

Scientific American

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Woodworth Planing Machine Extension.

We understand that, at the recent Planing Machine Trial, in Cooperstown, (noticed by us in No. 49) one of the counsel, not particularly noted for his courtesy, after having poured the vials of his wrath upon the unfortunate patentees who have presumed to run their machines, knowing of the existence of the Woodworth Patent, announced that the assignees intended to ask an extension of the patent by an especial act of Congress, based upon the principle of planing by mechanical pressure. The assignees of this patent must have been deeply chagrined at the want of discretion thus manifested, to say nothing of the want of courtesy towards opponents, many of whom, doubtless, are honorable men, and far above the suspicion of piracy. By making such a statement at this early period, the public mind will prepare itself to resist to the last extremity so glaring an act of injustice to their interests. Flushed with the success which has attended their past efforts in obtaining verdicts,—and a re-issue under circumstances which many suppose reflects anything but credit upon the actors in the game, the assignees presume to urge a powerfully vital question upon our Senators and Representatives in Congress; and, as we learn, are now preparing themselves with every means to carry the bill through the next Session of Congress. That it can never be done, we hesitate not to state thus early; and so sure as the sun rises to-morrow, they will only meet disappointment in any such effort to saddle a hideous monopoly upon the American people. We have few legislators who would dare thus to trifle with an intelligent constituency,—trifling it is, because it is in direct contravention of the republican spirit of our patent laws. Such an arbitrary position might be assumed in half-civilized countries, and the writer of this guillotined for expressing his honest conviction, but it will not do here. The American masses are much too intelligent to permit any such encroachment. We are in favor of allowing everything to the Woodworth assignees which justly belongs to them, and that their patent should now exist until the 27th day of December, 1856. We are then in favor of its becoming public property, and shall use our best exertions to accomplish this just end.

Let us briefly examine some points at issue in this question. In the first place, to claim mechanical pressure applied to planing, would interdict the use of any other than such machines as the assignees of Woodworth were willing to allow, as no planing except by hand can be done without mechanical pressure. Mechanics and manufacturers do you know that this claim, once secured, would prevent you the free use of the old Daniel's machine, which has become public property, and is now being generally employed in your shops? Most certainly you would be called upon to pay tribute to an inquisitorial monopoly, with whom the "quality of mercy is not strained." Again, in some instances the owners of this patent have attempted to stop parties from running machines applied to different purposes, which in no way could affect their interests—done for fees, of course. We have no guarantee that this system will not be pursued to an extent not before attempted.

This statement exhibits the tendency of the parties, and it must appeal strongly to the prejudices of our mechanics, whose interests become seriously affected thereby. We call upon the mechanics, manufacturers, and editors, throughout the country, to watch every movement made to further such designs, and be prepared to counteract any influence which may be brought to bear in carrying them forward. We do not mean to be misunderstood in reference to this matter; and, as occasion requires, we shall aim some well-directed efforts at this scheme, and explain the reasons upon which the appeal will doubtless be made to secure the new patent.

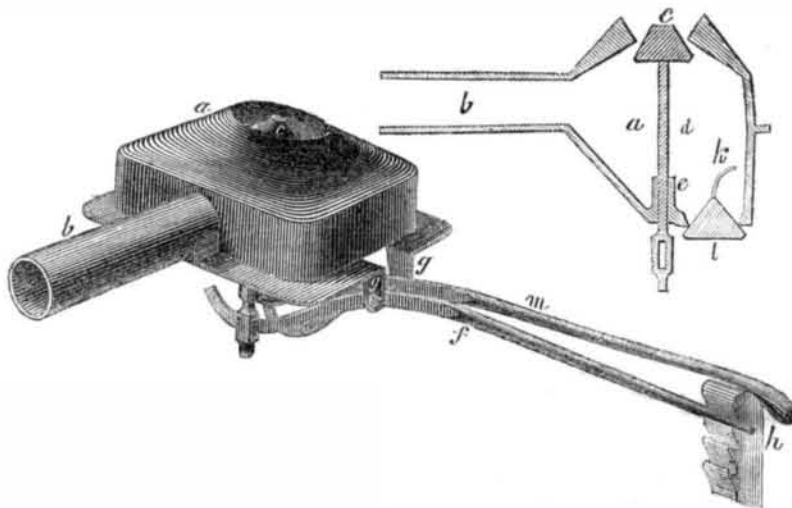
Prudential Policy.

"The Farmer & Mechanic, American Cabinet, Plow, Loom, Anvil," etc. etc.,—a journal of feeble pretensions, in publishing a letter upon the "static pressure engine," says—"We (meaning four or five Editors), have carefully avoided a single remark on the subject for the present, for reasons not necessary now to state," and winds up the sentence by referring their readers to the "clear and lucid arguments" found in the Scientific American. This is the first time our amalgamating cotemporary has ever given full credit to our abilities. We have every reason to bow in deference to that calm and inadequate philosophy which indites the wise policy of carefully avoiding committal remarks upon such a subject. Fallstaff's opinion about fighting is justly appreciated by our neighbor.

To Subscribers.

The next number will be the last of this Volume. We hope to commence our new volume with a great addition of subscribers. No person, we believe, can invest two dollars in a more suitable manner, both as it respects profit and pleasure, than by subscribing for the Scientific American. Useful and standard information, something suitable for every man and every family, may be found every week in our columns. We have no travelling agents, and have been greatly indebted to our readers for asking their neighbors to subscribe. If every subscriber could get one neighbor to subscribe, we would be enabled to advance the Scientific American as far ahead of what it now is, as it is ahead of its cotemporaries, and as it now is, in appearance and matter, to what it was four years ago.

PORTER'S IMPROVED FORGE TUYERE.



The accompanying engravings represent an improvement made in Forge Tuyere's, by Mr. Robt. D. Porter, which has received a high character for real merit. The shaded engraving is a perspective view, taken from above, as it is fastened in the masonry of the hearth, forming the bottom of the fire. The tuyere is composed of a cast-iron air box of the form better shown in the sectional view, which is taken vertically; b is a tube to the air box, and is attached to the bellows; c is a conical valve for rendering the aperture on the top of the air-box more or less open; d is the stem of this valve, f is the lever to move it. This lever works on a fulcrum pin between the lugs, g g; the longer end of this lever rests in the notched standard, h, by which means the conical valve can be opened as desired and kept so positioned. l is a valve for removing clinkers from the air box; it is worked by the lever, m. By opening the ash-box, k, occasionally, the scoria and ashes will drop from the air-box. The form of the aperture of this tuyere

together with that of the valve, direct the current of air in the most suitable manner. For some kinds of work a contracted current is required, for others an expanded current, such as for a broad fire; this tuyere presents every advantage in respect to such currents. The motion of the air through the aperture prevents the settling of ashes and cinders, and should any scale obstruct the blast, it is easily removed by working the valve, c. Mr. Porter has presented to us numerous testimonials in favor of his tuyere from respectable sources, and those best qualified to judge of its merits, viz., practical men who have used it. It saves a great deal of fuel and labor, as is attested by the said testimonials. The tuyere is durable, and has been used by some for three years, but it never has been, until now, brought prominently into public notice.

The Tuyere is patented, and Mr. Porter is now in this city, and we recommend our friends to give his improvement a candid examination.

Short Conversations on Mechanics---No. 5.

A. Last week you wished to know something about forces being measured according to the square of the velocity.

Q. "Yes."

A. If the resistance to a moving body is always the same at every point, the proper measure of force is  $(W \times v)$  the weight multiplied into the velocity, but the whole work which a moving body will perform to bring it to a state of rest, is measured by  $(W \times v^2)$  or according to the square of the velocity. This is the vis viva or living force. Bourne says, "of two balls of equal weight, but one moving twice as fast as the other, the faster ball has four times the mechanical force accumulated in it that the slower ball has. If the speed of a fly-wheel is doubled, it has four times the momentum it possessed before—momentum being measurable by a reference to the height through which a body must have fallen to acquire the velocity given." To explain the subject we will take a train of cars upon a level track, and let us suppose the resistance the same, at whatever velocity; then, if we imagine the train to be running 20 miles per hour, and it is desired to bring it to a state of rest at the station-house, the engineers shut off his steam, as he has learned by experience, at one mile distant, and he knows the train will be brought to rest in five minutes, at the end of

the mile: now, if the same train is made to move with a velocity of 40 miles per hour, he will have to shut off his steam at four miles distant from the station, and the time occupied in bringing the train to rest, will be ten minutes. The force of a moving body—that is, its whole accumulated force, or the total amount it will perform, no matter in what time, in being brought to a state of rest—varies as the square of its velocity multiplied by its weight. This question agitated the philosophers of Europe during the days of Leibnitz and Newton, and the controversy, to the no small credit of mathematics, was rather dropped than ended. Leibnitz asserted the principle that a body projected upwards against gravity, was always as the square of the velocity; in other words, if one velocity would shoot a cannon ball upwards one mile, two velocities would project it upwards four miles; and three velocities, nine miles. The old opinion was, that force was always proportional to the velocity. The world of science was divided upon the subject: Germany and Italy adopted the opinion of Leibnitz, and Britain and a number of the French mathematicians opposed it, and stood fast by the old system. It is singular, indeed, that both parties adopted different measures of force. And when any mechanical problem was proposed concerning the action of bodies,

whether at rest or in motion, they resolved it in the same manner, and came to the same conclusions, in a certain sense. Their ideas were, therefore, not inconsistent with each other, and both were therefore true. In measuring the force of one moving body by its effect upon another, there is no doubt but the forces of such bodies are as the quantities of matter multiplied into the velocities; because the forces of bodies of equal products, if opposed, destroy each other. In this way of measuring them, it is evident that the forces vary, not as the squares, but simply as the velocities. There are two ways of computing the amount of retarding forces; they both lead to different results, but both are just, and the one ought not to exclude the other. Thus, if a cannon ball be projected upwards opposite to the centre of gravity; we may inquire how long the motion will continue, or how far it will carry the ball; in other words, the retardation of gravity during a certain time, or while the body is moving over a certain space. If we use the first inquiry as a measure of force, that force will be proportional to the velocity; but if we employ the second as a measure, viz., the length of the line, or distance which the moving body describes, then it will be found that this measure is as the square of the velocity; because to that quantity the length of the line is known to be proportional. Thus, then, are two values of forces directed in this manner, the one proportional to the velocity, the other to the square of it; the one measure is time, the other, distance. Both methods of measurement are perfectly correct and consistent when understood.

Q. "I must say that this is a somewhat abstruse subject to me, but has it anything to do with measuring the power of working machinery, such as the horse-power of an engine?"

A. It has not, and when you hear people estimating the force of a machine, and setting it up as increasing in force according to the square of the velocity, then set them down as not being acquainted with the dynamical unit introduced by James Watt, long after the above controversy ceased. In estimating the value of his engines, he assumed as a dynamical unit of a horse-power, 33,000 lbs. lifted one foot high in one minute; this definition is founded on the assumption that the resistance remains the same at every new point of space, and pressure must be exerted afresh at every point through which resistance has to be overcome. The unit of measure of the steam engine is  $(W \times v)$ ; the unit of measure for falling bodies is  $(W \times v^2)$ .

Q. "This is very plain to me now, viz., that the power of machines (that which I wish to know about) is measured simply by the pressure multiplied into the velocity."

A. Exactly; but remember that you cannot propel a steamship nor a locomotive with a double speed by using simply the double amount of fuel. In experiments made with steamships belonging to the British Mail Line running between Ireland and England, so late as 1849-50, it was found that, all things being equal, the speed was doubled by using about four times the amount of fuel; this was according to the square of the velocity, and accords with the known laws of resistance, which are parallel to gravity.

Q. "In moving machinery of any kind, is there any independent force generated, which is plus of the prime mover? There are centripetal and centrifugal forces, and it has been asserted that the latter is plus the prime mover, and increases with the square of the velocity. Is this so?"

A. It is not, and I should like to hear some of your reasons for making the assertion.

Q. "I forget them all at present, but will try and collect them by next week, and as this is the only information that I wished to have fully elucidated, I hope you will explain it all and I will not give you any more trouble—at least for some time."

A. I will do so.

By the very latest news from Europe we learn that the Great Exhibition is to close on the 15th of Oct. next. The prizes are not to be awarded for some days afterwards.