Scientific American.

A WEEKLY JOURNAL OF PRACTICAL INFORMATION IN ART, SCIENCE, MECHANICS, CHEMISTRY AND MANUFACTURES.

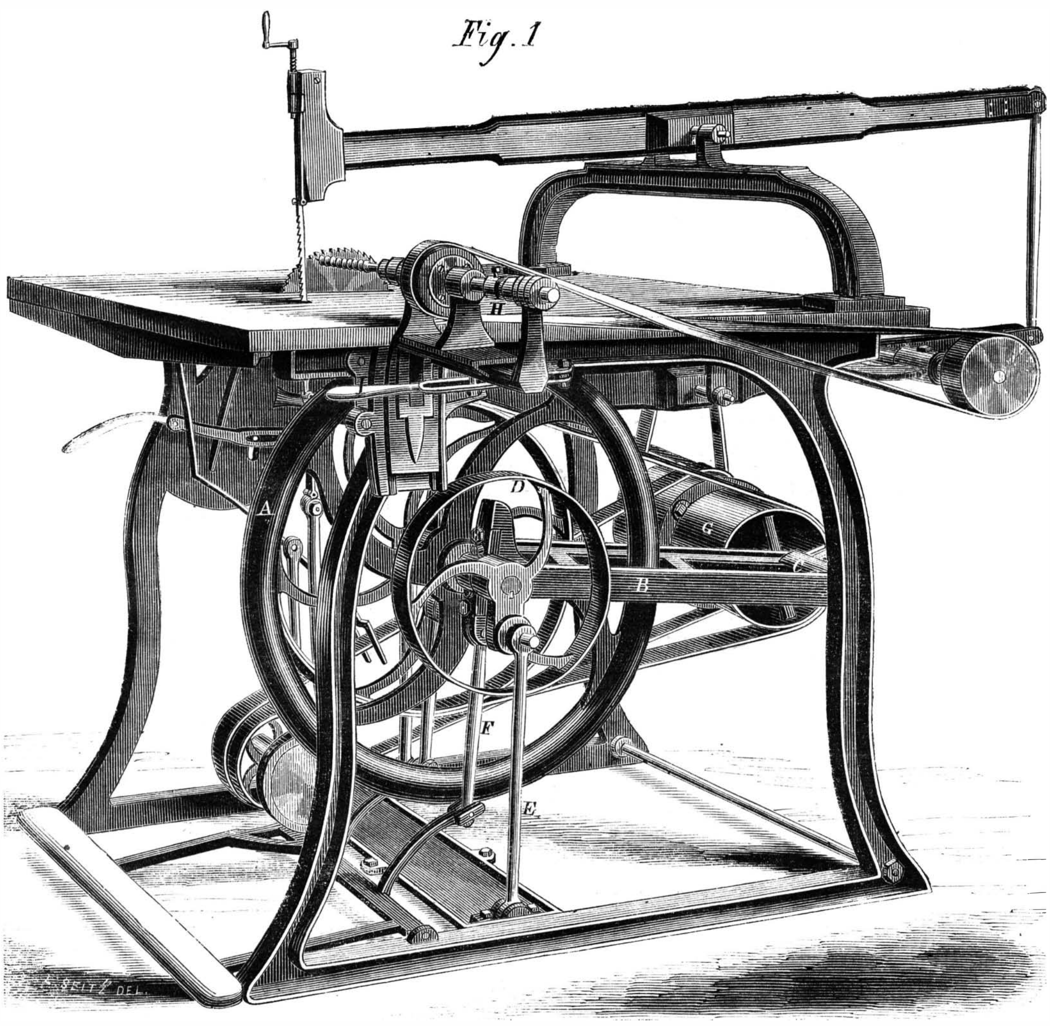
Vol. XI.---No. 2. (NEW SERIES.) NEW YORK, JULY 9, 1864. SINGLE COPIES SIX CENTS. $3 PER ANNUM—IN ADVANCE.

Improved Treadle Motion.

It is well known that the ordinary treadle is capable of transmitting the power imparted by the foot in one direction only, and that is on the downward thrust. The return of the treadle and continuance of the movement being effected by the momentum of the fly-wheel.

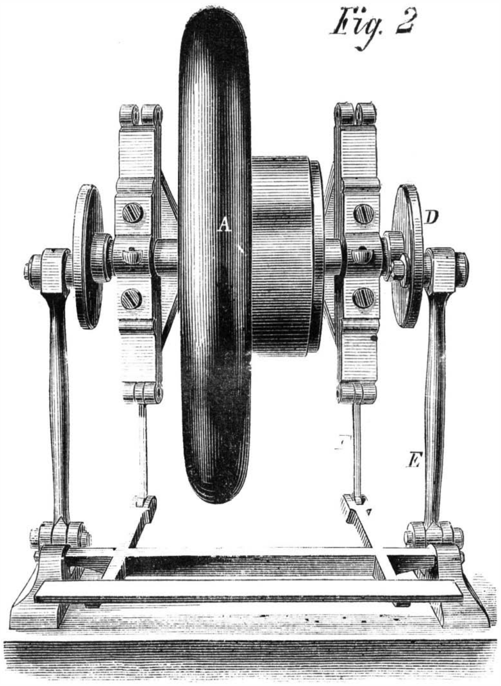
In these engravings a combination is represented which is an effectual remedy for this objection, and renders the treadle a much better agent for imparting the power applied to it. We shall refer to Fig. 2 first, since that shows the motion isolated or by itself.

Fig. 1



KAEFER'S TREADLE MOTION.

Fig. 2



In the perspective view (Fig. 1) so many pulley arms, and other parts not belonging to the motion, intervene, that the arrangement looks complicated, whereas it is extremely simple. The fly-wheel, A, is merely set in a frame, B, which vibrates on a shaft, C (Fig. 1). On each end of the fly-wheel shaft there is a face-plate, D, having rods, E, attached. The lower ends of these rods are secured to the floor. The treadle arms, F, are attached to the swinging frame, A, and it is easy to see that as the frame is lifted by pushing down with the foot, the stationary rods, E, on the face-plates, turn the fly-wheel and also the pulleys connected to it. From these pulleys belts run to a counter-shaft and pulleys, G (Fig. 1), at the back part of the machine. This is the whole arrangement, and it is simple and effective.

The point gained is this:—When the greatest force is exerted by the workman (that is, in pushing down with his foot), the frame is raised and the fly-wheel revolved. When the face-plate cranks, D, pass the center, the frame, A, with its weight and that of the fly-wheel, falls and carries the treadle up. In plain words, this treadle motion has the advantage of the weight of the fly-wheel and part of the frame, A, exerted at a time when the common treadle has no force but that of the momentum of the fly-wheel. In the engravings it is shown applied to circular and scroll saws, and also a boring head. This last is so arranged with a collar, H, on the sliding spindle that the auger can be set to bore a hole of any depth by simply moving the lever, I, in and out. In the compass of the machine here shown (some six feet square) there are many conveniences for doing work ordinarily done by hand at a great expense of time and labor. Mechanics in country towns, or in places remote from power, will find this machine a great improvement on the old treadle, and those interested should examine into its merits. It was patented on the 6th of March, 1861, through the Scientific American Patent Agency, by M. Kaefer, of New York city. For further information address him at room No. 3, over the Harlem railroad freight depot, corner of Center and White streets.

The New Tax Bill and its Provisions.

Our readers are doubtless aware that the taxation on manufactured articles and materials has been increased, but has not yet become a law. We subjoin that portion which relates to metals, etc.:—

"The bill increases all the rates on iron equal, as near as may be, to the internal duties, and so as to steel, which is a fraction over. On some manufactures of iron, including the smaller sizes, the duties have been slightly increased; on files, saws, and a few other articles, a compound duty partly specific and partly ad valorem; on screws, commonly called wood screws, 2 inches or over in length, 6½ cents per pound; less than 2 inches in length, 9½ cents per pound; on screws of any other material than iron, and all other screws of iron except wood screws, 35 per cent ad valorem.

"On iron in pigs $9 per tun; on vessels of cast-iron not otherwise provided for, and on imitations of said iron, $1; and potter's iron, stoves and stove plates of cast-iron, 11½ cents per pound; on cast-iron steam, gas, and water pipes, 11½ cents per pound; on cast-iron butts and hinges, 2½ cents per pound; on all castings of iron not otherwise provided for, 35 per cent ad valorem; on old scrap iron $9 per tun.

"On steel in any form, not otherwise provided for, 30 per cent ad valorem; on cross-cut saws, 10 cents per lineal foot; on mill, pit, and drag saws, not over nine inches, 15½ cents per lineal foot; on all manufactures of steel, or of which steel shall be a component part, not otherwise provided for, 35 per cent ad valorem—provided that all articles partially manufactured of steel or of which steel shall be a component part, not otherwise provided for, shall pay the same rate of duty as if wholly manufactured.

"On lead in pigs and bars, 2 cents per pound; on old scrap lead, fit only to be re-manufactured, 2 cents per pound; lead in sheets, pipe or shot, 2¾ cents per pound; pewter when old and fit only to be re-manufactured, 2 cents per pound; lead ore, 1½ cents per pound.

"Copper in pigs, bars, or ingots, 2¼ cents per pound; copper, old and fit only to be re-manufactured, 2 cents per pound; sheating copper in sheets 48 inches long and 14 inches wide, weighing from 14 to 15 ounces per square foot, 3½ cents per pound; copper rods, bolts, nails, spikes, copper blocks, copper in sheet or plate called brazer copper, and other sheets of copper not otherwise provided for, 25 per cent ad valorem.

"On zinc, spelter, or tin, manufactured in blocks or pigs, $1\frac{1}{2}$ cent per pound; zinc, spelter, or tin sheets, $2\frac{1}{4}$ cents per pound.

The Cause of the Boiler Explosion at Merrick & Sons.

The unusually intelligent coroner's jury in this case, of which Coleman Sellers was foreman, have rendered a verdict clearly pointing out a fault in the construction of the boiler as the cause of the explosion. It seems also that the order had been given to discontinue the use of the defective boiler, and this order was in course of execution at the time the explosion occurred. We extract the portion of the verdict which explains the faulty construction:—

"The bottom or furnace part of the boiler consists of a series of arched passages used as furnaces; said passages being twenty-one inches wide, semicircular on the top or crown, and stayed from one to the other by a series of iron braces. The parts between the arches are what have been termed water-legs. These water-legs on the old boiler extended from the front to the back of the boiler, thus forming powerful beams, thirty inches in depth, to resist the pressure of the steam tending to push the bottom out of the boiler. At the front they are connected by a water-space below the doors of the furnaces, and at the back by a water-space extending to the bottom; and thus were firmly united and formed, as it were, a floor supported by beams about thirty inches deep, five inches wide, and only thirteen feet long, which were, moreover, tied together, top and bottom, at both ends to prevent their spreading at the bottom from the pressure above; a form admirably adapted to carry the load placed upon it.

"In the new boiler we find that the beams upon which depend the stability of the bottom were not continued from end to end of a uniform depth, but by the cutting-off of the part which was filled with sediment in the old boiler, have been reduced to a depth, from the crown to the bottom, of but thirteen inches for a distance of one-half of their entire length. Hence the floor-beams, as it were, are reduced to less than one-half the depth of those in the old boiler, namely, from thirty inches to thirteen inches in the center of the boiler bottom. The most valuable part of the beams having been removed by this operation, and the main support of the crown sheets taken away, no additional stays were put in to compensate for this weakness.

"Without going into any calculation of the strength of the floor of the boiler, we see that it is not half as strong as the old one, and has yielded under a pressure of only fifty-seven pounds per square inch. That the yield took place at this part, in the very center of the boiler bottom, is manifested by the leak, which persistently appeared at this very part, where a rupture should have begun if the floor was too weak. This leak was mended from time to time, but, on the day of the explosion, had increased to such an extent as to endanger the water-supply, and to cause the order to be given for discontinuing the use of this boiler, unfortunately too late, although this order was promptly given, and was in course of execution."

Kinds of Cotton and the Yield.

The sceptre of King Cotton is wrested from him! The royal prerogative was sacrificed through the reckless passion and insane folly of his friends. Yet it is right: he never was entitled to the distinction. First useful, then influential, then powerful, he became inflated with insufferable vanity, and odious with intolerable arrogance. Profiting by the lesson, reduced to his natural position, he may again become useful, perhaps travel north a little, and act in a circle less circumscribed by prejudice and that "vaulting ambition" that so often overleaps itself.

The plant producing the downy fiber attached to its seeds, which has recently come into use so nearly universal for the various purposes of clothing, is of the same family as the common mallow; botanically considered, of the order *malvaceæ*, of the genus *gossypium*, of which the species, as modified by cultivation, are somewhat uncertain in their classification, the principal being *herbaceum* (the green-seed upland of the Southern States), *hirsutum* (the shrub cotton), and *arboreum* (tree cotton.) The cotton of Peru and South America generally is the *hirsutum*, growing bushy and stout, and living several years in temperate climates destitute of frost. The tree variety is from fifteen to twenty feet in hight, and is found in the East Indies, growing wild, and in South America, the staple long, strong, silky, and yellowish. There is so much variety, in different climates and latitudes, in the size and habit of the plant, the color of the flower and of the seed, the quality of the fiber, and other points of difference, that confusion arises in the classifications of botanists, in different quarters of the globe.

Much the larger proportion of cotton grown is produced in this country. Seven-eighths of the entire product of the world, it has been estimated, has been reached by our increased production. The East Indies occupy the next place, followed by South America (Brazil mainly), the West Indies, and Africa.

It has been used for the manufacture of cloth more than two thousand years, being first known in India, then introduced into Greece and the countries of the Mediterranean. It is now found in all tropical latitudes, and adjacent temperate localities in the United States south of 35°; in the West Indies; in South America down to Peru; in the Pacific Isles; in Australia, Japan, India, and China, and in nearly all explored portions of Africa.

The United States census for 1850 gave the average product per acre in unginned cotton, by States, as follows:—

Florida	250	pounds.
Tennessee	300	"
South Carolina	320	"
Georgia	500	"
Alabama	525	"
Louisiana	550	"
Mississippi	650	"
Arkansas	700	"
Texas	750	"

This statement shows the difference in soil, and the effects of wasteful culture in the older States; but it shows most conspicuously, also, the influence of climate, especially in the figures for South Carolina and Tennessee.—*Report of Agricultural Department.*

BARON VON LENK'S GUN-COTTON PATENTED IN THIS COUNTRY.

On the 4th of June, 1864, Baron Von Lenk procured a patent through the Scientific American Patent Agency, for the manufacture of gun-cotton by his process in the United States. The assignees of the patent in this country are Messrs. Rawson & Richmond, of Detroit, Mich., who announce their purpose to proceed at once to erect a large manufactory, and to embark in the production of the article. Their establishment will be under the charge of a practical and competent person sent over from Austria by General Von Lenk.

Our readers will remember that the commission of Austrian chemists came to the conclusion that "gun-cotton is far superior to gunpowder for all explosive power; that its use is less dangerous; that for artillery and small-arms one pound of gun-cotton will give greater result than three pounds of gunpowder, and for blasting and mining purposes 1 lb. of the former is equal to 6 lbs. of the latter; that damp does not affect it; that it is not liable to decomposition; that it will not explode short of 277° Fah.; that there is no smoke; that there is no fouling or refuse matter; that the recoil of the gun is but $\frac{2}{3}$ of that from gun-powder; that lighter and shorter guns can be used; that the velocity of the projectile is greater and more accurate; that the heating of the gun is much less; and that there is no danger in its manufacture."

The statement that the velocity imparted to the shot is greater while the recoil of the gun is less, we should hardly believe except on further evidence than the report of one commission, however eminent.

In consequence of the general interest in this improvement we publish the patent in full. It contains a complete description of the process in as few words as possible.

IMPROVED GUN-COTTON.

To all whom it may concern:—

Be it known that I, Baron W. Lenk, of the city of Vienna, in the Empire of Austria, have invented a new and improved mode of making an explosive material out of cotton and other vegetable fibers; and that I do hereby declare that the following statement is a full and accurate description of the articles used, and the mode and manner of manufacturing the same, into an article which is termed, "Baron Lenk's Improved Gun-cotton."

First, The cotton or other vegetable fiber is first taken and spun into loose threads of sufficient strength to be easily handled.

Second, The cotton must then be thoroughly boiled in a solution of potash or of soda, in order to remove all greasy substances which the cotton may contain, and after thus boiled it may be exposed to the sun, or wind or in a heated room, to dry the same.

Third, The cotton must now be taken into a room heated to 100° Fah. in order to make it perfectly dry.

Fourth, A mixture is now made containing one part weight of nitric acid of $1\frac{48}{100}$ to $1\frac{50}{100}$ specific gravity, and three parts weight of common sulphuric acid. This mixture must stand in closed earthen or glass jars for several days, or until the two acids become fully mixed and cooled.

Fifth, This mixture of acids is now put into an apparatus containing three apartments, one for the main bulk of the acids, one for the immersion of the cotton, and one for receiving the cotton after being immersed. This apparatus may be made of cast-iron.

Sixth, The cotton is now taken and dipped in the acid bath, in said apparatus, in such a manner that every three ounces of the cotton must come in contact with sixty pounds of the mixture of acids, or in other words, the bath must contain fully sixty pounds of the mixture while parcels of three ounces of cotton are being dipped. The parcels thus dipped must be gently pressed, and the acids allowed to flow back into the acid bath, and the parcels are then put into the third apartment of the apparatus, where for every one pound of cotton there must be ten and a half pounds of said mixture of the acids. The cotton must remain in this state subject to the action of the acids for forty-eight hours, and the mixture must always have an equally strong concentration, and must be kept under a uniform temperature by a cooling process.

Seventh, The cotton is now taken out from the acids and pressed, and then put into a centrifugal machine to remove all surplus acids.

Eighth, The cotton is again put into another centrifugal machine, into which a constant stream of fresh water is admitted. This process is intended to remove the last particles of adhesive acids.

Ninth, The cotton is now taken and put into a flume or trough, and secured in such a manner that a running stream of fresh water may pass through and over it; and the same must remain in this situation for at least fourteen days. To lessen the time for this operation the cotton may be immersed or saturated in alcohol for the space of twenty-four hours. This process is also intended to extract all and the last particles of acids that may possibly adhere to the cotton.

Tenth, The cotton is now taken from the stream of water, or if from the alcohol it must be washed, and then boiled in a solution of common soap and again dried. This process is intended to restore the cotton to its original softness and appearance.

Eleventh, The cotton is now taken and immersed in a solution of water-glass of one pound to two pounds of soft water which must be $1\frac{09}{100}$ specific gravity of concentration. To one pound of cotton $\frac{198}{1000}$th of a pound of this solution of 46° Beaumè is required. The cotton is then taken out of this solution and exposed to the action of the atmosphere for at least four days. This process has the tendency to preserve the material, and also to make its explosive qualities less rapid.

Twelfth, The gun-cotton is again washed in soft water free of lime, dried, and can then be packed in wood or metal boxes for storage or exportation; and may be used for artillery. Torpedoes, shells, mining blasting, small-arms, and for all purposes where explosive power is required.

Thirteenth, All other vegetable fibers may be treated and manufactured as herein stated, which process will make the same explosive like the gun-cotton and adapted to the same purposes.

I claim as my invention an explosive improved gun-cotton made substantially as herein described,

BARON W. LENK.

City of Vienna, Austria, Dec. 1, 1862.

AN American pint holds 7,000 grains of water.