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Contents:

(Illustrated articles are marked with an asterisk.)

THE WATER SUPPLY OF LONDON---DECREASE OF RAIN FALL, AND POLLUTION OF STREAMS.

The constantly increasing demand of London for water, produced by the yearly augmentation to the population and the extension of manufactures, together with the continually lessening summer flow of the Thames, is a source of grave apprehension to Parliament and the thinking portion of the British Metropolis. Not only is the rapidly increasing demand, and the rapidly decreasing volume of water during the summer months, a source of uneasiness, but the pollution of the Thames and its tributaries by the modern system of sewage causes even greater solicitude. This sewage, the offspring as it is of the extension of population, is an evil, it seems, which, while it cannot be prevented, is capable, by proper engineering, of having its polluting influence so far ameliorated as to be comparatively innocuous.

This subject, of the London water supply, both with regard to maintaining a supply throughout the year adequate to meet the increasing demand as well as to correct the pollution of the streams—the sources of supply—by the contaminating effects of the sewage from the cities near their banks, has been the subject of a very valuable and interesting paper lately read by Mr. Denton before the London Society of Arts.

It is explained, in the first place, that the decrease in the summer volume of flow of the Thames is caused by the fact "that the rain fall is getting positively, though gradually, less in quantity from the disafforesting of the woodland, the improved cultivation of the soil, and the drainage of lands and districts; that although by the drainage of land we gain an increase of water in the winter season, we suffer a diminution in summer." And with respect to the pollution of the streams, that "the sewage of towns is corrupting our rivers and streams in their transit through the country to the sea, proportionally as the sewage of towns extends and the summer flow of rivers becomes less." Thus, while the increase of population and manufactures is rapidly increasing the sewage, the rivers into which this foul sewage is emptied are each summer becoming less and less in volume, and hence the pollution is increasing proportionally as these causes are augmented. This indeed is a state of affairs which we should be very loth to contemplate for our city of New York, and it is a matter which will tax the skill of the English Engineers to the utmost to render the sewage harmless and to maintain an adequate water supply for their metropolis throughout the year.

With respect to the diminution of the rain fall, the following table, prepared by Prof. Austed, and published in the Journal of the Royal Agricultural Society of England, is both interesting and instructive as illustrating the effects of the works of civilization on meteorological phenomena:

Years.	Mean rain fall. Inches.	Mean of 14 years. Inches.
1815—1821	23.7	28·3
1822—1828	27·9	26·1
1829—1835	24·3	24·7
1836—1842	25·1	24·6
1843—1849	24·1	24·0
1850—1856	23·8	23·8
1857—1863	23·7	

On this data Mr. Denton observes, "If we deduce that the rain fall is gradually declining, we cannot reject from consideration the counterbalancing circumstance that land drainage, which is taking place all over the country, discharges into the rivers from the land a *larger* quantity of water than found its way to them before drainage, and more than is actually lost to the rivers by the lessened rain fall." And if the whole of the land which sheds its water into the Thames was wet land, there would be a constant gain in the volume of the river by the extension of the drainage system, but as the wet lands form but a small portion of this surface, and "the water of drainage issuing from our clay lands is not constant, it is, for the most part, discharged in the winter months, when both soil and air are frequently in a state of saturation, and when vegetation is dormant, and ceases to flow in summer, when evaporation is active and the demands for vegetation can hardly be satisfied." Thus the drainage adds to the derangement of the water supply, and the more the drainage is extended and improved, the more, proportionally, will this derangement increase, and "the floods of winter and the droughts of summer" will both increase.

Now there seems to be but one way that the great excess in winter—an excess sometimes so great as to cause serious floods—can be made to balance and supply the deficiency caused by the droughts of summer. This method is to store enough of the winter's surplus to supply the deficiency in summer, and this is the method recommended by Mr. Denton. Of course storehouses for such vast quantities of water means the construction of huge reservoirs, containing enough for two months, or thereabouts, metropolitan supply. This is a plan already being carried out in one of our largest eastern cities, by building a huge reservoir to be filled by the surplus of the season of plenty, to be let into the mains when the lake, from which the supply is drawn, runs low. To show how much in excess the rain fall is over the wants of the population—that is, if it can be collected and made available, it has been calculated, that while the mean average rain fall of the Thames Basin is twenty-six inches, "it only requires three-fourths of an inch of the surplus of winter, from the whole water shed of the Thames, or one and one-half inches from one moiety of the water shed to satisfy the whole population with it." Or, to put the matter more practically, as Mr. Denton remarks, "as it will only be necessary to collect water for six months of the year, one-half an inch of rain, falling on an acre of land, is sufficient to supply two persons with thirty gallons each per diem for six months, and no winter passes by in which there does not run off to the sea, without serving any useful purpose, in excess of the mean summer flow of the river, at least five times the quantity required to meet the supply of the metropolis in the dry times of the summer, when the river cannot fairly part with any portion of its volume; and this or any portion of it may be stored for compensation to the river if reservoirs were properly constructed for the purpose."

It would thus appear that the means necessary to be adopted to maintain an adequate water supply, as regards quantity, are clearly pointed out, and it only remains to free the river water from the pollution of the sewage, to have the supply amply sufficient both as regards quantity and quality. An enormous volume of water is pumped out of the Thames daily by the five water companies; they extract from that river sixty millions of gallons daily, which they have the power to increase to one hundred millions.

It is stated that the flow of the Thames—which should always, it is maintained, be kept at a standard flow of say 450 millions of gallons per diem, is often reduced in dry summers by the pumps of the water companies to 300 to 350 millions. With respect to neutralizing the polluting effects of the constantly increasing sewage, the problem appears to be much more difficult than to store up an adequate supply of water as regards quantity alone. As the summer flow is decreasing and the sewage is continually increasing, both the difficulties and necessities of a correction of this growing evil are apparent.

Rivers, to answer one of the purposes for which it seems nature intended them, must receive the liquid shed into them by the land which they drain, and at the same time supply the population with pure water; but if the river is dirtied by impurities, one of these important objects is at once defeated. And the very small quantity of sewage necessary to render the water unfit for culinary purposes is quite remarkable; it is concluded that "as soon as sewage can be detected by chemical analysis to exist in an appreciable degree in the water we are called on to drink, it is a vital error to use it."

Now, of all the methods proposed for the abstraction of the impurities from sewage, there is only one which scientific men regard as possible to be applied on a scale at all extensive, and that is the distribution of the sewage over land. And even this requires a surface and a proper subsoil, together with the right sort of vegetation to extract and assimilate sufficient of the impurities to render it safe to allow it to mix with water to be used for drinking purposes.

These conclusions, on this point, are thus briefly summed up in the paper alluded to:—

1st. That sewage run over a surface of land which has neither natural or artificial drainage to assist vegetation in retaining the deleterious elements, altogether fails to secure that degree of purity which will allow of its being discharged into rivers from whence may be taken water for drinking purposes, though the operation may serve to clarify and improve its character sufficiently to allow of its being utilized in rivers for navigation and for many other riparian uses.

2d. That land artificially drained to a depth of a few feet, affords, if irrigated, only an imperfect means, in conjunction with vegetation, of separating from sewage its objectionable elements.

3d. That when sewage can be lifted upon high and fertile grounds with a free and porous subsoil, which will admit of its penetration to a considerable depth after it has fed vegetation on the surface, a perfect means of purification may be attained.

The latter plan, which is the only one which thoroughly purifies the sewage, will in most cases require the use of steam engines, pumps, pumping stations, reservoirs, conduits, and other engineering appliances, and a constant outlay for attendance and repairs. It is estimated that it will annually cost some $30,000 to raise the sewage of 250,000 persons 100 feet high and a distance of five miles.

The above remarks and extracts cannot fail to impress upon the reader the extraordinary degree of complication the uses and abuses of progress entail on such an absolutely essential matter as a proper supply of pure water. To maintain life, three wants must be supplied—air, water, and food. Formerly it was only the latter that demanded the sweat of one's brow; but now a supply of pure water not only demands the most skillful engineering talent, but also the expenditure of vast quantities of labor.

SPEED OF THE 15-INCH SHOT.

While Captain Noble and the British artillerists are speculating on the capacity of the 15-inch American cast-iron navy smooth-bore cannon, with a velocity of shot less than 1,200 feet per second, we on this side of the Atlantic are wondering why they do not indulge in a little mathematics with respect to the effect of the 453-lb. ball at higher velocities. Are they afraid to "penetrate" "rack" or to produce a tremendous "non-local effect" on their targets—the representatives of the strength of the British navy—even on paper?

Fifteen hundred feet is a common velocity with our 453-lb balls: it is given in the text book on ordnance used by the military schools all over the country, where the American idea is taught how to shoot.

And while Capt. Noble, the eminent ordnance mathematician of Her Majesty's service is astonishing his brethren and tickling the patentees of small-bore ordnance and the small-bore members of Parliament, by his skill in holding the 15-inch ball down to a velocity of less than 1,200 feet per second, with a harness of algebra, and the power "per circular inch" down to a certain number of "foot tuns," our farmer boys are using a school book which shows that the ball goes some 1,500 feet per second. That is, as the square of 1,170 is 1,368,-900, and the square of 1,500 is 2,250 000, about 63 per cent more *vis viva* than this mathematical gymnast thinks to be possible.

The following extracts from Benton's text book on Ordnance speak for themselves and illustrate our meaning:

The navy 15-inch trial gun was fired 900 times with charges varying from 35 to 70 lbs., mostly mortar or navy cannon powder . . . Our army 15-inch gun has been fired without injury 250 times with charges varying from 40 to 100 lbs. of mammoth powder—the same that was used in England in trials against the target. One hundred of these rounds were with 100 lbs. of powder and spherical projectiles of 450 lbs. each. 15-inch gun No. 105 has likewise been fired as follows, namely:

No. of times fired.	Charge.	Weight of ball.	Velocity.
2	60 lbs.	430 lbs.	1191 feet.
3	70 lbs.	431 lbs.	1278 feet.
3	80 lbs.	433 lbs.	1355 feet.
3	90 lbs.	452 lbs.	1433 feet.
2	100 lbs.	453 lbs.	1509 feet.

Now, ye artillerists of Shoeburyness, the next time you project a 15-inch ball against your 8-inch solid slab backed by 18 inches of teak and a thin iron skin, or even against your much vaunted "Hercules" target, be sure and put plenty of powder behind it. We are not particular about the kind, no matter whether it is English, Dutch, French, or Japanese, only make sure to put in sufficient to drive the ball at least 1,500 feet per second.

At the late trials with the 15-inch at Shoeburyness, according to the official statements published in the scientific journals, it was demonstrated that 50 lbs. of the English powder was equal to 60 lbs. of the mammoth grain imported from America, hence, according to this ratio it will require 83⅓ lbs. of the Shoeburyness powder to equal 100 lbs. of the mammoth grain. So if it is the intention of the English trials to find out the real power of the gun, that is the charge which should be employed; and in order that the trial may be comparative, the gun should be exactly the same distance from the target that it was on the trial already made.

Waive your excessive delicacy just once; do not be afraid of bursting the big cast-iron smooth-bore. But it is not so much the success of this lump of cast iron that we are interested in, as it is in the pleasure of witnessing the demolition of the absurd small-bore system on which you have wasted millions. The English ordnance engineer started with a loud blowing of trumpets years ago to build 13·2-inch wrought-iron Armstrong rifles, but finding they were no go, these gun-makers were driven to smaller calibers, hence the arguments of their mathematicians to prove them to be the best.

We are willing to hazard the prediction that before long the British small-bore system of naval ordnance will be as completely smashed, as the "reputation of Sir William G. Armstrong, the whilom great "rifle engineer."

With respect to the character of the metal best adapted for projectiles for iron-clad warfare, it will not, we think, be denied but that the invention—or discovery—of the advantage, of chilled cast-iron shot for the penetration of armor, is as applicable and adds as much to the efficiency of smooth-bore ordnance as it does to the rifle.

Therefore, on the trials to which we have alluded, any advantage which the nine-inch rifle may have had over the big smooth-bore, owing to the peculiar character of the iron its shot was made of, or in the method of casting it, it is not an advantage in any way whatever due to the gun itself. And it is quite clear that, in order to make a fair test, each gun should be fired with the best projectile known, capable of being used in the gun. In other words, no advantage should be permitted of one gun over the other, except such advantages as are due solely to the piece itself, such as strength, caliber, and method of rifling.

PROGRESS OF THE PNEUMATIC RAILROAD.

The first practical example of the Pneumatic Railroad ever constructed in this country has just been completed by the Holske Machine Company, No. 528 Water street, and will form one of the prominent features at the exhibition of the American Institute in this city, now just opening. The pneumatic tube is six feet in diameter, composed of fifteen thicknesses of wood veneers, wound and cemented one upon the other in alternate spirals. This makes a tube of remarkable strength and rigidity, although the total thickness of wood is only an inch and a quarter. This tube is made under J. K. Mayo's patent. The blowing apparatus consists of a wheel 10 feet in diameter, made on the principle of a screw propeller. The pneumatic car consists of an open vehicle with a valve or disk at one end, which fits the tube. The car seats twelve passengers. The tube is over 100 feet long.

Messrs. Holske have also built a Pneumatic Postal Dispatch for the exhibition. It consists of a pneumatic tube 24 feet in length and two feet square, having a lamp-post letter-box arrangement upon it, and a pneumatic car within. The construction is such that when the car, which is driven by air pressure, passes through the tube, it collects the letters from the lamp-post. The intention is to lay down these tubes through the city for the speedy collection and delivery of postal matter.

The above railroad and postal devices are made from designs by Mr. A. E. Beach, of the SCIENTIFIC AMERICAN, and their practical operation will be more fully described hereafter.

English Patents.

The Lord Chancellor, the Master of the Rolls, and the late and the present Attorney-General (the latter then Solicitor-General), as commissioners of patents, report that 2,124 patents were passed in the year 1866. The amount received in the year for stamp duties, the fees being now paid by means of stamps, was £114,461, which was more than double the expenditure of the department, though this must have been upon a liberal scale, if we may judge from the first item, £9,428, paid in fees to the Attorney-General and the Solicitor-General, and £856 to their clerks. The receipts included £31,400 for continuing old patents beyond the first three years of their term of fourteen years, and £21,900 for continuing old patents beyond the first seven years of their term. The fee of £50 for continuing a patent beyond its third year is paid on about 30 per cent. of the patents issued, and the other 70 per cent. become void at the end of three years. The further sum of £100, payable at the end of the seventh year is paid on about 10 per cent. of the patents issued, so that 90 per cent. are allowed to become void at the end of the seventh year.

Chloro-Iodized Collodion.

A friend of ours is working entirely, both in the gallery and the field, with chloro-iodized collodion: the results are excellent; we are inclined to believe they are better than can be obtained with a bromo-iodized collodion. Our own experience with a similar collodion is equally satisfactory; we get more detail and better work in general with the chloro-iodized than with the bromo-iodized collodion.

Formula.—Alcohol, 4 ounces; ether, 4 ounces; pyroxyline, 48 grains (more or less); iodide of ammonium, 40 grains; chloride of ammonium or magnesium, 8 grains.

Chloride of magnesium is more easily soluble in alcohol and ether, and therefore preferable. Our friend has 24 grains of chloride of ammonium in this quantity of collodion, but we are certain so much will not dissolve.—*Humphrey's Journal.*

OFFICIAL REPORT OF PATENTS AND CLAIMS

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FOR THE WEEK ENDING SEPTEMBER 3, 1867.

Reported Officially for the Scientific American

PATENTS ARE GRANTED FOR SEVENTEEN YEARS the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

68,334.—DOOR LOCK.—E. Allen and J. Brady, Norwich, Ct.
1st, The combination of the two opposite sets of tumblers, the key, I, notched on both sides or edges, and the cam, D, applied to operate simultaneously on both sets of tumblers, substantially as and for the purpose specified.
2d, The cam, D, constructed with teeth, g, the sliding frame furnished with bolts, G, and spurs, h, and the two opposite sets of tumblers, arranged to operate in relation with each other and with the key, I, springs, c, and stop, n, substantially as and for the purpose specified.

68,335.—MODE OF PREPARING TAN BARK FOR USE.—Alexander Appleby, Brownfield, Me.
I claim bark prepared by being rendered flexible and flattened and reduced by means substantially as described; and furthermore,
I claim the proces as hereinbefore specified for preparing bark for transportation and use as explained, such consisting in rendering the bark soft and flexible, by moistnre or steam, and next flattening it and removing from it the ross, by means as set forth or the equivalent thereof.

68,336.—RIG FOR SLOOPS AND SCHOONERS.—John Atwood, Jr., Provincetown, Mass.
1st, I claim in combination with the stationary mast, A, the secondary or additional mast, B, when the latter is so arranged as to be capable of being firmly fixed to the deck and form a support to the stationary mast, or of being raised so as to form a continuation of the said stationary mast, as and for the purpose specified.
2d, I claim in combination with the secondary mast, B. the guides, a a, the eyes, b, and crosstree, c, as described.

68,337.—ROTARY ENGINE.—Wm. Atwood, Cape Elizabeth, Me.
I claim the construction of the chamber, having inclined and horizontal portions on the interior faces of the cylinder heads, as and for the purposes described.
2d, The rotary piston, D, with its slots and alternating wings, E, as and for the purposes described.
3d, In combination with the cylinder chamber, the rotary piston and alternating wings, the arrangement of the four ports of the cylinder, substantially as and for the pur oses described.

68,338.—KEY FOR LOCKS.—A. G. Batchelder, Lowell, Mass.
I claim the key, A, as made with the notch, a, arranged in its shank, and with respect to its bit, c, substantially in manner and for the purpose as specified.

68,339.—BUSINESS CARD AND PIN CUSHION.—De Witt C. Beamer (assignor to himself and James Markland), Philadelphia, Pa.
1st, I claim a combined hermetically sealed, scented, perfumed business card and pin cushion, constructed substantially as above described and for the purposes set forth.
2d, The combination of the piece of lapping, B with the board, A, and strips, E E, the lapping having a hole, a', for the reception of a perfume material, and arranged substantially as described and for the purposes set forth.

68,340.—BENDING MACHINE.—L. H. Beckwith, Port Jervis, N. Y., assignor to himself, M. Colgan, Port Jervis; and M. M. Livingston, New York city.
1st, I claim a forming lever, in combination with a holding box and former, the whole constructed and arranged substantially as described, and having a mode of operation substantially as set forth.
2d, The combination of the set screws, D I, and stops, F s, with the holding boxes, substantially as and for the purpose herein specified.
3d, The cam shaped clamp, C, in combination with the holding box, B, and adjustable stop, s, substantially as specified, for holding the bar or rod in the holding box while being operated upon.

68,341.—STRAP ATTACHMENT.—Alma Bedford, Coldwater, Mich.
I claim an improved fastening device consisting of a clamping plate made concave or with an upturned edge, combined by means of a central independent screw, with an opposite plate of smaller diameter or demension, the whole arranged and operating substantially in the manner and for the purpose herein set forth.

68,342.—MACHINE FOR FRAMING MATCH SPLINTS.—Jacob Bentz, Brooklyn, N. Y.
1st, I claim the employment of a splint clamp feeding device arranged to work in connection with the machine for framing and filling the splint clamp with splints, substantially as and for the purpose herein shown.
2d, The employment of the cams, S S, the levers, R R, and connecting rods, T T, for the purpose of automatically operating the said feeding device with the operation of framing and filling of the splint frames, substantially as herein shown.
3d, The employment of the slot, U, in connection with the grooved bed, C. and hopper, B, and plungers or comb, E, substantially as and for the purpose herein described.

68,343.—STRAW SCATTERER.—Montgomery Blair, Barry, Ill.
I claim the foregoing described machine with its combination of pulleys, rollers, and revolving rakes, and stop rakes, all moved by means of bands and pulley attached to common wagons.

68,344.—MANUFACTURE OF HOSE.—Glaucus H. Bonnaffon, Allagheny City, Pa.
I claim strengthening hose or belting by plates or straps of metal, or other suitable material, connected with the riveting in the folded edges, which plates or straps are also riveted to the hose or belting at points laterally back from the main riveting, substantially as and for the purposes above set forth.

68,345.—PREPARING SHORT CUT STRAW FOR FEED.—Charles Brown, Buffalo, N. Y.
I claim preparing short cut hay and straw, by crushing and winnowing to produce an improved article of food for cattle and horses, substantially as described.

68,346.—MACHINE FOR REMOVING THE SEED FROM BROOM CORN.—James D. Brown, Preble County, Ohio.
I claim the wheel, B. provided with teeth or spikes, b b, and the chute, D, arranged and in combination with the whole substantantially as herein set forth and for the purpose specified.

68,347.—RAILWAY CAR SEAT.—Justus A. Brown, Bath, Me.
1st, I claim the reciprocating arm, C C, pivoted to the seat, A, with the bar, g, connected to their lower ends, and having the back, B, pivoted to their upper ends, which is provided with pin, c, playing into the slot, d, of the back, as represented and described.
2d, The pin, c, in combination with the back, B, operating with the slotted arms, C. pivoted to the seat frame, substantially as described for the purpose specified.

68,348.—HOSE COUPLING.—John R. Buchanan, Chicago, Ill.
I claim the combination and arrangement of nut, D, barrel thimble, B, and hose, C, arranged to operate substantially as and for the purpose set forth.

68,349.—BUOY SAFE.—F. O. Buisson, Nantiat, France.
I claim a buoy safe composed of a metallic buoy made up of separate compartments provided with lids or doors and outside cork armor, substantially as specified.

68,350.—APPARATUS FOR TESTING DEEP WELLS.—T. Burr and T. Wakelee, Battle Creek, Mich.
1st, We claim the packing boxes. B B C C C2 C2, constructed and operating substantially as described and for the purpose set forth.
2d, The gas pipe, D. in connection with the packing band, substantially as and for the purpose set forth.
3d, The lever, i, in combination with the connecting rods. G G, brake, E, extension rods, F F, and packing bands, B B C C C2 C2, substantially as described and for the purpose set forth.

68,351.—APPARATUS FOR COATING METAL PLATES WITH TIN AND OTHER METALS.—H. W. Butterworth, Philadelphia, Pa.
1st, I claim rollers, a and a', combined with a pan for containing molten lead, substantially as and for the purpose herein set forth.
2d, The pan, B, in combination with the rollers, a and a' and b and b', geared together so as to operate together substantially as described for the purpose specified.
3d, The arrangement of the curved apron, b2, in the bottom of the pan, B, in respect to the rollers, a and a' and b and b'.

68,352.—GRAIN FORK.—Abram Clow (assignor to himself and Charles Clow), Port Byron, N. Y.
1st, I claim the arrangement of the sockets, a' and C, placed in line, so that in seating the center tooth, B', it must be driven through both sockets, as herein described and for the purpose specified.
2d, Also the elevated rests or supports, f f, for steadying and stiffening the bow, D, substantially as and for the purpose specified.

68,353.—WINDOW VENTILATOR.—Samuel Darling, Bangor, Me.
1st, I claim combining with an ordinary window sash a ventilating device inserted in the sash itself, substantially as described.
2d, In combination with a ventillating device substantially such as described, openings or perforations in the sash inclining downward and outward.
3d, In combination with double sashes, one or more ventilating tubes inserted therein and provided with a valve, substantially as described.

68,354.—CHURN DASHER.—Geo. H. Dow, Freeport, Ill.
I claim the valve seat, D, and valve. D', in combination with the dasher, B, and shaft, A, when constructed as and for the purpose set forth.

68,355.—CLOTHES DRYER AND STAND.—W. H. Earnest, Parkersburg, W. Va.
I claim the revolving head, C, flat at its top and with a circumferential groove on its edge, around which is passed the wire, E, having a series of arms, D, suspended by means of narrow slots at their inner ends, said arms being grooved at their sides and beveled on their upper edges, the whole supported by the stand, A. as specified.

68,356.—CENTRIFUGAL MACHINE FOR WASHING SUGAR.—George E. Evans, Boston, Mass.
1st, I claim a removable cone for forming a wall of sugar in centrifugal machines constructed and operated substantially as described.
2d, In centrifugal machine for washing sugars, I claim operating a removable cone placed within such centrifugals by lifting it while the centrifugal is being revolved for the purpose of forming a wall of sugar, in the manner and for the purpose substantially as described.

68,357.—MACHINE FOR SEPARATING TINNED AND GALVANIZED ARTICLES OF METAL.—Herbert E. Fowler, Walcottville, Conn.
I claim the vibrating separator, fitted substantially as specified, in combination with the supply hopper, as and for the purposes set forth.

68,358.—COW MILKER.—George H. Gardner (assignor to himself and A. B. Cooley), Philadelphia, Pa.
1st, I claim the combination with the vessel, A, of a piston, B, its rod, d, and the operating lever, C', the whole being constructed, arranged, and operating substantially as set forth for the purpose specified.
2d, The branch pipes, D, rendered adjustable on the vessel, A, substantially as and for the purpose herein set forth.
3d, The adjustable teat cups, G, strengthened by the rings, v v1 and v2, substantially in the manner described.
4th, The manner substantially as described of securing teat cups, G, to the branch pipes.

68,359.—AMALGAMATOR.—H. A. Gaston, Nevada City, Cal.
1st, I claim the dies, E, in the bottom of the pan, constructed and operating in combination with mullers, A, essentially as described.
2d, The mullers, A, when constructed of a spiral form, whereby they are made to spread or grind the pulp when rotated in one direction and to loosen it from the bottom when rotated in the opposite direction, substantially as described.

68,360.—METHOD OF HOLDING WHIPS.—John Gibson, Jr., Albany, N. Y.
1st, I claim constructing whips with a hollow butt or handle end, for the purpose substantially as set forth and described.
2d, I claim the standard, C, with or without the elastic washer, e, or its equivalent, attached to the body, dickey seat, dash, or any other part of the carriage or sleigh, for the purposes set forth and described.
3d, The hollow or bore, a, of the whip handle, in combination with the standard, C, for holding the whip, substantially as set forth and described.

68,361.—BUTTENER FOR SHOES.—John F. Goldthwait, Boston, Mass.
I claim a buttoner substantially as described, consisting of a continuous loop, enlarged at C, for the purpose of receiving the button, and narrowed at d, to suit the eye of the button.

68,362.—DRILLING MACHINE.—Wm. D. Grimshaw, Newark, N. J. Antedated Aug. 18, 1867.
1st, I claim the slides, t, clamped to the standard, b, and receiving the bed, u, constructed and arranged in the manner and for the purposes specified.
2d, I claim the pulleys, d r and s, arranged as set forth, in combination with the drill stock, k, treadle, g, and crank, 2, as and for the purposes specified.

68,363.—PREPARING AND TREATING VEGETABLE FIBERS.—Charles Heaton, New York city.
1st, I claim subjecting crude vegetable fibrous material to any chemical treatment which softens and shrinks its bulk without disintegrating the same, for the purpose set forth and described.
2d, Preparing bamboo or other crude vegetable fibrous matter for transportation and subsequent disintegration as a fiber-producing material, by means of an alkaline or a caustic alkaline solution.
3d, Softening and preparing bamboo, or other crude vegetable fibrous matter, by means of an alkaline solution, when so applied as not to disintegrate the material, but simply to prepare it for mechanical reduction, as fully set forth.
4th, The process of disintegrating bamboo or other like crude vegetable fibrous matter, by means of the beating or rag engine or its mechanical equivalent, when such bamboo or other fibrous matter has not been reduced to a pulpy mass by chemical action or when the material has not been previously subjected to a treatment which destroys its woody conformation, but has been prepared for the mechanical disintegration by being softened in an alkaline solution.

68,364.—BOOT HEEL.—John Hubbell, Buffalo, N. Y. Antedated Aug. 25, 1867.
I claim extending the metallic heel plate upwardly sufficient to meet the upper leather, as represented at a3, and making the front part concave as shown at a4, for the purpose and as described.

68,365.—ROLLING RUBBER INTO SHEETS AND APPLYING THE SAME TO FABRICS.—David C. Hull, Chelsea, Mass.
I claim the improvement in the manufacture of sheets of rubber by means of rollers, the same consisting in the formation of two separate sheets, by two pairs of reducing rollers, and subsequently bringing together and uniting the two sheets so made by means of two rollers and by the pressure of such sheets between such rollers, as specified.
I also claim the new manufacture or compound rubber sheet as made by such process or means.
I also claim the duplex or compound rubber sheet making machine, as composed of the two pairs of reducing rollers, B C and D E. and one or more compressing rollers, F, the whole being to operate substantially as and for the purpose described.
I also claim the above described improvement in the application of rubber to cloth by means of rollers, the same consisting in the formation of two separate sheets of rubber by two separate sets of reducing rollers and applying and pressing by means of two rollers, such two sheets together and upon a single piece of cloth or upon two pieces of cloth, so as to unite the sheets and cloth in manner as specified.
I also claim the new manufacture or compound rubber coated cloth or its equivalent, made by means and in the manner specified.

68,366.—COOKING RANGE.—M. C. Hull, New York City.
1st. I claim in a range or stove provided with an elevated oven, a descending flue in the lower portion of the range, for the purpose and substantially as set forth.
2d. I claim the arrangement of the air pipe, k, smoke flue, n, and elevated ovens, o, o', in combination with a range or stove having a descending flue, substantially as and for the purpose set forth.
3d, I claim a conical register introduced in the hot air flue around the smoke flue, in the manner and for the purposes specified.
4th, I claim forming a chamber, for non-conducting material, above the top oven flue, for the purposes and as set forth.
5th, I claim inclining the upper plate of the top oven flue, so as to deflect the products of combustion down upon the top of the oven as set forth.
6th, I claim the air flue, k, within the smoke flue, n, in combination with an air heating range or stove, substantially as set forth.

68,367.—DRYING OILS FOR PAINTS.—Fleury Huot, N. Y. City.
I claim the manufacture of drying oils having a body adapted to paint, &c., by the acid reaction in the manner specified.

68,368.—CAR SEATS AND COUCHES.—Isaac W. Lamb, Salem, Michigan.
1st, I claim the backs, B, hinged to the seats and connected by rods to upper movable berths, constructed and arranged as described.
2d, The arms, b, b', in combination with the movable backs, as and for the purpose set forth.
3d, In combination with the arm, b. b', and backs, I claim the arrangement of cords, rollers and pulleys, for the purpose set forth.
4th, I claim the stops, o, o', in combination with the seat frame and arms, b, b'.
5th, I claim the upper couches, D, D', attached to the seat backs by long and short rods, all constructed and arranged as described and for the purpose set forth.
6th, In combination with the upper couches, supported and operated as described, I claim curtains, e, e, as and for the purpose set forth.

68,369.—HORSE COLLARS.—William Leonard, Boston, Mass.
I claim a horse collar, the bearing surface of which is made of rubber compound, when the edges of such rubber are reinforced to enable the rubber to be secured in position, substantially as set forth.
Also, in combination with the above, I claim interposing between the rubber and the stuffing, c, the cloth, h, substantially as and for the purpose described.

68,370.—PAPER STOCK.—Heman S. Lucas, Chester, Mass.
I claim the application of the fibres of the stalks and leaves of the plant *Spartina Juncea,* (or low Rush Salt Grass,) to the manufacture of paper stock.

68,371.—PLATFORM SCALES.—C. C. Lyman, Edinboro, Pa.
I claim the cams. G, shaft, D. and pulleys, H, as arranged in combination with the platform, B, for the purpose and in the manner set forth.

68,372.—CATTLE STANCHIONS.—Chas. H. Mann, Fairlee, Vt.
I claim the rotary stanchion, as well as its arrangement and combination with a holding frame or its equivalent, the whole being substantially as described.

68,373.—SOFA BEDSTEAD.—Chas. F. Martine, Boston, Mass.
1st, I claim the spring catch, a. and pin, e, in the stationary section, D, and the notched opening in the hinged section, C, of the arm for securing said sections together as and for the purpose specified.
2d, The latches, G G, pivoted to the back, L, and used in combination with the staples or loops, I, I, and cord, J, for disengaging both ends of the back simultaneously, substantially as specified.

68,374.—MACHINE FOR STIRRING STARCH.—Purdy Mason and James W. Brant, Oswego, N. Y.
1st, We claim the tank, A, with its glass stave or window, as and for the purpose set forth.
2d, The use of the adjustable gates, G. G, with their weights and cords for regulating them, substantially as herein set forth.
3d The combination and arrangement of the tank, A, and shaft, D, with its arms with the sleeves, H, H, cords, J, J, and gates, G, G, as and for the purpose specified.

68,375.—APPARATUS FOR THE MANUFACTURE OF SODA WATER AND FOR AERATING LIQUIDS.—John Mathews, Jr., New York, City.
1st, I claim a soda-water or other aerating apparatus, having its pump feed and agitator or mixer, so arranged in relation to its condenser or reservoir as that all joints in the latter above its average water level may be dispensed with as herein specified.
2d, In soda-water or other aerating apparatus the combination with the reservoir or condenser, C, a reciprocating discharge pipe or tube, J, to the pump, substantially as and for the purposes herein set forth.
3d, The combination of the stationary hollow plunger, D, reciprocating pump cylinder, F, reciprocating discharge pipe, J, connected therewith, receiving and delivery valves, and reservoir or condenser, C, essentially as specified.
4th, The volutes, L, M, or their equivalents, acting as agitators or mixers, arranged on the reciprocating pump discharge pipe, where it projects into the reservoir, C, or otherwise similarly driven for action therein, as set forth.
5th, The combination with the pump for direct action thereby of an agitator or agitators within the condenser.

68,376.—GATES.—Isaac H. McOmber, El Paso, Ill.
I claim the block, G, roller, H, staple, C, and bolt, D, shaft, E, and spring, F, constructed and arranged to operate as and for the purpose set forth.

68,377.—STEAM ENGINE.—Cyrus H. Merrick, Pittsburg, Pa.
1st, I claim so constructing the steam valves and ports of the cylinder of a reciprocating engine as to open a communication for exhaust steam between the two ends of the cylinder at or about the time when the live steam is cut off and before the completion of either stroke, substantially as and for the purposes above set forth.
2d, Balancing the piston of a reciprocating engine by the use of exhaust steam or other fluid motor employed while the crank is approaching to, passing and receeding from the dead points or centers, during any desirable portion of the stroke, substantially as and for the purpose above described.
3d, So constructing and arranging the steam valve and ports of a steam engine as to admit steam to cylinder during the middle of each stroke, and for a greater or less proportion of such stroke, in combination with one or more openings or communicating passages from end to end of the cylinder fitted with a valve or valves or other suitable device for permitting or preventing the flow of stream, in order to balance the piston, substantially in the manner and for the purposes hereinbefore set forth.

68,378.—WASHING MACHINE.—Lewis Merrifield, Lagrange Center, Ind.
I claim the combination and arrangement of the frame, D, grooved rollers, B B, rubber, K, tub, H, with the springs and catches, E, all as and for the purpose specified.

68,379.—CURBING.—Jeremiah Miller, Pittsburg, Pa.
I claim a metallic curbing or metallic base for railings fences and similar purposes consisting of a cap or crown piece, web, flange and gutter constructed substantially as and for the purposes described.

68,380.—HOSE COUPLING.—Peter H. Niles, Boston, Mass., assignor to himself and Agustus Russ, Cambridge, Mass.
1st, I claim the construction of a self-packing coupling composed of an elastic ring expanded into a recess in the opposite section of the coupling by means substantially as described.
2d, I claim the expanding ring, D, in conformation with the recess, G, forming a self-packing coupling substantially as above described.
3d, I claim the ring, D, nut, B, washer, C, and flange, E, acting in combination substantially as above described.

68,381.—WOOD SCREWS.—Richard J. Nunn, Savannah, Ga.
1st, I claim the nails or locking brads, b, in combination with the screw having its head constructed with nicks or notches, a', substantially as and for the purpose herein set forth.
2d, The supplemental head, c, in combination with the locking brads, b, and the notched head of the screw, substantially as and for the purpose herein set forth.

68,382.—CONDENSER.—Frederick Ortlieb, Williamsburg, N. Y.
1st, I claim the outer siphonic pipe through which the water from the condenser flows for extracting the air and gases from the steam condensing spaces through a pipe or pipes communicating therewith essentially as set forth.
2d, The combination of the water circulating or siphonic pipe, C, with the pipe, D, or its extension, D', made adjustable so as to regulate the outflow through the pipe, C, for operation in connection with the condenser substantially as specified.

68,383.—LINING IN STOVES.—Austin Packard, Brooklyn, N.Y.
I claim fastening or securing fire brick or soap stone lining in the fire boxes or fire pots of stoves, ranges, cabooses or in other places where such linings are or may be used substantially as hereinbefore set forth.

68,384.—CANNING FRUIT.—C. J. Paine, Young America, Ill.
1st I claim the improved mode herein described for canning fruit, etc., by means of steam introduced into the body of the fruit, etc., whilst the same is in a cold state, substantially as set forth.
2d, I claim the special use of the pipe, C, provided with the perforations, E, and operating in the manner and for the purpose substantially of specified.
3d, The filler or funnel, D, provided with the collar, D', in combination with the pipe, C, and operating so as to be adjusted to any hight can or jar, in the manner substantially as herein set forth.
4th, The combination of the pipe, C, filler, D, provided with the collar D', and boiler, A, arranged and operatin as and for the pur ose spe ified,