to and fro, and above all the captain and lieutenants shouting so as to be heard above the shrill escaping steam "hard a-port, hard, hard!" "Brace around the foreyard!" "Let fly the halyards and sheer fore-and-aft!" I stepped abaft the foremast to be out of the way of its fall and waited for the shock. But

"There is a sweet little cherub who sits up aloft
And looks after the life of poor Jack."

We approached as all agree within ten feet of the rock, and then began to recede. Just realize that there was only ten feet between us and eternity. It is the opinion of sea-faring men on board, that the ship if she had struck, would have sunk in five minutes, for it is a sharp ledge of rocks, six or seven miles from any shore, and deep water all around. The boats could not have been got ready, and if they could, they never could have lived in the heavy surf. No—if she had gone ten feet farther we should have been almost instantly precipitated into a raging sea, where six or seven miles from land, in a dense fog, few of us would have escaped. We should have all perished as miserably as did those in the *Hungarian*. Three seconds more would have tolled the death-knell of most, if not all of us, for we were so enveloped in fog, and far from land, and also no boat at the lighthouse, that if we had seized fragments of the wreck they would have been torn from our grasp by the sea boiling as in a cauldron over the sunken reefs, hours before our fate could have been known. I knew there was no time to run below for life-preservers —which are hung up by each berth—and so contented myself with just stringing up my nerves for a buffet with the waves. For three minutes, I can assure you, man showed what he is when expecting the "King of Terrors." Two or three ladies took it heroically and seemed to draw in strength from the scene around them. It was a terrible moment for the captain—Captain Stone of the Royal Navy—for as we swung around, the sails taken aback and heeling us over, everybody expected to feel the grinding crash beneath their feet. I felt for him, for all his great rashness, and gladly say that to his decision inour hour of need we owe our lives. The rock is called Fasnet Rock, and upon it is the Cape Clear lighthouse. A subscription is now being taken up among the passengers for the seaman who first shouted "breakers ahead." I shall never forget to my dying day the face of the captain when he heard that wild shout. I have seen distress and pain in all their forms, but never a face like that, so full of horror perfect agony, and crushing responsibility. The cry "breakers ahead," the stopping of the engines, the escape of the steam, and the shifting of the helm, all occured in one second. It seemed at the instant as if it was utterly impossible to stop the ship's way in time to save us; but God rules. He put forth His hand, and the vessel, trembling as if with mortal fear, yielded to her powerful engines, receded from the rock, and we were saved.

ROTARY DYNAMOMETER.

[Translated from Armengaud's Genie Industriel.]

The construction of this dynamometer is based on the property of gear-wheels with oblique or helical teeth, to exert a lateral pressure which is in direct proportion to the power transmitted by the wheels and to the inclination of their teeth.

This dynamometer is represented in the accompanying engraving, where Fig. 1 represents a side elevation and Fig. 2 is a plan or top view, and it consists of two parallel shafts, which have their bearings in four boxes that are firmly secured to a suitable bed or frame.

Each of these shafts bears a cog-wheel with oblique teeth and a pulley for receiving or transmitting the action of a belt. The pulleys and the wheels are firmly keyed to the shafts, and they are precisely of equal diameters, so that they rotate with equal velocities.

The shaft of the wheel, A, rotates perfectly free in its journals, and it is prevented from moving in a longitudinal direction by two projections, which confine the ends of the shaft.

The wheel, B, on the other hand is mounted on a shaft with long cylindrical journals, and the wheel, A, is considerably wider than the wheel, B, so that the latter can assume a motion in a longitudinal direction of the shaft without being thrown out of gear with the wheel, A.

The end of the shaft, B, is provided with a steel point, which presses against the plate, F, that is made of one or more leaves of spring steel, according to the power which it has to sustain. The ends of the plate, F, are connected to the frame, E, by means of links, G, which form the support for said plates.

The small rod, K, one end of which is connected with the plate, F, at about the middle of its length, is attached with its other end to the index, I, and causes the same to sweep over the sector, H, which is provided with a scale, and which is secured to the frame, E, in such a manner that it can easily be observed while the device is in motion.

The rod, K, is provided with a right and left hand screw, so that its length can be adjusted, and that the index can be set to the starting point on the scale.

In order to use this device for the purpose of measuring the power required by some working machine, it is fastened down to the floor in such a position that the

Fig. 1

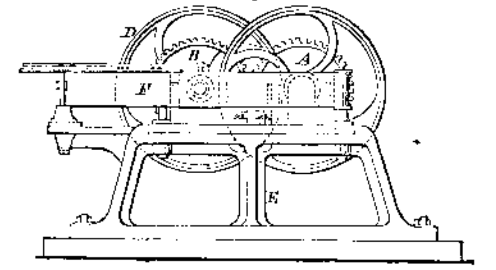
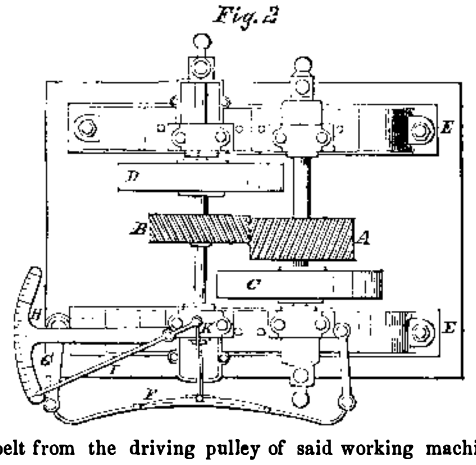


Fig. 2



belt from the driving pulley of said working machine can be brought on the pulley, D, of the dynamometer. Another belt from the pulley, C, transmits the power to the spindle of the working machine under observation.

As soon as the motion of the spindle of the working machine meets with a resistance, the index, I, will be seen to move on the sector, H, and if the resistance to be overcome by the working machine is pretty uniform, the index will maintain its position with slight oscillations.

The point indicated by the index on the scale, H, is noted, and the number of revolutions of the pulley, C, per minute are counted, and by multiplying the two figures thus obtained, the number of foot-pounds per minute required to drive the working machine in question is found.

The scale on the sector, H, is obtained by actual experiment. A brake is applied to the pulley, C, while motion is imparted to the pulley, P, and the power exerted by an arm of known length which extends from the brake, and which connects with a spring balance, is noted. The force consumed is equal to the sustained weight multiplied into the space traveled over by the surface to which the brake is applied, and it will be easily understood how the device above described furnishes the elements necessary to determine the power required to drive a certain working machine.

The weight to be applied to the spring plate, F, for the purpose of indicating one foot-pound per second, can be determined by calculation.

If the angle, *a*, indicates the inclination of the cogs towards the axle of the wheel, the power, Q, applied to the circumference is decomposed into two components—one, R, perpendicular to the direction of the axle and one, P, parallel to the axle of the wheel, and the component, P, is equal to Qx sin. *a*.

The spring plate, F, the reaction of which balances the component, P, is bent in the form of a parabola, so as to increase the sensibility of the device and to obtain a scale with equal graduations for equal powers. Consequently, if

P, the weight applied to the circumference of the pulley, B = 1 lb.

a, the angle of the cogs with the direction of the axle = 22° 30′.

R, the radius of the pulley, C.

R′, the radius of the pitch circle of the cog-wheels, A B.

P′, the effect exerted on the spring plate by the end of the axle of the wheel, B; and it is found

$$P' = P \times \sin a \times \frac{R}{R'}$$

$$= 1 \times \frac{0.38268 \times 0{\cdot}245}{0{\cdot}153} = 0{\cdot}613 \text{ lbs.}$$

The number 0·613 expresses the effect exerted on the spring plate by applying one pound to the circumference of the pulley, B, and it is only necessary, therefore, to apply multiples of this number to the spring plate in order to find the effect of two, three or more pounds applied to the circumference of the pulley.

In order to obtain, in foot-pounds per second, the effect measured by this device, it is necessary to count the number of revolutions of the pulley per minute, multiply this number with the number given by the index and divide by 60.

For instance, if the index shows 15 lbs. and the number of revolutions is 70, the result will be

$$\frac{70 \times 15}{60} = 17{\cdot}50 \text{ foot-pounds per second.}$$

In order to be able to find the result without a calculation, a table has been prepared, giving the effect in foot-pounds per seconds or the effect of from 5 to 75 lbs., as indicated by the index, and for velocities of from 10 to 100 revolutions per minute:—

Revolutions per minute.

Indications of the scale.	10	20	30	40	50	60	70	80	90	100
	Foot-pounds per second.									
5........	0.83	1.67	2.50	3.33	4.17	5.00	5.83	6.67	7.50	8.33
10........	1.67	3.33	5.00	6.67	8.33	10.00	11.67	13.33	15.00	16.67
15........	2.50	5,00	7.50	10.00	12.50	15.00	17.50	20.00	22.50	25.00
20........	3.33	6.67	10.00	13.33	16.67	20.00	23.33	26.67	30.00	33.33
25........	4.17	8.33	12.50	16.67	20.83	25.00	29.16	33.33	37.50	41.67
30........	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00	45.00	50.00
35........	5.83	11.67	17.50	23.33	29.17	35.00	40.83	46.67	52.50	58.33
40........	6.67	13.33	20.00	26.67	33.33	40.00	46.67	53 33	60.00	66.67
45........	7.50	15.00	22.50	30.00	37.50	45.00	52.50	60.00	67.50	75.00
50........	8.33	16.67	25.00	33.33	41.67	50.00	58.33	66.67	75.00	83.33
55........	9.17	18.33	27.50	36.67	45.83	55.00	61.16	73.33	82.50	91.67
60........	10.00	20.00	30.00	40.00	50.00	60.00	70.00	80.00	90.00	100.00
65........	10.83	21.67	32.50	43.33	54.17	65.00	75.83	86.67	97.50	108.33
70........	11.67	23.33	35.00	46.67	58.33	70.00	81.67	93.33	105.00	116.67
75........	12.50	25.00	37.50	50.00	62.50	75.00	87.50	100.00	112.50	125-00

The advantages of this device are, that it is extremely simple in its construction; that it indicates the effect on a scale which is not affected by the motion of the machine, and which allows of observing the index with the greatest convenience; and that it indicates pretty large effects without requiring a very strong spring, and that the resistance of the spring can be regulated by using gear-wheels with cogs of more or less inclination.

IMPROVEMENTS IN THE COTTON PLANT.

MESSRS. EDITORS:—I have, for over two years, endeavored to graft or bud the *Asclepias Syrica* (or silk weed) on to the *Gossypium* (or cotton plant), but have failed in my efforts, which I attribute to a want of experience.

Should any of your numerous readers be able to inform me of the best time and manner to operate on those plants, I should feel obliged, as I am now located in a cotton growing country, and am anxious to solve the problem as to whether it is possible to grow cotton in other than Southern States. My theory is, that it can be done by raising a hybrid which will combine the qualities of the silky down of the silk weed—which grows in every State—with that of the cotton plant. If it is possible to do this, no estimate could be formed of the benefits which would accrue to the United States, commercially and politically.

The *Asclepias Syrica* differs from other species of *Asclepias*, in having large purple flowers, sharp thorns, and pods which contain a large quantity of silky-like thread, and has often been used in filling beds and pillows. In cultivating and drying these, I have succeeded in obtaining a fine, strong silk, weighing 3 oz. to the stalk. I intend, next Spring, to plant Western silk-weed *seed* with cotton *seed*, and anticipate getting a hybrid seed from them. What say your horticultural readers? Shall I succeed or not? ALBANY PECKHAM, D.D.S.

Whitesville, Ga., Sept. 1, 1860.