

AMERICAN EXHIBITORS ABROAD.

The Paris Exposition will doubtless cause many articles of American ingenuity to be exhibited to the world which are peculiar to our country and consequently novel to artisans abroad. The list of agricultural implements is quite large and these alone will form an interesting display, as the majority of them differ essentially from those of foreign construction and many are entirely unknown in Europe. Some articles, however, which we have sent are common to both hemispheres and one of these, a city railroad car, we recently inspected at the manufactory of John Stephenson & Co., the celebrated car and omnibus builders of this city. This car does not differ materially in size and shape from those now running on our city roads, but it is constructed with a view of accommodating passengers on the roof which has a neat iron railing at each side and ornamented ladders extending up to it from the rear platform. The upholstery is exceedingly rich and the finish of the wood work surpasses anything of the kind we have before seen. The panels have well executed oil paintings on them, and the whole exterior is polished like a mirror. Our first impression was that this car must have been "got up" for the occasion, superior mechanics engaged in its construction and special artists employed to embellish it, in short, that it was something to look at and not to use. On inquiry, however, we found that it was one of a number ordered by the India-street Railway Company of Bombay, India, and is to stop at Paris on its way to the place for which it was ordered. We also learned that all the work was done by the regular employes of the Messrs. Stephenson, even the artist who executed the oil paintings on the panels is "to the manor born" and acquired his profession in their shop. We further learned that this firm built the first street car used in England and that they, a short time since, filled an order of five to run between Liverpool and Birkenhead. They have also furnished cars for Pernambuco, Rio Janeiro, Buenos Ayres, Valparaiso, Carizal and various other foreign places, and during the past year constructed and delivered three hundred and sixty eight cars and quite a number of wagons and omnibuses. It is exceedingly gratifying that the industrial accomplishments of our artisans demand such attention from abroad and that foreign orders are multiplying upon them. We cannot like our English cousins boast with reference to our "dominions" but we can now point with honest pride to our mechanics and say, upon their handiwork "the sun never sets."

State Trial of Breech-Loaders.

We give below the list of guns entered for trial before the State Military Commission at its late session in this city, with a table of the results:—

Spencer rifle, by Arthur Cheney, Boston, Mass. Gray gun, original, alteration and magazine carbine (making three in all) Joshua Gray, Boston, Mass. Milbank gun, alteration, Isaac M. Milbank, Greenfield Hill, Conn. Meigs rifle, alteration, Jos. V. Meigs, Lowell, Mass. Needle gun, alteration, S. Weill, No. 421 East Houston street. Cochrane breech-loading musket and carbine, original, and alteration (two) J. W. Cochrane, No. 189 Broadway. Allen gun, alteration, A. H. Allen, Norwich, Conn. Miller's rifle, original, W. H. & G. W. Miller, West Meriden, Conn. Robertson & Simpson gun, original, Robertson & Simpson, Hartford, Conn. Empire breech-loading fire-arm, original, alteration (two), Geo. C. Walter, No. 64 Broadway. Berdan rifle, alteration, H. Berdan. Joslyn breech-loading fire-arm, two original arms, Wm. Herrick, No. West Ninth street. National rifle, National Arms Company, original, A. J. Bergen, corner Kent avenue and Hughes street, Brooklyn, E. D. Hubbell gun, alteration, James H. Crue, Philadelphia, Pa. Fitch gun, an alteration, J. P. Fitch, Fifty-second street, New York City. Aranson gun, alteration, J. N. Aranson, No. 7 Warren street. Poultney musket, original, Poultney & Trimble, Baltimore, Md.

Gun.	Penetration.	Shots.	Time.
Gray	11 1/2	99	8:00
Page	20	145	8:20
Spencer	99	8:20	
Miller	9	99	8:27
Berdan	11	99	8:20
Hubbell	11 1/2	99	13:32
Meigs	11	99	5:40
Milbank	11 1/2	99	6:55
Empire	98	99	4:40
National	11	91	7:45
Morgenstein	13 1/2	38	4:30
Allen	11 1/2	99	8:52
Robtson & Simpson	10 1/2	99	8:30

Osborne's Photo-Lithographic Process.

We have lately examined some very beautiful specimens of photo-lithography, made under the auspices of the American Photo-Lithographic Company, No. 95 Liberty street, New York. They are produced by the processes of J. W. Osborne, patented in 1861, and some time ago noticed in our columns. For many years Mr. Osborne has been engaged in the endeavor to reduce his invention to commercial practice, and his efforts now seem to have been crowned with complete success. By means of these improvements all kinds of line engravings and printed matter can be copied, transferred to stone, and printed by lithography, at a trifling cost, with great ease and rapidity. Some of Mr. Osborne's copies of steel engravings that we have seen are really superb, being apparently equal to the originals. Letter-press pages may be reproduced, so exact in the imitation of the original that it is difficult to determine which was printed from the types and which by the photographic process. One of the striking advantages of this new art is that its copies may be made larger or smaller or of the same size of the originals, every line of the latter being faithfully reproduced.

The uses of this remarkable improvement will be very extensive, and its effects upon the art taste of the masses will be universally beneficial. All the high priced, and rarest engravings can be duplicated by thousands, and the humblest

homes be adorned with the best pictures for less money than is paid for the trashy pictorial stuff now too often seen.

Novel Improvement in Locks.

Mr. Er Lawshe, of Atlanta, Ga., at present at the office of G. W. Platt, 20 Maiden Lane, New York City, has recently patented through this office a lock for cars, mail bags, etc., which combines security and seal, and is very simple in detail. It is so constructed that an agent at either terminus of the railroad can lock the cars "through" or "way" according to the destination of the freight; and it so combines both a "way" and a "through" lock as to render as much security as the ordinary lock, while as a "through" lock it affords additional security against picking or breaking. When a car locked "through" arrives at its destination with its tablet indicating "through," the evidence is that there has been no interference with it, thus showing, should the freight check short, that the agent who locked the car is the responsible party, but should the tablet show "through" and the lock be locked "way," or vice versa, it is evidence that the lock has been tampered with.

The construction of the lock is such that if one part should be acted upon another part secures the locking mechanism, whereby picking becomes somewhat impracticable if not impossible. This lock is not only applicable for a car lock but is also peculiarly adapted for mail bags, as with it the bags can be locked "way" or "through," as the case may be, thus enabling the locks to be permanently attached to the bags; and by increasing the number of tablets the lock can be more generally employed.

Button Holes Done Away With.

The use of buttons so made that they can be attached to the clothing without stitching by needles is becoming quite general, and an extensive use thereof has satisfied the public of the real value of the improvement. The man who has no wife may now step into almost any store, buy buttons of any pattern and attach them to his dress in a twinkling. One of the earliest manufacturing companies that engaged in this sort of button making is said to be now in the enjoyment of the princely profit of \$250,000 a year.

We have lately examined a very excellent improvement in this class of patented buttons, shown to us by Mr. P. Chariatte, 587 Greenwich street, N. Y., which presents several superior points, of which one of the most striking is that it does away with the necessity of button holes, thus saving labor, and preventing wear of the garment. The use of rubber is also dispensed with; the parts are all of the simplest form, and easily made by the usual mechanism; the mode of attachment is convenient; the buttons may be quickly applied or removed from the clothing, and the fastening is very secure. Altogether the invention is one of the best of its class that we have seen and is worthy of general introduction.

Science Familiarly Illustrated.

How Much Gas is Required to Lift A Man.

The question is often asked how large must a balloon be in order to lift a man. Many think it a very abstruse question, and not to be answered or reasoned about except by those who are well crammed with mathematics and chemistry. But the fact is, as we shall show, that in reality it is not beyond the comprehension of ordinary school boys; such questions ought to be put in the arithmetics.

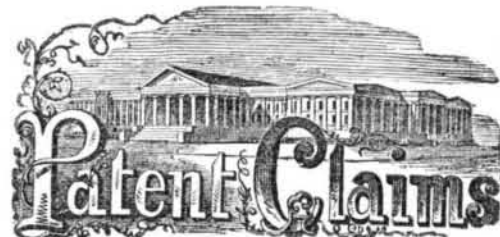
We say a balloon goes up because it is lighter than the air. If it be a pound lighter, it lifts a pound, if it be a hundred and fifty pounds lighter it may carry up a man. But what does the lightness depend upon? What is it proportioned to? How shall we measure it?

A balloon is a bag filled with a gas lighter than the air. The lightest gas known is hydrogen. One hundred cubic inches of it weigh only 2.14 grains, while the same bulk of air weighs 31 grains. The ascending force of 100 cubic inches of hydrogen would therefore be the difference of these weights, that is 31-2.14=28.86 grs. The ascending force of a cubic foot of hydrogen will be 28.86x17.28=498.7 grs. The ascending force of 1,000 cubic feet will be 498.7x1,000=498,700 grs. or 71.25 lbs. And 1,000 ÷ 71.25 = 14 feet in round numbers for the bulk of hydrogen required to lift one pound. Now this bulk multiplied by the weight of a man gives the cubic feet of gas needed to lift him as 14x150=2,100 cubic feet.

So far we have made no account of the weight of the bag. This should be added to the weight to be lifted. What the weight of the bag really is, depends of course upon the material of which it is constructed. Also in practice as the gas is not pure and is liable to leak away, an extra supply of gas must be taken on board. An aeronaut would not feel safe unless he had ascending power sufficient to lift two or three men besides himself.

Hydrogen gas is not often used when common illuminating gas can be had. But the latter weighs five or six times as much as hydrogen, and the balloon must be correspondingly larger.

BOOKS AND MEN.—It is a very curious fact, if correctly stated by M. Natoli, that in Great Britain there are only six volumes, while in Italy there are 19.5 volumes to every 100 persons. As there can be hardly any practicable mode of estimating the books in private hands, the statement must refer to public libraries. The inference would be, that where fewest books are possessed by individuals, most books are provided publicly, and vice versa. It is added that in Bavaria there are 26.4 volumes to 100 persons; in France, 11.7; in Belgium, 10.4; in Prussia 10; in Austria 6.9, and in Russia 1.3. Total: France 4,389,000 volumes; Great Britain 1,771,498; Austria 2,408,000; Prussia 2,040,450; Russia 682,090.



ISSUED FROM THE U. S. PATENT OFFICE FOR THE WEEK ENDING FEB. 19. 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.

62,107.—HORSE RAKE.—Sylvester E. Ament, Oswego, Ill. First, I claim the formation of a groove or channel, H, cut within and around the cylindrical part of the bearing, D, when employed substantially as and for the purpose herein set forth. Second, I claim situating the radial or perpendicular faces, W X Y Z, within the joint of or parts, E D G, substantially as and for the purpose herein set forth. Third, I claim putting the stops, I and J, beneath the tangents of the strap, G, or in other words, concealing the same within the handle, E, substantially as and for the purpose herein set forth. Fourth, I claim the employment of duplicate pawls, I and J, when adapted to operate relatively to one or more pairs of reversed faces, W X Y, substantially as and for the purpose herein set forth. Fifth, I claim the employment of a spring, K, inserted through a hole in the handle, E, and adapted to serve in combination with the duplicate pawls, I and J, substantially as and for the purpose herein set forth. Sixth, I claim the employment of a cam shaft, n, having a cam, n', and a hook, n, upon each end thereof, adapted to operate in combination with the locking devices of a single-handled revolving rake, A, a a, substantially as and for the purpose herein set forth. Seventh, I claim the employment of a ball or weight, m, adapted to slide or to be dragged upon the earth behind the rake head, A, and to serve in combination with the locking devices of a revolving rake, A, a a, substantially as and for the purpose herein set forth. Eighth, I claim the application of the disk pieces, C C, to the ends of the shaft, A, when constructed and employed substantially as and for the purpose herein set forth. Ninth, I claim the use of the bearing bolts, F F, when constructed and employed substantially as and for the purpose herein set forth. Tenth, I claim, in revolving rakes, A, a a, the use of one or more chocks or braces, T T, when employed to brace the runner in rear of the rake head, substantially as and for the purpose herein set forth. Eleventh, I claim the use of wooden runners, T T, provided with braces in rear of the rake head, in combination with a revolving rake, A, a a, in such manner that the only point of contact of said runners with the ground shall be in rear of the rake head, substantially as and for the purpose herein set forth. Twelfth, I claim, in combination with a single-handled revolving rake, A, a a, E, when its locking devices do not depend upon the teeth for resistance, except uniformly upon the whole, through the medium of the shaft, A. The employment of two pairs of reversed faces, W Y and X Z, when arranged relative to each other, and to pawls, I and J, or their equivalents, substantially as and for the purpose herein set forth. Thirteenth, I claim the use of a check chain or connection, M', when employed substantially as and for the purpose herein set forth.

62,108.—MUCILAGE AND MARKING BRUSHES.—William R. Anderson, New York City.

I claim the combination of the shield tube, d, with the cemented surface of the brush tube, i, for extending moisture and forming a durable shield fastening, substantially in the manner set forth. I also claim, in combination with the reservoir, the filtering plate, a, a, substantially as set forth.

62,109.—CULTIVATOR.—James Armstrong, Jr., Elmira, Ill.

First, I claim providing a shovel-carrying frame, D, which is pivoted to levers, C, so as to operate substantially as described, with an auxiliary adjusting lever, G, or its equivalent, whereby the driver can regulate the depth of the shovels at pleasure, whether the machine be in motion or at rest, substantially as set forth. Second, I claim pivoting a lever, G, which has an eccentric bearing, g, upon one end, to the draft tongue of frame, D, and providing such lever with a locking device for holding it in any desired position, substantially as described. Third, Supporting an adjustable shovel-carrying frame, D, upon the axle, A, by means of the levers, C, and an adjusting device, G g f h, substantially as described. Fourth, I claim the use, in a cultivator, of an eccentric lever, g, for the purpose described.

62,110.—GRINDING OR POLISHING IMPLEMENTS.—Nicholas A. Buhle, New York City.

First, I claim the composition above described for making grinding or polishing stones, wheels, or other implements, substantially as above set forth.

Second, I also claim, in grinding or polishing implements or artificial stone, making their different surfaces, or portions of their surfaces, of different degrees of fineness, substantially as described.

62,111.—LINIMENT.—John W. Burnham, Winterport, Me.

I claim the liniment, consisting of the ingredients mentioned, combined substantially as described.

62,112.—CLOCK.—L. F. Carter and W. W. Carter, Bristol, Conn.

We claim the employment of the attachment, d, in combination with a clock movement, substantially as and for the purpose described.

62,113.—FURNACE FOR CONVERTING IRON INTO STEEL.—Antoine Galy Cazalat (assigns one-half to Jules Despecher), Paris, France.

First, I claim the arrangement of parts, as above specified, applied on either side of the furnace for introducing steam into or through the molten metal.

Second, The upper reservoir of cast iron, as described, for the purpose of restoring to the purified iron the requisite amount of carbon for converting the same into ordinary steel.

Third, The conversion of ordinary steel into homogeneous steel by maintaining the liquid metal in a quiet state of fusion, and at a high temperature, by injecting steam in the chimney, and

Fourth, The means indicated of submitting steel cast in molds to high gaseous pressure, whereby the blisters are expelled and the metal close grained and condensed.

62,114.—PROPELLER.—R. D. Chatterton, Bath, England.

I claim the arrangement of the longitudinal pipes, B, the direct-action steam pump, placed between the diaphragm valves, G G', and the reversing apparatus for the simultaneous operation of the said valves by a single motion, substantially as described and represented.

62,115.—COMPOSITION FOR ROOFING.—John P. Cowing, Seneca Falls, N. Y.

I claim the simple compound of ground fire clay, rock, and coal tar, as specified.

62,116.—MOLE PLOW.—Jacob Creamer, Jeffersonville, Ohio.

First, I claim the combination of the rectangular frame, A, bent axles, B B', and hinged retaining bars, I and K, the said parts being respectively constructed and arranged for use substantially in the manner and for the purpose set forth.

Second, The arrangement of the swinging frame, A, capstan, b'', capstan head, b'', parallel bars, C, chains, e, lever, d, and horse, f, substantially as set forth.

62,117.—LIFTING JACK.—A. M. Culver, Bedford, Ohio.

I claim the arrangement of the legs, B B', pivoted to and in combination with the lever, A, in the manner and for the purpose described.

62,118.—EXTINGUISHING FIRES.—R. Ogden Doremus, New York City. Antedated Feb. 6, 1867.

I claim the within described method of extinguishing fire by means of sulphurous acid, and ammonia or carbonic acid in a liquid or solid state, substantially as set forth.

61,119.—SLEIGH.—A. E. Doty, Ilion, N. Y., assignor to J. I. New and C. H. Doty.

First, I claim a metallic runner curved and attached to the beam as seen in fig. 1.

Second, The compound ox-bow brace as is seen in figs. 1 and 2.

62,120.—PREPARED LEATHER.—Smith Dyar, Charlestown, Mass.

I claim, as a new article of manufacture, skins prepared, printed, and polished, substantially as set forth.