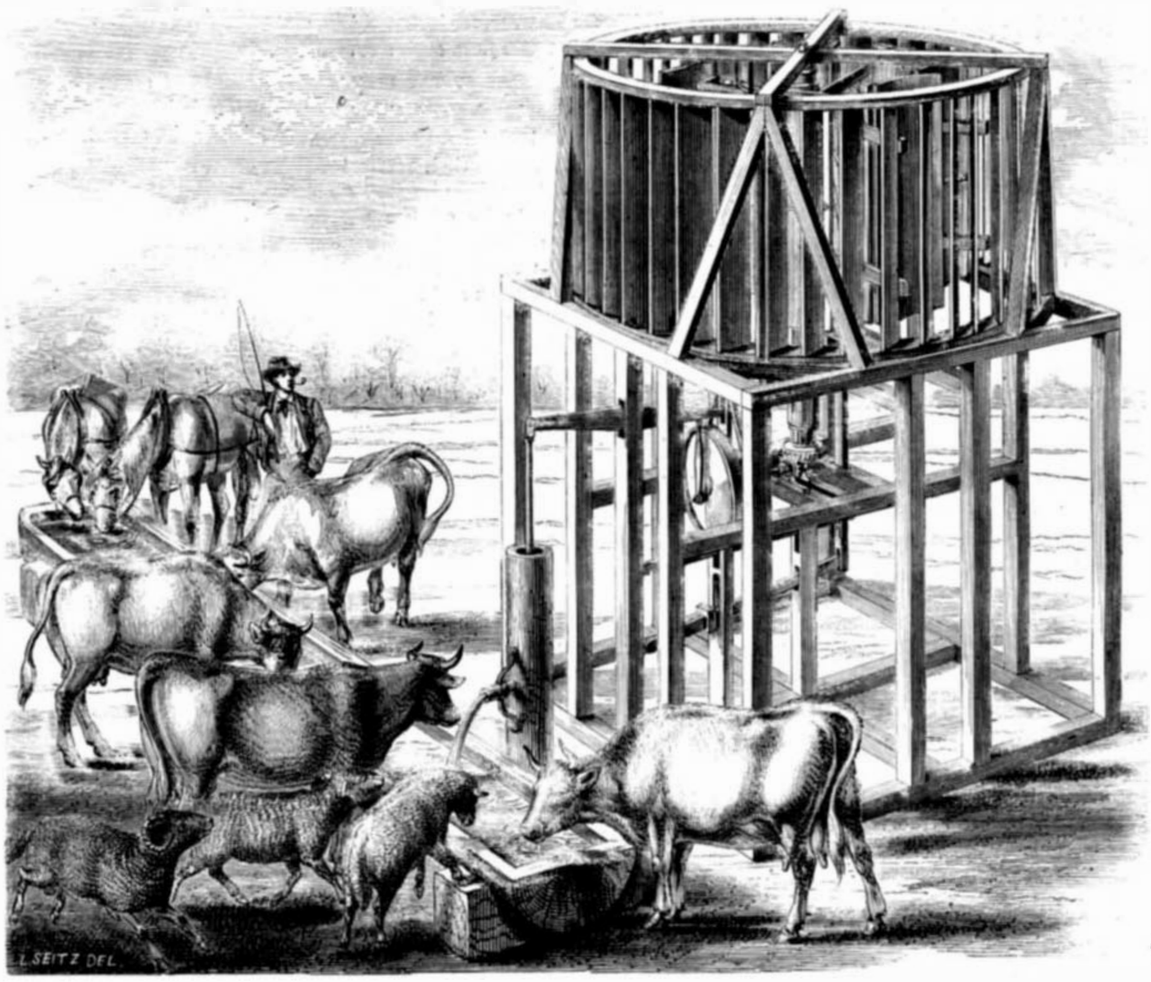
Improved Windmill.

Although the force of wind is an unreliable motor for some manufacturing purposes, yet it affords a cheap and ready means for driving machines the proper action of which does not depend upon absolute steadiness of motion. It has been and is still extensively employed in some sections of this country for pumping and other purposes. For service, at railway stations and on farms, it is a valuable aid to man. Much of this value, however, depends upon the plan and construction of the wind wheel or mill. The one represented herewith appears to be constructed on right principles and is calculated to work satisfactorily under all circumstances, whatever the force or direction of the wind. It is a horizontal wheel, mounted on a vertical shaft, and having eight fans or buckets hinged at their inner edge on uprights secured to radial arms. These fans are connected in pairs by pivoted iron rods so as to insure each one of each pair moving together when the angles of their inclination are changed. One fan of each pair has also a projecting brace, which connects by an iron rod with a bell crank lever on an upright bar near the central shaft. From this lever a rod passes down to an enveloping and sliding collar on the upright shaft, There are four of these bell cranks, one to each pair of fans, and by the raising or lowering of the sliding collar the fans are set at any required angle to suit the force of the wind. This collar is raised or lowered by a lever having a sliding weight by which its action on the collar can be regulated. This lever will also operate a lever brake in case of a gale—being self-operating under great pressure—which bears upon the rim of the fly-wheel. At the foot of the vertical shaft is a beveled gear engaging with another on a horizontal shaft, which carries a balance wheel having a crank to operate a walking beam for pumping purposes. The wind wheel is inclosed in a circular frame having upright slats set at an angle, to divert or guide the current of air upon the fans, giving a rotary motion always in one direction.



STRUNK'S WINDMILL.

The labor of raising water from wells for cattle is an onerous one. Where all the water used must be obtained from wells sometimes of great depth—one hundred and more feet, as on the prairies—the task is no small one. It has been estimated that cattle ordinarily consume fourteen gallons per head daily. Twenty head of cattle—not a large number on a farm—will therefore consume about three thousand barrels of water annually. In such cases an apparatus like that illustrated in the engraving would be invaluable, and also for railroads where the water for the locomotives is drawn from wells.

The inventor says that this machine will work equally well in a gale as in a moderate wind.

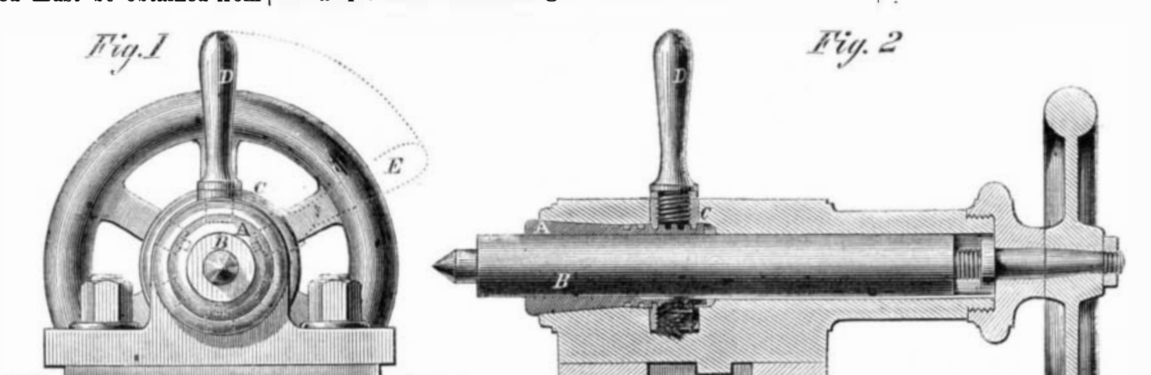
At the late State Fair of Wisconsin one of these machines pumped nearly all the water used for the stock on the grounds, from a depth of more than one hundred feet. The lower part of the structure can be boarded in and roofed, making a convenient granary, store-house, or carriage shed; or the wheel can be erected upon any building.

The device was patented through the Scientific American Patent Agency Nov. 13, 1866. For further particulars address F. & D. Strunk, Janesville, Wis.

Improved Lathe Arbor Tightener.

The most common methods of securing the dead arbor of a lathe at any point is either by a set screw bearing on its upper surface, or a ring with threaded stem set up with a lever nut. There are objections to both, especially when the tail stock is worn and the spindle becomes loose. The device herewith illustrated shows a sleeve, A, enveloping the arbor, B, and having the front end slightly cone shaped. The cylindrical part has a coarse thread cut on it and the whole sleeve fits a corresponding recess in the stock. It should be made of steel. It is slotted on the inside its whole length to receive a feather on the arbor as usual. The cone-shaped portion is cut through, to give it sufficient spring to close around the arbor when drawn back into the stock. C is a circular nut in a transverse recess which engages with the thread on the sleeve and has on its periphery tapped holes for receiving the handle, D.

By depressing this handle, as at E, Fig. 1, the sleeve is drawn back into the stock and holds the spindle with a perfect gripe, as it has a bearing around its whole circumference.



FAUGHT'S LATHE ARBOR TIGHTENER.

If at any time the spindle, sleeve, or the recess in the stock is worn by use, the handle, D, may be unscrewed and placed in another tapped hole.

The advantages of this device, so far at least as holding the arbor perfectly stiff is concerned, may be understood by any machinist. We regard it as a valuable device, as it cannot fail to keep the spindle always in line, and prevent the annoyances of finding the dead arbor out of line when set up. It is the invention of Luther R. Faught, who secured a patent through the Scientific American Patent Agency, Dec. 14, 1866, and who will reply to all inquiries in relation thereto. Address him at Sixteenth and Callowhill streets, Philadelphia, Pa.

The "Miantonomoh."

The visit of the United States turret-ship *Miantonomoh* to Gibraltar called forth the following remarks in the *Chronicle* of the 15th Dec.:—"The American iron-clad turret-ship *Miantonomoh*, which arrived in this port yesterday, is the first vessel of her class that has visited Gibraltar, and is naturally the object of much curiosity. The feeling that would be uppermost in most minds on first beholding this *monstrum, informe, ingens*, of the waters would be one of surprise that she should cross the Atlantic. Two huge turrets, the funnel and the ship's boats suspended on their davits high in air, are nearly all that is seen above water. The ship herself is a great platform rising little more above the surface of the sea than her own boats. Molière's fencing master says that the whole art of fence is comprised in two things—to hit your adversary and not to get hit yourself: the *Miantonomoh* seems constructed to carry out this doctrine in naval warfare. Her hitting apparatus, the two impenetrable towers with their Dahlgren 480-pounders, of which she carries two in each turret, is the only part she presents to an enemy, while the only part that he could hit to do her an injury is wisely screened below the waves, except the narrow rim that, like the tower, is invulnerable. We have not heard what thickness of iron is beneath the platform deck that supports the fighting part of the ship; but, unless the deck is made as invulnerable to heavy shot as are the sides and turrets, a vertical fire would still find a weak point in these formidable ships. If ever Gibraltar should be attacked again by floating batteries, they will be of harder and less inflammable material than those employed in the celebrated siege. General Elliott's red-hot shot, instead of setting fire to the floating batteries of the present day, would fly off from their sides in a thousand glowing fragments, like the sparks from heated iron beneath the blacksmith's hammer. If, then, heated shot are useless, and cold shot cannot penetrate the sides of modern iron-clads, it would be a satisfaction, in case of attack, if our artillery could penetrate them in another way, by plunging shot upon their deck from the level of the signal house or the rock gun. To send shot through an attacking ship from top to bottom would be much more damaging to her than sending it through from side to side. After all, however, we cannot feel quite sure that our ability to launch a vertical fire against an attacking squadron will ever prove of practical advantage, There is just now the keenest competition between the science of attack and that of defence. Who knows whether an enemy attacking Gibraltar from the sea on some future day may not have provided his vessels with impenetrable iron roofs, beneath which he may hammer away at our walls quite regardless of the shot that is pattering overhead like hail upon the slates."

150 FEET is understood to be about the maximum depth of the Straits of Dover. At this depth a leak in the proposed tunnel of only one square foot in area would require a steam engine of 1,600 horse-power to overcome it, while the pressure on every square foot of the bed, and, of course, if the bed were soft and capable of transmitting the pressure, on each square foot of tunnel, would exeeed four tuns.

AT the Oaks colliery, England, where so many perished, the workings reach to a distance of two miles, and the air-ways are sixty miles in length.