form the metal into a hoop, which is finished by heating and rolling. Arrangements are being made for making Bessemer tires in the same manner, and it is not unlikely that, the risk of broken welds being thus removed, they willtake the placeof all tires now in use.

PLATE GIRDERS.

We believe some small plate girders of Bessemer steel have been constructed, but its advantages would appear chiefly in large spans, where, in the case of iron, the weight of the bridge itself forms the greater part of its own load. For ordinary spans the present price of Bessemer steel leaves no margin of advantage to the engineer. It is known, however, that it is being learned how to turn the commoner kinds of English iron to good account in the Bessemer process, and as the waste in manufacture is very little and as a great number of firms are now competing in the business, it is in all respects probable that Bessemer metal will fall rapidly in price, and that its use will be as rapidly extended.

OUR SPECIAL CORRESPONDENCE.

The center of the cotton manufacture. Enormous profits of the business. Prosperity during the war. Curious effects on the business of our inflated currency. Work being resumed. Prosperity of other manufactures.

PROVIDENCE, April 22, 1865.

MESSRS. EDITORS:—This is the center of the manufacturing interest of New England. On the beautiful hights in the eastern part of the city are noble residences of the Spragues, the Browns, the Iveses, and many others whose villages are scattered along the valleys of this and the adjoining States, and who have made collossal fortunes by spinning, weaving, bleaching, or printing the white ala of the *gossypium herbaceum*, and thus fitting it for clothing the backs and limbs of men and women.

One establishment that I happen to known about, which has a capital of $200,000, made last year a gross profit of $97,000, and after reserving $27,000, they divide $60,000, which is a net profit of 30 per cent. This is, however, better than the average for the last year, as the decline in cotton from $1 80 to 25 cents per pound has in some cases swallowed up the whole, and in others, a large portion of the profits. But the cotton manufacture has never known a a more prosperous period than during this war.

I was very much interested in the details of the embarrassment to this industry, as to all others, from the fluctuations resulting from our inflated currency. A large manufacturer was asked the present cost of making a yard of 60×64 print cloths, besides the cost of the cotton. He replied about 3 cents, just double the cost under the old specie currency. He explained that wages are about 50 per cent higher, coal, freights and supplies generally about double, carrying the cost up to about 2½ cents, and the remaining half cent is caused by the uncertainties and fluctuations in the business. For instance, two months ago he decided from the rapid fall in cotton to stop buying, and to work up all he had on hand; consequently the beams were filled first with 30 yards of yarn, then with 20 yards, and then with 15 yards, thus making the expense of "drawing in" the same for half a piece as for a whole piece when the mill was running full time. Furthermore, the expense of superintendence, clerk hire and many other departments is no more with a full product than with half product. In short, there are inuumerable ways in which the uncertainties and embarrassments resulting from a fluctuating currency operate to diminish the production of wealth, in this, and in all other branches of the national industry.

The present comparatively low price of cotton has produced a common feeling that it will not probably fall much more at present, and a good many mills that have been suspended are resuming operations. There is a general feeling, however, that it is very much of a speculative, gambling transaction, rather than a safe, steady and substantial business.

The iron, steam engine, machine making, and other manufactures generally are very profitable, and the city is accumulating wealth with great rapidity. I have just been through one of the large manufactories of cheap jewelry, but will reserve an account of that for my next communication. B.

Correspondence

Northern Cotton.

MESSRS. EDITORS:—By an act of Congress, public attention has been attracted to the mode of preparing flax and hemp as a substitute for cotton. Those engaged in the experiment of these fibers are sanguine of success. Owing to the scarcity of the staple resulting from the war, the culture of cotton has been attempted in the States of Kansas and Missouri, and other States as far north as the 40th degree of north latitude, which seems to be the northern boundary of King Cotton, beyond which Nature has forbidden his jurisdiction on the American continent. This parallel appears to be also the southern boundary prescribed by nature in America for the growth of a plant which has many, if not all, of the characteristics of the cotton plant, viz., *Epilobium*, and which, according to the books, is indigenous as far south as Pennsylvania, and as far north as the arctic circle.

In the month of October last I collected a small quantity of the plants of the common fire-weed. The plant proved to be Epilobium, and in compliance with a request of the Agricultural Department at Washington, I have made certain experiments which it may be interesting to your readers and to the public to have submitted to them.

My first utilization of the fiber was the simple operation of picking it from the pod in which it grew, and placing it in the tube of a common oil lamp—forming a wick by twisting it with my fingers; it answers every purpose of wicking for which we have been paying from seven to ten dollars per pound.

Encouraged by this success, I resolved to ascertain whether it would spin, and the result was a stocking, which was carded, spun, knit and dyed by the same tiny hand that picked the fiber from the pod in which it grew. Next I had made a flat wick for the rotary burner used in kerosene lamps, which was equally successful in its operation; then a braided wick for a sperm candle, and a common strand wick for a tallow candle. For the purpose of testing the strength of the fiber, I took the braided wick to a shop, and lifted first a seven, then a fourteen pound weight, and then both together, without any symptoms of breaking. Furthermore, I had made a cord, about the size of a common clothes-line, which did not break till I put two fifty-pound weights upon it. The wicking was saturated with sperm oil; the cord was not saturated, but entirely dry, and twisted by hand, after the fiber had been spun into strands, on an old-fashioned large spinning wheel. The fiber was carded by hand, on cards of number 32 wire. Mixed with one-fourth wool or cotton fiber, the yarn can hardly be distinguished from woolen or cotton yarn, but I have not enough of the material to weave it, and of course know nothing upon that branch of the case. The woman who spun it said that it was much better than yarn she had worked in a cotton factory. A manufacturer of under-shirts and drawers (mixed half and half) has promised to try it next fall.

That it will make wadding, batting, etc., is conceded by the manufacturers of those articles, and an extensive paper manufacturer pronounced it the best material (except silk) he ever saw for fine paper. The fiber measures from three to six-eighths of an inch in length; the former grew on dry, sandy loam, the latter on moist ground near a spring of water.

Dr. Copman, of Utica, who is considered a very cautious observer, certifies, after careful examination and comparison under his glass, that the fiber of the Epilobium has all the characteristics of the cotton fiber, and is a very different substance from the fiber of the milk-weed, which was compared at the same time with both the cotton and Epilobium fiber.

RUTGER B. MILLER.

Utica, April 4, 1865.

Petroleum in Chemung Valley.

MESSRS. EDITORS:—I am a reader of your valuable paper, and among the quantities of good reading I occasionally see an article on petroleum oil, and I write this letter to communicate something upon that subject. We have discovered petroleum in the Chemung Valley. It has been found all along the Chemung Canal, and in the Valley clear to the head of Seneca Lake. I myself have skimmed quantities of it off the water, and will send you a sample if you would like to see it. Others have done the same thing, and the people of Havana and Watkins are now in a blaze of excitement upon the subject. The oil is of the best quality, as many will tell you who have gathered bottles of it. The existence of the oil has only lately become generally known, but last week it was discovered oozing out of the ground in large quantities in different places. Some geologists and chemists have examined it, and say the whole valley is filled with oil. I send you this letter thinking the information may be worth publishing in your valuable journal, of which I am a constant reader. W. J. CRANDELL.

Millport, April 24, 1865.

Saleratus and the Teeth.

MESSRS. EDITORS:—In the last number of the SCIENTIFIC AMERICAN I notice an extract from the correspondence of the *Dental Quarterly* in regard to the effects of saleratus and cream of tartar upon the teeth. The publication of such ideas as we find expressed therein for a long time, in all kinds of journals, has resulted in disseminating among the people erroneous ideas in regard to their teeth, and has increased the labor of dentists exceedingly, thus showing their baneful effects. If the people generally had clear ideas of the simple nature of decay of their teeth, the trouble and expense of keeping them in good condition would be exceedingly lessened. Hence one who understands why teeth go to ruin and cause so much misery in life must feel as if the short extract in question must go still futher to mystify the public. This simple subject should have one thorough ventilation in the public journals to solve the difficulties and wonders of many minds in this respect, and set the people to thinking rightly, instead of catching up here and there little absurd notions, which only have the effect to mislead and injure them.

The enlightened labors of Dr. Amos Westcott, one of our leading dentists, have settled to a certainty the cause of caries of the teeth, and his experiments have been so thoroughly conducted and so generally recorded in standard works on dentistry, that if any dentist has of late felt that there is a mystery about the decay of teeth, he shows that he cannot have studied any standard work in dentistry, and hence is unfit to advise the public in dental matters. Saleratus is an alkali, and cream of tartar is an acid, and the correspondent says:—"Saleratus removes the gelatine, the cream of tartar removes the lime—the two principal ingredients of the teeth—and between the two evils the teeth stand a poor chance, and hence the result." The experiment of the correspondent conflicts with Dr. Westcott's experiment with saleratus and teeth, for on page 286 of Harris's "Principles and Practice of Dental Surgery," the main work extant in dentistry, we find among the results of Dr. Westcott's experiments the following recorded:—"Alkalies do not act upon the enamel of teeth; the caustic potash acts readily upon the bone of the teeth by uniting with its animal matter." Why? Because in the enamel less than one in one hundred parts consists of animal matter, while in the bone twenty-eight parts in one hundred are gelatine and water. In the enamel ninety-nine parts consist of lime, magnesia and soda. Although the two results are differently recorded, we must give preference to that of Dr. Westcott, for it has the stamp of authority and consistency and relative facts, which show great sagacity and education, while all we have to do to demonstrate the lack of penetration and information of the Portsmouth correspondent is to consider what has escaped his notice, although I dare say any woman could have told it to him, viz., that of all this 32 tuns of saleratus and cream of tartar dispensed to the 10,000 people of Portsmouth in a year, to the ruin of their teeth, not one ounce ever came in contact with a sane person's teeth until after the two articles had been combined in cooking so as to form tartrate of potash, a neutral salt, or the bitartrate and carbonic acid gas, which are two totally different articles from either cream of tartar or saleratus, and absolutely harmless to the teeth practically. Suffice it to say that the only cause of the decay of the teeth is contact with acids, which arise either by the taking

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of one into the mouth, or by decomposition of food left in small portions between the teeth, where it finds three things eminently conducive to its decay, viz., warmth, moisture, and oxygen from the air. This would be prevented by an alkaline state of the saliva, but that condition is found only in those cases where a person enjoys the most perfect health constantly. Pardon me for sending you so long a communication; but these things seem so little understood by the public generally that some degree of minuteness appears called for. C. A. N.

New York, April 24, 1865.

Incubation.

MESSRS. EDITORS:—Can you inform me what the amount of heat used in incubation is, and if it is the same for the whole three weeks. I have made some experiments to find out myself, but none were satisfactory. H. H.

Woburn, Mass., April 15, 1865.

[The proper heat for the hatching of hens' eggs, is 104° of Fah., to which degree the surface of the body of the hen will raise the thermometer when she sits upon her eggs. In those birds that do not sit constantly, but trust to the heat of the sun, the temperature of the eggs is probably below 104°.

The full period of incubation by the hen, in this country, is well known to be twenty-one days. In warmer climates it is said to be a day or two less. The periods of incubation vary much in different species of birds; we introduce the following table, which has been compiled from different authors by Count Morozzo, in a letter from him to Lacepede, to show the periods of incubation compared with those of the life of certain birds.

Names of Birds.	Periods of their Incubation. Days.	Duration of theis Life. Years.
Swan	42	about 200
Parrot	40	about 100
Goose	30	80 or more.
Eagle	30	Period of life not known.
Bustard	30	
Duck	30	
Turkey	30	
Peacock	26 to 27	25 to 28
Pheasant	20 to 25	18 to 20
Crow	20	100 or more.
Nightingale	19 to 20	17 to 18
Hen	18 to 19	16 to 18
Pigeon	17 to 18	16 to 17
Linnet	14	13 to 14
Canary	13 to 14	13 to 14
Goldfinch	13 to 14	18 to 20

Crane and heron, as well as ostrich, hatch their eggs chiefly by the heat of the sun.—EDS.

Thin Steel Wanted.

MESSRS. EDITORS:—Being engaged in working on smut machines, I have observed that the zinc we use for screens, no matter how well put on, seems to be so much affected by the weather that the surface gets very uneven, and the wheat cannot spread evenly over it. I was thinking, from seeing several interesting articles in your valuable paper about rolling steel thin, that if we could get steel about 36 on the wire gage, not to cost a great deal more than zinc, it would answer a better purpose, be more durable, and keep a better surface. Would you be kind enough to let me know the names of any parties that make steel such as would answer, and oblige.

R. A.

Chicago, April 4, 1865.

[The plate for the steel letter was rolled at the Sligo Iron Works, Pittsburgh, Pa.—EDS.

To Preserve Maple Sirup.

MESSRS. EDITORS:—The SCIENTIFIC AMERICAN of April 8 has a plan for keeping maple sirup to retain its delicious flavor, which is to nearly fill bottles and put cotton in the mouths of them. "to allow the gases of fermentation to escape." Maple sirup to be fit for anything but vinegar or rum must not ferment in the least. It may be kept the year round just as good as when made by filling bottles or stone jugs with the hot sirup, leaving just room for the corks, and sealing them with wax. We have kept it thus for several years past, and ask for no better plan.

Red Bank, Ohio. P. F.

[The best way to have maple sirup pure is to buy good sugar and melt it down as required. It is more economical in this way, for the consumer does not pay for water and other matters which the sirup holds. There is no risk or trouble whatever, either with bottles or any other vessels.—EDS.

The Laws of Falling Bodies.

MESSRS. EDITORS:—Several questions having arisen in regard to the force of falling bodies, between some parties here, I am requested to write to you and get your opinion in regard to the matter.

The first is, "Will a ball shot from a rifle into the air, perpendicularly, have the same velocity, and consequently the same force, when it returns to the earth that it had when it left the gun?" In practice, common pigeon shot, being discharged into the air, fall back harmlessly to the earth, although they leave the gun with force enough to kill one. This fact does not harmonize with the law, that the velocity of a descending body is the same in its ascent as in its descent. Why do not shot have the same force in falling as in ascending.

Second, "Will not a ball of candle wicking, weighing 1 lb., fall 100 or 1,000 feet in exactly the same space of time as a ball of lead of equal weight?"

Third, "Will not all bodies of the same material and same shape fall alike to the earth in the same space of time, notwithstanding one may be three times as heavy as the other?"

These questions all suppose the experiments to be done in the air with the atmosphere as it is, and not in a vacuum. I myself can understand the solution of these questions, but I cannot answer the question "why shot do not have the same force in falling they have in ascending." My answer is, they will when they have acquired the same velocity in falling they had at the moment of leaving the gun. We know they do not have that velocity, but yet the answer is "that the velocity acquired during the fall is equal to the velocity of projection."

WM. SPALDING.

Derby Line, Vt., April 19, 1865.

[The resistance of the air causes the shot to fall with a velocity less than that of their ascent. A ball of candle wicking will fall with the same velocity as a ball of lead in a vacuum, but not in the air. In a vacuum the size of a body has no influence on the rate of its descent, but in the air the larger the ball of any material the more rapid is its fall.—EDS.

New Discovery of the Breeding of Sex.

[For the Scientific American.]

A knowledge of the cause of the difference of sexes in the animal kingdom is a means of breeding whichever sex may be preferred.

For several years I have been in possession of this knowledge, and being a Frenchman, I had intended to communicate it to the Academy of Sciences at Paris; but illness has prevented my return to France. Fearing that my secret may perish with me, as in the case of Segato, I have decided to publish it for the benefit of all civilized people.

Experience has shown that the theory heretofore prevailing in regard to the production of the sexes is false, and that this which I submit is the only true one.

It is the male who engenders the substance destined already to be of the masculine sex or the feminine before the female receives it. The right apparatus engenders the male, the left the female. By operating a partial castration, therefore, of the male, it is easy for stock breeders to procure offspring all of either sex.

At La Hotte, near Fort Liberty, in Hayti, this process has been in operation for several years, and for the twelve years that I have watched the result it has never failed.

A. DE FERRANDI.

Mahan's Field Fortification.

Messrs. John Wiley & Son, 535 Broadway, New York, have published a new edition of the treatise on Field Fortification, by D. H. Mahan, L.L.D., Professor of Civil Engineering in the United States Military Academy. It is a work of 284 pages, and is designed as a text book for the numerous private military schools that are springing up all over the country. We extract the following definitions:

The term *Intrenchments* or *Lines* is applied to fortifications of considerable extent, thrown up to cover an entire army or an army corps on the front and flanks. A position so fortified is said to bo *Intrenched.*

The term *Field Work* is applied to a fortification of limited extent, to be occupied by a small isolated detachment dependent upon its own means of resistance.

Fortifications should be regarded only as accessory defensive means, but still a very important one, and they will conduce to the end proposed the more nearly they are made to satisfy the foregoing conditions of a strong defensive position.

To satisfy the first three of these conditions, viz.: to offer an obstruction to a hand-to-hand conflict; to shelter the assailed from the view and fire of the assailant; and to afford the assailed a commanding view and a sweeping fire over the assailant's lines of approach; fortifications must consist of a covering mass of earth, stone, wood, or iron, of sufficient height and thickness to screen the men behind it from view, and to intercept the missiles of the assailed, and of some obstruction in advance of it which will prove a serious obstacle in the way of the assailant's advance.

Parapet.—The covering mass is termed a *parapet* when it fulfils the last two of these conditions; when intended simply as a screen, as in the case of a cover for cavalry when waiting to be brought into action, it is termed an *epaulment;* and when used to cover troops from an enfilading fire on the flank or in the rear, a *traverse.*

Ditch.—The most usual obstruction to impede the enemy's advance to attack with the bayonet, is a *ditch* placed in front of the parapet. When the parapet is of earth, the ditch furnishes the material for its construction.

Banquette.—When the parapet is too high to admit of a man standing on the natural level of the ground to fire over it, a platform of earth or wood is placed behind it, from which the soldier can fire at the proper level. This is termed a *banquette.*

Banquette Slope.—When the top surface of this platform, termed the *banquette tread,* is too high to be reached from the ground by an ordinary step, a ramp, either of earth or timber, is placed in rear of it, by which it is reached. This ramp is the *banquette slope.*

Interior slope.—The interior face of the parapet, when arranged for musketry, is termed the *breast hight,* or *interior slope;* when for artillery the *genouillère.*

Superior slope.—The top of the parapet is the *superior slope.*

Exterior slope.—The exterior face is termed the *exterior slope.*

Berm.—Between the parapet and ditch a narrow zone is usually left on the natural surface of the ground which is termed the *berm.*

Scarp and Counterscarp.—The side of the ditch adjacent to the parapet is termed the *scarp;* the side opposite to this, the *counterscarp.*

Glacis.—A mound of earth placed in front of the counterscarp with a gentle slope outwards is termed a *glacis.*

Trench.—To obtain speedy cover, the parapet is formed from a ditch within, termed a *trench,* of sufficient depth, with the height of the parapet, to give shelter to the troops when standing in the trench. The natural ground serves as the banquette tread in this case.

A NEW invention for working ships' pumps by the capstan in case of fire, for which a patent has been registered by Mr. Matthew Blank, engineer, was tried on the 6th ult. on board the *Irresistible,* in Southampton-water. Sixty revolutions were obtained with one man to each bar of the capstan, and 73 with two men to each bar; while 100 men would, as we are informed, be required, under ordinary circumstances, to get 70 revolutions. The trial was successful, and the invention was pronounced very valuable. Extra hands were put to the capstan to force a column of water to the upper deck. This pressure was hardly fair to the inventor, but, notwithstanding the immense force applied, nothing gave way.—*London Artizan.*

MR. CAILLET has pointed out to the Academy of Sciences that cast-iron loses carbon when kept for a considerable period at a heat somewhat below its point of fusion, and suggests that this fact might be turned to practical account. He finds that "blades of iron, heated among clean borings of cast iron, become cemented and form excellent steel," while "blades heated in the same furnace, but not in contact with the cast iron, are not cemented." He adds that the cast iron is not at all deteriorated by the process.

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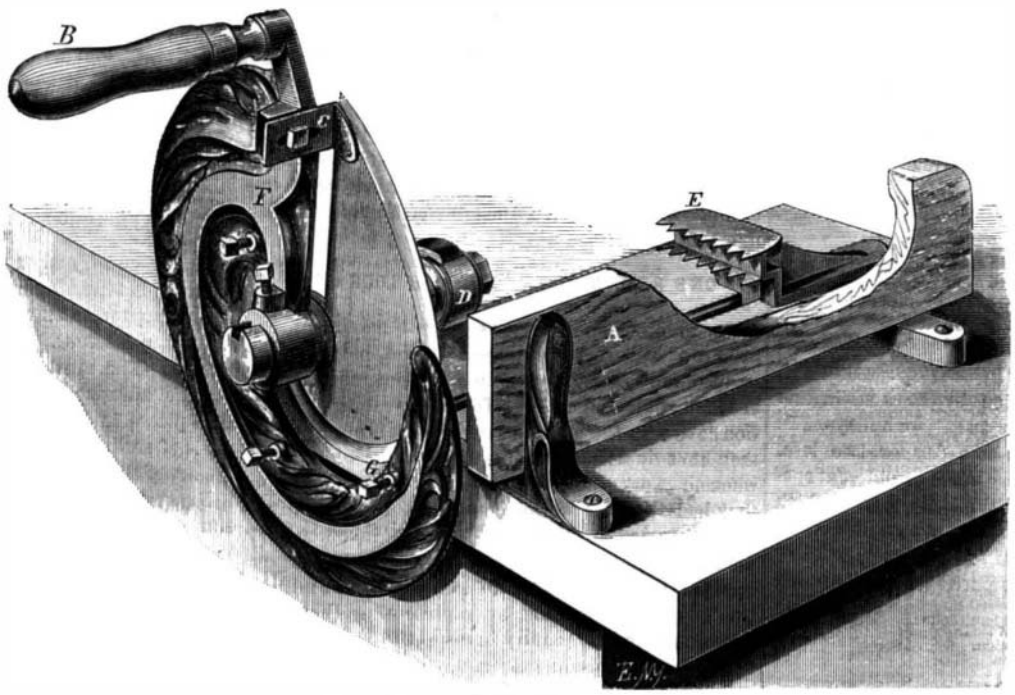
Improved Bread Slicer.

There has been a great demand of late years, especially since the war, for a convenient and simple machine to slice bread and meat with. The inventor of the one herewith illustrated says that his object has been to combine utility, neatness and durability at a moderate cost, and he thinks the end is obtained in his machine.

It is self-feeding, and by merely placing the loaf or joint of meat to be cut in the feed box, A, on turning the handle, B, the knife is revolved against the food and a slice is removed. The knife works close to the edge of the board, and can be adjusted at any time by the screws, C, in the handle. The loaf is fed up to the knife through the agency of a leather belt, D, which passes over rollers not seen; the end being attached to the clamp, E, which presses the work forward and holds it down at the same time.

In the guard, F, which protects the knife there are several cutters provided with bolts, G, which score the food to be cut in a vertical direction, so that strips may be removed instead of slices; the knife acts in conjunction with these. Any desired thickness of slice or shred can be cut by properly adjusting the feeding mechanism, and for cutting cabbage, bread, boneless meats, etc., it will be found useful. It was patented Jan., 3d, 1865, by G. B. Pullinger. For further information address J. H. Beardsley, 119 Nassau street, New York.



PULLINGER'S BREAD SLICER.

Improved Longitudinal Time Fuse.

Great difficulty is experienced in lighting the time fuses on the front ends of shells, particularly those used in rifled guns having soft cups or rings, to cut off windage, or impart rotary motion to the projectile; in these the flame from the charge is stopped too suddenly to reach the fuse. This imperfection is remedied in the shell shown herewith. This time fuse —graduated and cut like the Boreman fuse—is located in a longitudinal groove or grooves in the periphery of the shell, commencing near its base in front of the gas cup, and extending forward, entering the chamber of the shell nearer its front. Its position thus greatly increases the chances of ignition, whilst its construction is exceedingly simple as can readily be seen. Mr. Wright, the inventor of this shell is also the inventor of the ring fuse, and the cap machines which have supplied our armies since the rebellion, some sixteen machines being in operation, each capable of making fifty thousand a day. This fuse was patented March 21, 1865; for further information address. Geo. Wright, care of S. S. Fahnestock, Washington City, D. C.

Fig. 1

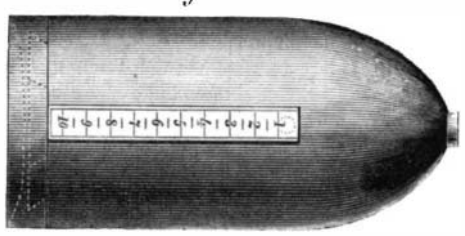
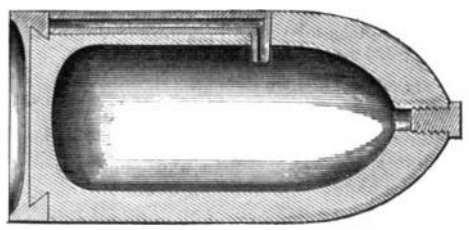


Fig. 2



WRIGHT'S LONGITUDINAL TIME FUSE.

New English Water Motor.

A rotary engine which, if it should utilise the percentage of power claimed for it by the gentleman who designed it, Mr. C. H. L. Fitzwilliams, is likely to be very largely adopted where small power is occasionally required, was described at a recent meeting of the Institute of Engineers in Scotland.

Practically, the engine may be regarded as two drums united to form one large cylinder, within which there work two pistons, each formed by uniting the halves of cylinders of different diameters, and easing down the asperities. Each piston rotates upon a shaft, which passes through the center of the drum, and as the pistons are connected by toothed wheels outside the cylinder, so that the large sides shall always be parallel to each other, it will be obvious that in each drum a water channel is alternately formed and closed between the piston and the side of the cylinder, the pressure of water in the supply-pipe acting upon the portion of the piston which connects the peripheries of the two halves. Mr. Fitzwilliams considers that if the fall is not more than 30 feet it cannot matter much where the engine is placed with regard to it; it would be just as efficient placed at the top as at the bottom of the fall. The water moves through the engine in one solid stream, during one-half of the revolution down one side, and during the other half down the other.

A comparatively small surface of the water comes in contact with the sides of the engine, so that the friction cannot be great between either the water and the engine itself, or between the different molecules of the water. The invention is likewise applicable as a water-meter, and as a pump, for which latter use it is claimed to be superior to the ordinary centrifugal pump, as it can work at quick or slow speeds with equal efficiency.

An interesting discussion followed the reading of the paper, Prof. Rankine, Mr. J. M. Gale, Mr. Downie, Mr. J. Elder, Mr. Yule, Dr. Joule, Mr. Day, and Mr. Fitzwilliams, taking part; and the general opinion seemed to be that it could not be used as a motive power economically, but that as a water meter it could be advantageously employed.

TRAINING DOGS.—In the course of some conversation in relation to dogs, Governor Anderson, of Ohio, related a Texan practice in training dogs with sheep. A pup is taken from its mother before its eyes are opened, and put with a ewe to suckle. After a few times the ewe becomes reconciled to the pup, which follows her like a lamb, grows up among and remains with the flock, and no wolf, man, or strange dog can come near the sheep, and the dog will bring the flock to the fold regularly at 7½ o'clock, if you habitually feed him at that hour.

New Metallic Alloys.

Messrs. T. Dunlevie and John Jones of England have patented a metallic alloy, to be employed for the bearings of shafts or frictional surfaces in machinery. The improvements consist in the combination and use of spelter and block tin, to which is added a small quantity of copper and a small amount of antimony, and the mode of combining the above in the melting pot is as follows:—First, take 4 ozs. of copper, melting or fusing it in any ordinary crucible.—When fused, add 16 ozs. of block tin and 1 oz. of antimony; and when the whole are melted together, pour the compound out into a mold. Then melt in a separate vessel 128 ozs. of spelter, together with 96 ozs. of block tin, and when both are fused, add the above ingot of copper, tin, and antimony, and fuse altogether; when properly fused in these proportions, or thereabouts, the alloy is complete. The chief features of this alloy are of great durability, and its low temperature when under the heating influence of friction.

For lining bearings, journals, etc., the bearing is to be tinned, in the ordinary method, with block tin and salammoniac. The improved lining alloy is then gradually fused, and the bearing heated, until it will fuse a solid strip of the alloy. A heated shaft, or mandril, is then inclosed in the bearing and mold, and the alloy poured in between the bearing and the shaft, remaining until it hardens; the bearing is then taken from the mold lined with the alloy.

JEFF DAVIS AND HIS 16 TUNS OF GOLD.

The flying ex-President of the ex-Confederacy is reported to be on his way to Mexico with a sum in gold variously estimated from six to thirteen millions of dollars—being the proceeds and net avails of the contents of all the banks he could get at during the closing hours of his career. The probability of its safe transport is much lessened when we reflect upon the enormous weight of it. We read, in a familiar verse of "John Gilpin:"—

He carries weight, he rides a race
'Tis for a thousand pounds!

In like manner Davis carries—estimating his plunder at $10,000,000, net—the enormous weight of 16 tuns—one million of dollars weighing 3,700 lbs. Considering the condition of Southern roads and the endurance of wagons and horse-flesh, it is unlikely that the treasure will ever be carried off safely, and we hope ere long to chronicle its capture.

Mechanical Improvements.

There have recently been introduced in the Fort Pitt Works two very important mechanical improvements, the first a new plan for turning trunnions, and the second for casting shells. Heretofore, the shoulders about the trunnions have had to be shipped off by hand, a slow and laborious plan, but by the employment of another eccentric cam applied to the lathe, this portion of the gun, like all the rest, can now be turned. This great improvement has been made by Mr. Kaylor, an employee of the works. The second improvement, in the making of shells, is in casting them with five-inch sinking heads, which are subsequently turned off, instead of the small heads formerly made, by which great density of metal is obtained.

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