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SUBSCRIPTIONS are coming in with a rush, but our books are still open. We have room for more names. Send in your lists as fast as possible; and always bear in mind that the SCIENTIFIC AMERICAN can be had for \$2 50 in clubs of 10 and upwards. Single subscriptions \$3 per annum; \$1 50 for six months; \$1 for four months.

THE ALDEN MACHINE.

On the opposite page we publish an illustration which very fully represents the Alden type-setting and type-distributing machine—an invention from which our facilities for the diffusion of intelligence and education must take a new point of departure—its completion forming, in the estimation of its proprietor, an era in literature only second to the original discovery of printing by type. This machine enables a single hand to do—and the hand may be that either of man or woman—all the type-setting work for which, at present, eight ordinary compositors would be required; while, in the matter of distributing type, the machine is all but an automaton, requiring only the very slightest supervision of human agency, and so perfect in mechanism as to prevent physical impossibilities against the occurrence of any mistake. It has now triumphantly stood the severest test of practical experiment in the *Tribune* office, in this city—the judges certainly not being prejudiced in its favor, if not absolutely hostile; and the result is so complete a triumph, that so soon as the requisite number of machines can be supplied, it is supposed, all the "great dailies" of this city will be set up by the Alden machine, and, of course, the minor and country press will follow suit as rapidly as possible. It has been carefully examined by the leading mechanical and other progressive minds of the age, and is pronounced a most marvelous triumph of human ingenuity. Mr. Theodore Tilton, in the *Independent*, pronouncing it "the eighth wonder of the world;" and Col. Halpine, in the *Citizen*, declaring, in regard to its automatic power of distributing type, that "the fingers of steel and brass would seem to have not only eyes in their busy tips with which to read the letters, but brains to comprehend their spelling and meaning, and to direct their re-distribution, when used, into their proper places."

The original discoverer or inventor of this machine was Timothy Alden, a young printer of Massachusetts, who gave his life in devotion to the discovery, and died before accomplishing its completion for practical use. The machine was bequeathed by him to his cousin, Henry W. Alden, who expended a large amount of money upon it without attaining

any satisfactory or practical result. It was, in fact, a "slough of despond, in which all capital embarked was swallowed up without return, until, finally, it fell under the eyes of Mr. Charles C. Yeaton, of Brooklyn, who, commanding the confidence of such gentlemen of intelligence, public spirit, and capital as Josiah O. Low, Augustus C. Richards, Charles F. Livermore, and various others, organized a company for its further development and completion. By the faith and resources of these men, acting through the industry and talent of Mr. Yeaton, and an able corps of assistants and mechanics, the imperfect and inoperative discovery of Timothy Alden—valuable as a curiosity, but in no other light—has now been carried forward to a splendid success as a great triumph of the labor-saving machinery of the age; and already the present company is about being merged into another—combining the American and foreign patents—with a capital of three million dollars, to start a factory that will be commensurate to supply five perfect machines *per diem*.

The discovery is already protected by patents in all European countries, obtained through the Scientific American Patent Agency, and the Alden machine will, perhaps, soon be accepted abroad as one of the last and highest triumphs of that "Yankee ingenuity," whose benefits the world has already to acknowledge in connection with the names of Morse and Fulton.

To give any detailed account of the *modus operandi* of a machine so intricate and yet so simple in its action, would be not merely an impossible, but an absurd attempt, in such limits as are at our disposal. It must be not only seen, but thoroughly studied, to enable anyone to appreciate its rare mechanical excellence, and the talent displayed by its creators in conquering successive difficulties. Fortunately this opportunity is now furnished to any to whom the *Tribune* office is accessible, and will soon be furnished to all who have access to any newspaper or other printing office; for, unless we are mistaken, the day is not far distant when the only limit to the general adoption of these great engines of labor-saving and economy, will be the capacity of the factory to meet the demands of the public. They have had to fight their way up against embattled lines of prejudice, and the covering of the heavens by a "fog" who declared "the thing impossible," but they have finally conquered and overborne all opposition by the practical test of their working, and we congratulate not merely the Company, but the whole reading public, on the assurance of their success, now established beyond any question.

THE PARIS EXHIBITION.

By an advertisement on another page it will be seen that the time for making application for space at the great Paris international exhibition of 1867, has been extended to the 20th of the present month, January, 1866. Applications must be made to the agent, J. C. Derby, Esq., whose office is at No. 40 Park Row, in this city. Mr. Derby will furnish blank forms for the applications, with full instructions, to any person who will write to him for them and will inclose a postage stamp for his reply.

Professor Joy stated at the last meeting of the Polytechnic Association that, on his recent visit to Paris, it seemed to him as if the whole city was being pulled down in making preparations for the great exhibition. One company has purchased a tract of two miles in length right in the heart of the city, and is pulling down all the buildings to make room for others better adapted for one of the collateral speculations connected with the exhibition. One feature is to be a representation of the industry of all nations in practical operation by the natives of the several countries. If this scheme is carried out as proposed, there will be seen in the middle of Paris, Laplanders making fishing tackle; Ural Tartars employed in the preparation of skins and carpets; the Kabyles of Algeria making the glazed pottery of Bjerdjers, carvings in the wood of the fig tree, ornaments in silver and coral, and carpets of Oran and other districts; natives of Morocco weaving silk, cotton and woolen fabrics, making fez caps, saddles, and arms, and preparing shagreen; negroes of Soudan producing cotton cloth, morocco work and pottery; the half *petit blancs*, of the Isle of Bourbon, making sacks for

sugar and coffee; Anatolians weaving Smyrna carpets, silks and cloth of gold; Syrians fabricating tissues and arms of Damascus and Aleppo, mother of pearl work of Bethlehem, and gold work of Beyrout; Persians at work on Kurdistan carpets, silk embroidery, Kirman shawls, silks and cottons of Yerd, enameled tiles, and damascened arms; Indians weaving muslins, embroidering cashmeres, engraving ivory and wood, and twisting threads of gold into bracelets and other ornaments; Cambogians fabricating boxes and toys from sandalwood; Siamese carving rhinoceros horn; and, perhaps, Chinamen carving a nest of ivory balls; Japanese painting their incomparable lacquer wares; Mexicans turning their perfumed pottery; and redskins composing head-dresses of feathers and bead-embroidered moccasins.

FILE-CUTTING MACHINERY.

Although many attempts to cut files by machinery have been made, few have been successful. Those that have, however, are, in the hands of competent business men, making immense fortunes for their owners and stockholders. The consumption of files in this country is very great. Besides those imported, millions of dollars' worth are made both by hand and by machine, so that there is a fair field for inventors and capitalists to divide the profits. The Whipple File Company, of Providence, R. I., is said to divide from fifty to eighty per cent among its stockholders; and another concern, the Russell File Company, by a secret process, recuts old files at a rapid rate, and has, we learn, been successful in a financial point of view. We have never seen a recut file that, in our opinion, was worth the price paid for doing it. Ordinarily recut files are thinner, inferior in temper, and generally much poorer in quality than new files. It is possible, however, that the files recut by the company alluded to are entirely free from these objections.

It is clear, at all events, that files can be manufactured by machinery, and that a great market for them exists which can be profitably supplied by more than one company.

Any workman that knows how to use a file will make it last a week, but many destroy them in far less time, so that, with the immense iron works of this country, the marine steam engine and locomotive shops, the tool works and hundreds of minor industries, it is easy to see that tuns upon tuns of them must be needed.

We know of several file-cutting machines, models of which are now in this office and at Washington. One of them, we are certain, is destined to work a great change in the cost and time of producing files.

CONCENTRATED BEEF.

After many years of persevering effort, and the expenditure of many thousand dollars, Mr. Gail Borden has at last succeeded in producing an extract of beef that is not only nourishing but palatable. We have before us a specimen of this extract; it closely resembles a piece of erasing india-rubber. This specimen is about 2½ inches in length, 1½ inches in width, and ¾ths of an inch in thickness, and it weighs 4 oz.; the price of it at retail is 75 cents—equal to \$3 per pound. At the present cost of production the article is expected to come into use only for making beef tea for invalids; but after a market is opened, establishments for its preparation will be erected in Texas and other cattle-grazing localities, where beef is cheap, and it will probably be brought into general use for making soups, etc.

At the present time there is only one establishment in operation, that is at Elgin, Illinois, 42 miles N. W. from Chicago. Beeves, fresh from the pastures and stalls, are killed, the meat is macerated in boiling water, care being taken to avoid ebullition which would carry off some of the most savory and nutritive elements; the extract is then concentrated in a vacuum pan to a very thick jelly; and the drying is completed by a process that, for the present, is kept secret.

The perfect extract is rolled and cut into the form described, and wrapped in paper that has been saturated with paraffine. Paraffine being tasteless and inodorous, exerting no chemical action, and being impervious to air and moisture, is an admirable substance for this purpose, and may be profitably em-

ployed for a great variety of manufactures, where it is desirable to keep the product from the atmosphere.

The establishment at Elgin is capable of reducing the carcasses of eight heaves per day; from 100 lbs. of meat $4\frac{1}{2}$ lbs. of extract are obtained. Mr. Borden claims to get all the albumen, and everything but the fiber. He says that farmers who have given the substance remaining to their hogs, affirm that the swine refuse to eat it, and that it is worthless for purposes of food for any animal. The gelatin is not included in the extract; it is well known that that substance is all eliminated by the kidneys without imparting nutriment to the system.

We have tried Mr. Borden's extract, and find that it makes a palatable and nutritious beef tea. It is recommended by the Boston *Medical and Surgical Journal*, and other medical authorities of the highest respectability, for the use of invalids.

MAKING CRUCIBLES IN MOLDS.

In a visit to the plumbago crucible manufactory of J. H. Gantier & Co., of Jersey City, N. J., we learned that an entire revolution has recently been made in the process of fashioning the crucible. They were formerly all made by hand, on that ancient implement, the potter's wheel, but the substitution of steam for hand power, in its irresistible progress, has invaded even this most conservative portion of the arts. The wheel is still used, but it is driven by machinery, and the crucible is formed in a mold instead of being fashioned wholly by the hand of the workman, as heretofore.

In the old process, the black lead, after being assorted, ground, mixed with its proper proportion of clay and water, and kneaded for a long time by hand to beat out any bubbles of air which it might inclose, was divided into lumps of a suitable size each for a crucible. The "thrower" seized one of these lumps, and dashed it down upon the center of his wheel, which was a disk of cast iron, about fifteen inches in diameter, driven by a treadle working horizontally. As the lump revolved, the workman with his wet hands drew it up in a rude conical form, and then pressing one hand down the center of the mass, he brought it into the shape of an irregular hollow cylinder. Keeping his hands constantly wet, and continuing his manipulations with great dexterity, he soon brought the crucible to the desired shape in all particulars. The only guides to the eye of the workman in this operation, were two wires projecting horizontally at different heights from a vertical standard, and by so making the vessel that its exterior surface would be very near the ends of these wires, the desired form and size were obtained.

The improvement consists in the use of a plaster mold, the interior of which is of the proper form for the exterior of the crucible. This mold is set upon the center of the wheel, which rotates much more rapidly than wheels driven by the foot, the lump of plumbago is dropped into it, and is partly driven out from the center by centrifugal force against the sides of the mold. A bent lever, which has the exterior edge of its vertical arm cut to the form desired for the interior surface of the crucible, is now turned down so as to bring this arm into the mold, when the fashioning of the crucible is quickly completed.

The mold, with the crucible in it, is then set aside to dry, and when the drying is completed the crucibles are packed in the kiln to bake—each one being set in a rough earthenware sagger to protect it from the dust of the furnace.

Though crucibles made by the improved process answer perfectly well for melting steel or brass by anthracite fires, they do not prove durable when exposed to coke fires. Consequently, crucibles for the steel makers of Pittsburgh must still be fashioned by hand, and Messrs. J. H. Gantier & Co. continue to make them in the old way for the Pittsburgh market.

DEEP GOLD-COLORED LACKER.—Seed-lac three ounces turmeric one ounce, dragon's blood one-fourth ounce, alcohol one pint; digest for a week, frequently shaking, decant and filter.

Lackers are used upon polished metals to impart the appearance of gold. If yellow is required, use turmeric, aloes, saffron, or gamboge; for red, use annatto, or dragon's blood, to color. Turmeric, gamboge, and dragon's blood, generally afford a sufficient range of colors.

BROMIDE OF POTASSIUM.

Considerable stir has lately been occasioned among the photographers in this vicinity, in consequence of the visits among them of the assignee's agent of Cutting's "Bromide" patent, who has made profitable collections of money as damages for past and future use.

The patent in question was granted to James A. Cutting, of Boston, Mass., July 11, 1854, and contains the following claim:—"The employment of bromide of potassium in combination with collodion." No suggestion or allusion is contained in the patent to the use of free bromine, or any salt or extract thereof, except bromide of potassium.

The original application for the patent was rejected. The applicant then asserted that he could prove the use of a bromide basis in collodion in the month of April, 1853. The Patent Office replied, citing references conclusively showing the use of bromine long anterior to that date. Among the salts thus used was bromide of ammonium. A patent was finally granted to Mr. Cutting, with a claim to the use of bromide of potassium in collodion, as quoted, and those who use that salt appear to be infringers; but the use of any other salt or form of bromine in collodion, is free to the public.

The effect of bromide of potassium in collodion is to increase its sensitiveness, and thus to render photographic pictures more brilliant in their details of light and shadow.

This salt also possesses peculiar medicinal qualities. It has a sedative and soothing effect upon the perceptive faculties, produces good humor, and brings on sleep. The assignee of the patent seems to have understood this use of the drug; for the leading photographic dealers have complacently joined in a certificate to the validity of the patent, and have good naturedly paid over large sums for its use, and the patent is considered good for the collection of a million more. We congratulate all the parties concerned. We like to see patents well sustained and liberally paid for.

We have had frequent occasion to notice the great value of some small inventions, and in the above we have another example. Truly, it was a lucky thought of Mr. Cutting's to drop $2\frac{1}{2}$ grains of the bromide into an ounce of collodion.

On the 28th of October, 1808, there was submitted to the Emperor Napoleon by General Clark, Minister of War, the quixotic plan of a person named L'Houmond, designated as "ex-chief of the battalion of aeronauts," for making a descent on England by means of one hundred balloons of one hundred meters diameter each, the car of which could contain one thousand men with provisions for ten days, two peices of cannon with their ammunition chests, twenty-five horses, and fuel for the balloons. The Emperor wrote a few words on the margin, ordering the plan to M. Monge, the celebrated mathematician, "to see if it wereworth while to make so great an experiment."

WERE it not for the friction and the contraction of the vein, water would flow from a circular orifice with a velocity equal to that acquired by a body falling from the level of the surface to the level of the orifice, and in quantity equal to a solid cylinder moving with this velocity and equal in size to the orifice. In practice the flow is about two-thirds of this quantity.

STAVE, BARREL AND BRICK MACHINERY; ALSO HAND LOOMS FOR FLANNEL, ETC.—We have inquiries from our readers for the best mechanism of the above character. We advise the manufacturers to advertise in the SCIENTIFIC AMERICAN. Regular advertisements in our columns will doubtless bring them orders from all parts of the world.

UP to the year 1860, no less than fifty wells had been sunk in the great Sahara desert by the French. The total quantity of water given by these wells amounts to 7,920,000 gallons per day.

LACKER FOR TIN.—Any good lacker laid upon tin gives it the appearance of copper or brass. It is made by coloring lac varnish with turmeric to impart the color of brass to it, and with annatto, to give it the color of copper.

PATENT-OFFICE DECISIONS.

IMPROVEMENT IN PACKING FERULES FOR CONDENSERS AND REFRIGERATORS.

The Board, by Elisha Foote.—These ferules serve to make the joints between the tubes and headsheet steam and water tight, and at the same time allow the movement produced by expansion and contraction of the tubes from variations of temperature. The applicant has already a patent for these ferules. He has heretofore made them of lead, wood, and some other materials, but has found that paper best answers the purpose, and now he claims an additional patent for the substitution of that material. No change of any part of the apparatus was required for the use of one material rather than another.

As a general rule, the mere substitution of one material for another is not patentable—as in the prominent case of a porcelain door knob. A machine or instrument may be greatly improved by the use of steel, brass, etc. in place of poorer materials, but this involves the exercise of mechanical skill, rather than of the inventive faculties.

The rule, however, has its exceptions, and they apply in those cases where the result of the substitution is so decided and important as to give it the character of a new discovery or of an invention.

We do not perceive any such advantages from the use of paper to the applicant's device, and consequently must affirm the Examiner's decision regarding the application.

IMPROVEMENT IN BREACH-LOADING FIRE-ARMS.

The Board, by Elisha Foote.—The reference given by the Examiner seems to fully anticipate the applicant's device.

Besides there is a defect in his specification. In the apparatus shown, there is nothing to receive the recoil of the charge. The applicant states that he employs means for supporting the block against the force tending to cause it to recede during the explosion, but that these means being no part of his present improvement, need not be described. In this he is mistaken. He must show all that is necessary to carry his invention into practical operation. It is admissible to refer to what is already well known, or to what is described in some other patent, but nothing must be left to be devised by others or ascertained by experiment. A mechanic, skilled in the art, must be able by following the description and the drawings to construct the apparatus and make it practically operative and useful.

In this case something would have to be invented before the applicant's device would be made practical. The decision of the Examiner is affirmed.



ISSUED FROM THE UNITED STATES PATENT-OFFICE FOR THE WEEK ENDING DECEMBER 26, 1866.

Reported Officially for the Scientific American.

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.

51,675.—Combined Level Square, Compass, and Plumb Staff.—James R. Abbott, Midway, Ind.:

I claim the combined level square, compass and plumb staff, substantially as described.

51,676.—Machine for Boring Fence Posts.—John Agnew, Bath, Pa.:

I claim the post borer constructed as herein described, with sliding carriage, L, notched bar, O, clamps, P, racks, K, pinions, G, straps, H, and treadles, J, all arranged to operate substantially as and for the purposes set forth.

[This invention relates to a new and useful machine for boring fence posts, and it consists in the employment or use of a carriage arranged in such a manner that it may be readily moved towards and from the auger, the carriage being provided with a sliding gage, which is fitted on the carriage, and has the post to be bored clamped to it, all being arranged in such a manner that the posts may be bored very accurately and with the greatest facility.]

51,677.—Crutch.—George T. Allamby and John G. Bugbee, Bangor, Me.:

We claim the combination of the buffer, D, with the adjustable spur, C, inserted in a socket, A, placed on the lower part of a crutch; the spur, C, being provided with a spring, a, and knob, b, the knob through a slot, E, in the socket, A, all arranged to operate substantially as and for the purposes specified.

We also claim the sliding tube, c, in combination with socket, A, spur, C, spring, a, slot, E, and knob, b, when arranged to operate substantially as and for the purposes specified.

51,678.—Ore Separator.—Stephen F. Ambler, Brooklyn, N. Y.:

First, I claim the use and employment of the vertical hollow shaft, C, in combination with the basin, B, sieve, G, agitators, M, and branch tubes, F, arranged and operated as shown for the purpose specified.

Second, in combination with the same, I claim the scrapers, E, arranged and operated in the manner described and for the purpose specified.

51,679.—Safety Fuse.—Albert F. and John H. Andrews, Avon, Conn.:

First, We claim employing in the body of safety fuses, sliver of cotton or other suitable fiber, substantially in the manner and for the purpose herein set forth.

Second, We claim the combination of the tubular powder casing, D, the sliver, A, and the equivalent saturating material, M, the la-