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Tanning Apparatus.

The accompanying engravings illustrate an improved apparatus for tanning leather, invented by Jesse S. Wheat, of Wheeling, Va., who makes the following statements in relation to it :—

"I have my tanning process in full operation in this city, tanning leather in one-tenth of the time required by the old process, and I warrant the leather to be of the finest quality for wear. This process combines the handling or moving of the hides in the liquor, the circulation of the liquor through the vats the pressure upon the hides, and the circulation of the liquor through the tan bark in the leaches, all at the same operation; and the operation may be suspended upon one or more of the vats while it is continued in the others. Therefore, among its advantages, in addition to the short time consumed in tanning leather, is the great saving of labor."

Fig. 1 of the engravings is a perspective view of the apparatus and Fig. 2 is a horizontal section through the middle of the vats combined with a horizontal section through the several reservoirs.

The leather is placed in the air-tight cylindrical vats, X X″ X‴ X,⁗ and the tanning liquor which is prepared by mixing water with bark in the rectangular reservoirs, E″ E‴ E⁗ E⁗′, below, is made to circulate through the vats by means of a force pump, C. The liquor in the vats is subjected to pressure regulated by a weighted valve, and the hides are forced through the liquor by being placed on vibrating frames, H, Fig. 2, within the vats.

The water is mixed with the bark in the reservoirs, E″ E‴ E⁗ E⁗′, and these reservoirs have perforated false bottoms through which the clear liquor is strained into the lower parts of the reservoirs. From these places it is drawn out by means of the pump through branches from the pipe, A, which pass through the ends of the reservoirs, and are bent down so as to extend through the false bottoms into the clear liquor below. These branch pipes are provided with stop cocks, so that the connection between any one of them and the pump, may be opened or cut off at will, and thus the liquor may be drawn from such of the reservoirs as the operator may desire.

WHEAT'S IMPROVED TANNING APPARATUS

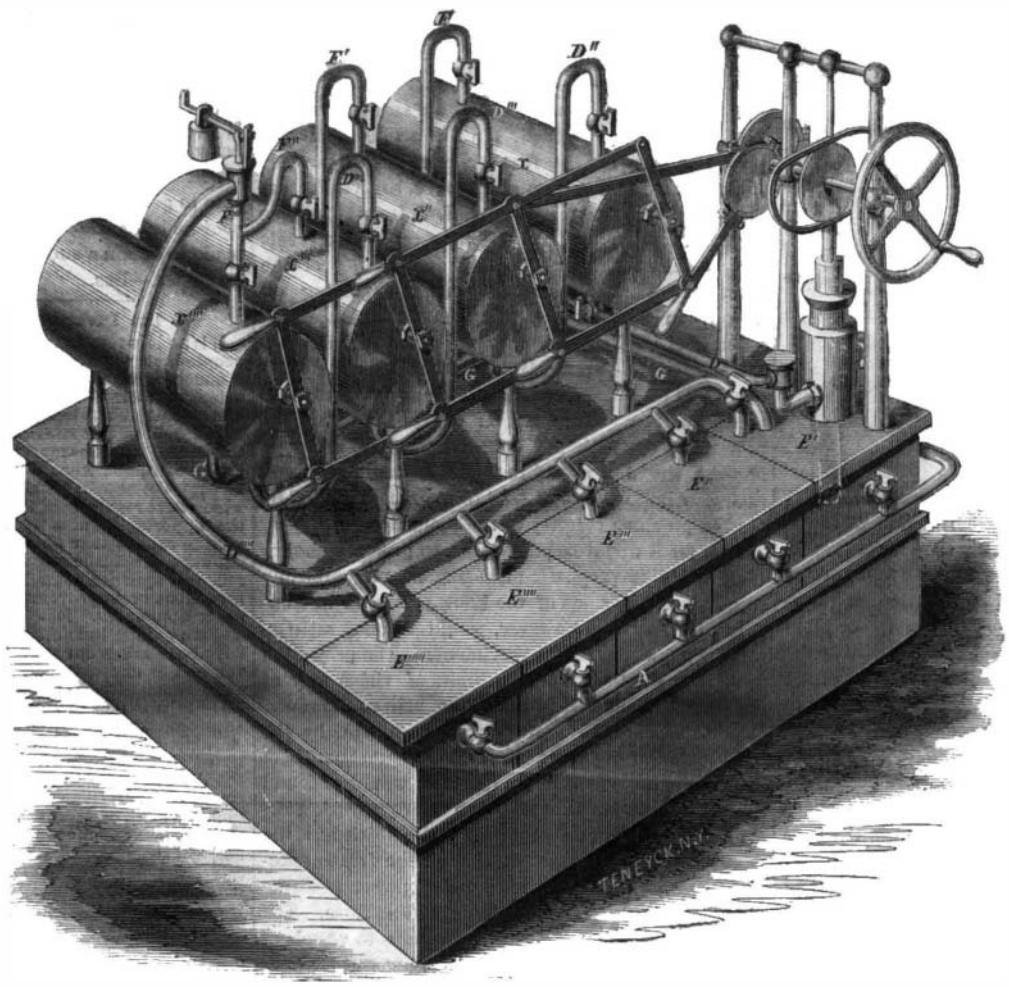
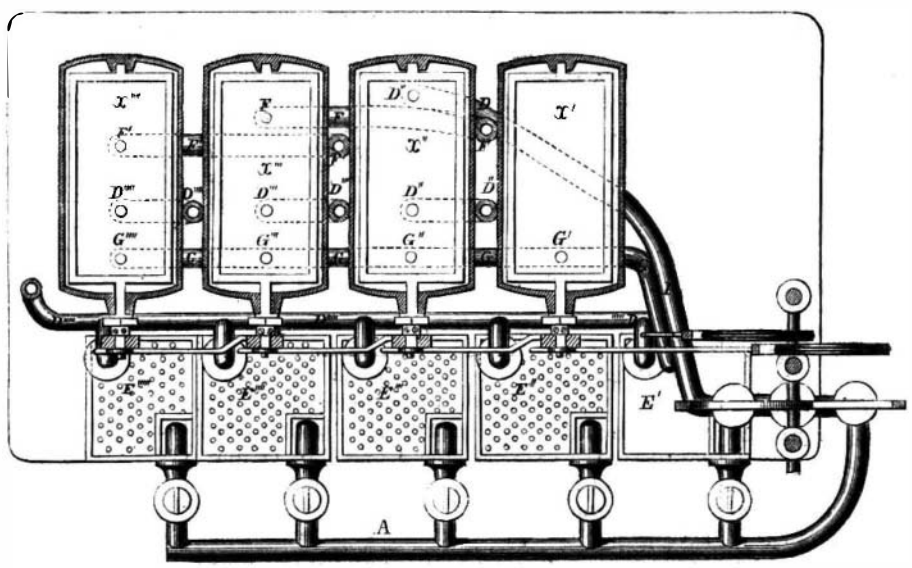


Fig. 2



From the pump the liquor is forced into the vats through the pipe, D, which has two branches leading into the bottoms of the vats, X and X″. From the top of vat X, a pipe, D″, leads to the bottom of vat X″, and a pipe, F, leads to the bottom of vat X‴. The pipe, D‴ leads from the top of vat X″ to the bottom of vat X‴, and the pipe, F′, leads from the top of vat X″ to the bottom of vat X⁗. A pipe, D⁗, leads from the top of vat X‴ to the pipe, F‴, which is connected with the top of vat X⁗. All of these pipes are furnished with stop cocks, so that any vat may be thrown out of the circulation by simply opening and closing the proper cocks.

From the upper end of pipe F‴, a pipe, D⁗′, leads down to the reservoirs with all of which it is connected by branch pipes; each branch being furnished with a stop cock.

It will thus be seen that the tanning liquor is kept in constant circulation through the vats containing the hides, and through the reservoirs containing the bark; extracting in its course the tannin from the bark and carrying it to the hides. The liquor in its circuit may be passed through such of the vats and reservoirs as the operator may desire by simply turning stop cocks.

In the upper end of the pipe, F‴, but below the exit of pipe D⁗′, is a valve which is pressed down by a weight upon the lever, N. By setting this weight at the proper point upon the lever, the pressure of the liquor within the vats may be adjusted to any degree desired. An emptying pipe, G, connected with the bottoms of all the vats by branch pipes, leads into the reservoirs, E.

The frames, H, Fig. 2, in the vats are hung upon shafts which pass through stuffing boxes in the ends of the vats, and they receive a vibratory motion from

eccentrics on the pump shaft with which they are connected by levers in such manner that by simply lifting the levers out of connection, the action of the frame in any vat may be suspended. The hides are introduced into the vats through manholes provided for the purpose.

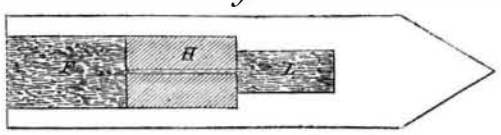
The patent for this invention was granted Nov. 6, 1860, through the Scientific American Patent agency, and further information in relation to it may be obtained by addressing the inventor as above.

Projectiles for Rifled Cannons.

[Concluded from last week.]

In the second method proposed for the improvement of projectiles, in order to insure more effectually an increase of action of the new auxiliary impulses to be applied to the projectile during its flight, I propose to use the explosive force of gunpowder to drive it along in its course. For this purpose the chambers or barrel on the rear of the projectile may be formed and loaded, as shown in Fig. 2, wherein L is a charge of gunpowder, H a heavy cylindrical shot or plug, with touch-hole and priming therein, and F a common fuze, or the rocket composition as above suggested.

Fig. 2

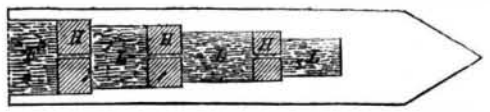


With reference to this proposed arrangement it will be understood that after the shot or shell, thus prepared, has been discharged from the gun, the fuze or composition powder, F, will thereby be ignited, and during the flight burn down to the priming in the plug, H, and thus explode the charge, D. The size of the fuze, or quantity of composition, must of course be timed and regulated so as to cause said explosion to take place at the most advantageous point in the range thereof. It may require probably, in the first instance, some little skill and practice in preparing and loading this projectile, in order to avoid every possibility of danger of its exploding within the bore of the gun. The cylindrical plug, therefore, should rest and abut on the shoulder of the chamber, L, and fit the barrel, F, as close as practicable and if necessary, may be packed and luted so as to be perfectly air-tight. The fuze, F, to the same end, may be rammed and packed directly into the barrel of the projectile and thus avoid the porosity of the fuze cord.

The action or reaction of the explosive force of the charge, L, as here proposed, must evidently give a powerful impulse to the projectile, which is at the time, moving with a very rapid velocity. To appreciate the amount of this reaction, it will be understood that at the time of said explosion the plug, H, is moving with the same velocity and direction as the projectile itself, and hence must have a momentum equivalent to its weight and velocity. The explosive force of the charge, L, therefore, to drive said plug out from the barrel of the projectile, must resist and in a measure overcome this said momentum. For example, if the force of the charge, L, was sufficient to give a velocity to the plug (when fired from a state of rest) equal to the velocity of the projectile at the time of the proposed action, it is evident the two forces or velocities would counteract each other, and the plug would fall out of the end of the barrel, as it were, perfectly dead or void of all motion, the gyratory motion of the projectile alone excepted.—Hence, as action and reaction are always equal, the reaction of the explosive force, in this case, to accelerate the velocity of the projectile and drive it forward, would be nearly equivalent to the effect of said explosion acting on and against a solid and stationary body. This reaction on the projectile being in proportion to the momentum of the plug, we may make the plug as large as practicable, to fit the bore of the barrel, so as to obtain the greatest velocity possible. When the projectile is arranged to carry a shell, carcass or the like for bombardment, the loss of weight therefrom by the abstraction of the plug, &c., from the body of the projectile would not be objectionable.

The above illustrates the mode proposed whereby one single explosive impulse may be given to the projectile during its flight, to increase its velocity and range. It is believed practicable, however, by increasing probably the length of the projectile and making the size and power of the rifled guns suitable thereto, to multiply the number of auxiliary impulses to the projectile, at pleasure. Thus in Fig. 3 is shown an arrangement whereby three successive impulses may be given to the projectile during its flight. H H H represents the several plugs, L L L

Fig. 3



the charges or gunpowder, and F the fuze or composition, as before mentioned. In this arrangement the primings may be the fuze or composition powder, which burns slower than gunpowder, so that the explosion of the several charges, L L L, may not be instantaneous, but in succession at certain intervals to be regulated by the quantity and quality of the priming. When a power is constantly acting on a body in motion, as gravitation for instance, the velocity of the body becomes uniformly accelerated. In the case of the projectile before us, after the same should be projected from the gun, the power proposed to act thereon, would not of course be a constant power, but one acting at certain very small intervals of time, the effect therefore would be analogous, and each new impulse would tend to increase and accelerate the previous velocity of the projectile.

How far it would be practicable to project a shot or shell with this proposed arrangement, may probably be calculated by some of the known formula in gunnery; its solution, however, would be most satisfactory by a few practical experiments. The projection of shot or shell beyond the limits of vision may at first appear of doubtful utility; we believe, however, that when the same is regulated and directed by the rigid rules of topography and trigonometry, there would be many cases where the same would be found highly useful and efficient. The improvement, however, it will be readily understood, which has the power to project the shot or shell to the greatest possible distance, must necessarily have power to strike nearer objects with the greatest possible force. The rapid introduction of steel-clad armor to vessels of war, and the impunity with which they can face and defy the most powerful ordnance of the present day would seem to demand some improvement in the force of projectiles in order to oppose and resist them. In all new inventions, should imperfections exist, practice will generally point out the defect and supply the remedy.

The barrels or chambers in the projectiles above proposed, as we have already stated, should be made concentric with the axis thereof. The recoil of a gun being known to be always in the line of the axis of the bore thereof, the proposed explosions in the projectile cannot therefore deflect the same from its intended course or aim. In addition thereto the rapid gyratory motion of the projectile, or its *vis viva*, tends also to counterpoise the inequalities in the density of the projectile and the component parts as herein suggested, and also to resist the inequalities, should they exist, in the explosive action of the charges therein.

CHARLES POTTS, C. E.

Trenton, N. J., Dec. 2, 1861.

Naphtha and Benzole in Paints and Varnish.

MESSRS. EDITORS:—I have been trying to use, for some time past, in paints, &c., refined naphtha, refined benzole or benzini instead of spirits of turpentine. I have had no trouble in using it in mixing paints, but cannot use it in asphaltum varnish. I have tried to thin black varnish made of asphaltum, spirits of turpentine and a small quantity of linseed oil boiled, but it would not mix—it curdled. I tried to make the same varnish by using the refined naphtha instead of spirits of turpentine and naphtha, but had the same trouble in both instances. I tried, also, to use it in copal varnishes. I melted the gum as usual, and reduced it as hot as I could, in one instance, with part spirits of turpentine and part naphtha, and in another instance with naphtha alone, and it seemed to work well enough. I had no trouble in straining it, but the next morning when I looked at it I found that the gum was precipitated to the bottom. I have tried to use the naphtha in place of spirits of turpentine in a drier for paints in which gum copal was used, and have had no trouble whatever. Now, I am at a loss to account for these things. I wish to inquire, through the columns of your excellent paper, how refined naphtha can be used in copal and asphaltum varnishes. I have asked a good many painters, &c., but I have not been able to ascertain, and I found that they were as anxious to learn as I was to find out in regard to it. Perhaps some of your subscribers who have been more successful in using it, and some parties who are interested in the manufacture or sale of the naphtha would inform your subscriber of the manner in which it is used. E. A. W. JONES.

Boston, Dec. 4, 1861.

[The above letter tells its own story. Our correspondent has not succeeded in rendering naphtha or benzole permanent solvents of asphaltum and gum copal. Perhaps some of our correspondents may be able to give the information desired. The fact of turpentine being scarce and costly accounts for the efforts made to obtain a substitute such as naphtha in making varnishes.—EDS.

The Inventive Genius of the Country.

It is no less remarkable than flattering to the American people that, whenever any event occurs, or any enterprise is undertaken, in which scientific improvements might be of value, numbers of inventors come forward with specifications offering everything required for the accomplishment of the desired purpose. Thus, when the Atlantic cable was talked of, numerous suggestions were made for the laying of it, and when it broke hundreds published plans, through the newspapers, for remedying the disaster, all of which were represented to be certain of success if afforded the opportunity of a trial. In like manner, a boiler explosion cannot take place in the city or on the river without scientific remedies being proposed against the recurrence of such accidents, nor a collision at sea without new inventions or improvements in steering gear, lights and other appliances. It is the same with the present war; and we publish in another column a list of patents which have been taken out since its commencement for new inventions or improvements in implements of war and other army requisites. The list includes projectiles, rifle and smooth bore cannon and small arms, breech-loading fire-arms, balloons, tents, canteens, camp furniture, military clothing, horse accouterments, hospital fittings, surgical instruments and other miscellaneous matters. It is obvious that the genius of the country is always equal to an emergency; and it augurs well for our future that we have such a wealth of inventive talent to assist in developing the immense resources at our command, and to add to our national strength and greatness. We may soon lay to ourselves the flattering unction that we are behind none in the mechanical arts, and in advance of many.

[The above is from the New York *Herald*. All the claims of the military inventions to which it refers, have been published in our columns weekly, as issued, and as stated by us in another article, a large number of them have been illustrated and fully described in the SCIENTIFIC AMERICAN. No less than 170 patents for army and navy implements have been granted. Of these 54 have been for improvements on cannon and small arms; 22 for projectiles; 32 for camp furniture; 10 for tents; 6 for canteens; 2 for war balloons; and 44 for miscellaneous articles. These afford evidence of the intense interest of our inventors in the war, and the intellectual acumen which they have brought to bear in furnishing our army with the best and most perfect articles for rendering our army and navy superior in equipments to those of all other Powers.

Population of the British Provinces in North America.

From the Montreal *Journal of Education* we take the following statistics of the population of Canada and other British provinces as shown by the latest census returns. The *Journal* states that the returns from the county of Saguenay in Canada East are not included, as they were not received at the time of publication. The pupulation of this county is estimated at between 3,000 and 4,000.

Canada West (census of 1861)	1,395,222	
Canada East (census of 1861)	1,103,666	
		2,498,888
New Brunswick (census of 1860)		250,000
Nova Scotia (census of 1861)		330,857
Newfoundland (census of 1857)		122,638
Total		3,202,383

The whole of these Provinces do not contain a population equal to the State of New York, and yet Nova Scotia was settled as early by Europeans.