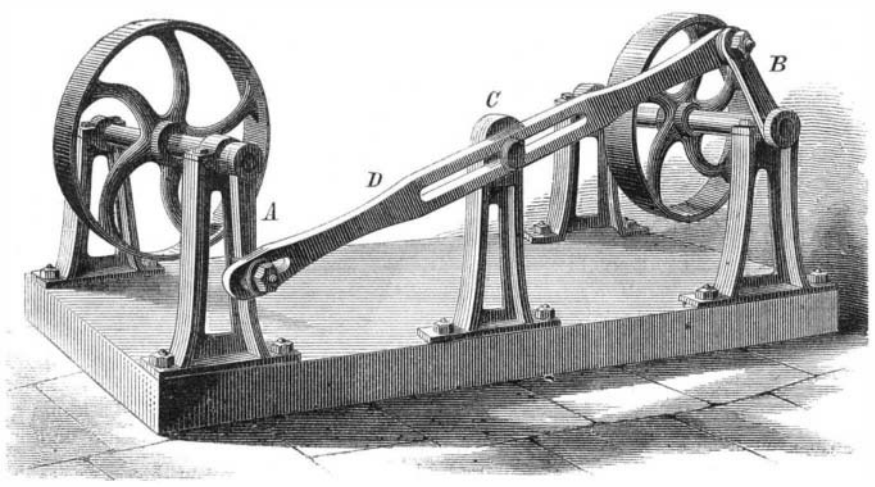
DEVICE FOR TRANSFERRING MOTION.

By means of the invention represented in the annexed engraving, an efficient substitute, it is claimed, for cog wheels is provided, in cases where it is desired to transmit motion from one shaft to another, both working with the same velocity. The device is stated to be cheaper and to operate with less loss of power than the cog wheel gearing; and also, to be able to transmit positive power for any distance, from one to twenty feet, and thus is of especial use in cases where belts would slip.

A and B are crank arms of two shafts, between and in a line with which is a fixed standard, C. The latter at its upper end has a stud or pin. D is the connecting bar, slotted longitudinally along its middle part for connection with the stud on the standard, as shown. One end of this bar is pivoted to crank arm, B, and the other extremity is provided with a short slot by which it is connected to the pin of the opposite crank.

When one shaft is set in motion, power will be communicated by the lever, U, to the other, which will rotate in an opposite direction. The inventor believes that, by connecting together a number of these devices (attaching a third shaft to the second by another lever, and similarly a fourth to the third and so on), power may be transmitted over considerable distances. Patented July 15, 1873, by Mr. William H. Benson, of Waynesboro, Augusta county, Virginia, who may be addressed for further particulars.



BENSON'S DEVICE FOR TRANSFERRING MOTION.

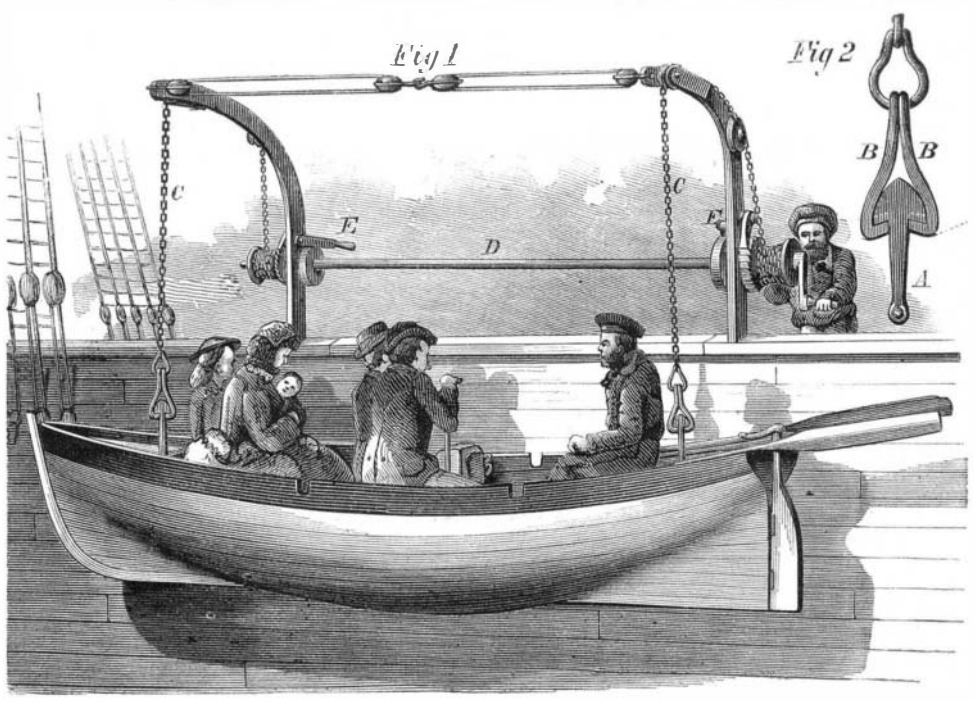
AUTOMATIC BOAT DETACHING APPARATUS.

Our engraving illustrates a new form of boat lowering and detaching device, by means of which, it is claimed, the boat can be lowered quickly, and safely and automatically set adrift as soon as it floats upon the water.

A A are bolts secured to the boat near the bow and stern, having, on the under side of their heads, V shaped recesses extending upwards. B B are slip hooks fastened, by a ring or other suitable means, to the ends of the chains, C. The lower ends of the hooks are turned upward and fit, as shown in the detail figure on the left of the illustration, into the recesses in the bolt heads. By this means, the boat is suspended from the davits by the chains, C. The latter are led inboard over suitable sheaves and fair leaders to drums on the shaft, D. Ratchet wheels and cranks are arranged in connection with the shaft, the pawls of the former holding the boat in position after it is hoisted by means of the usual tackles on the davit heads.

When the boat is to be lowered quickly, the falls are unhooked, and its weight allowed to hang by the chains, C. The pawls are then thrown from the ratchet wheels, and the shaft, D, is allowed to revolve by the chain unwinding, as the boat descends. The rapidity of the lowering is regulated by the brakes, G, pressed down by their levers against pulleys on the shaft. As soon, however, as the boat reaches the water, the chain slackening allows the hooks, B, to fall below and clear themselves at once from the recesses in A, leaving the boat free from any connection with the apparatus. It should be noted that the V shaped grooves and hook ends are of peculiar form, that is, they are angular and yet turn upward, so that, when once held together by the suspended weight of the boat, vertical, as well as transverse and lateral, displacement of the parts is prevented. It is claimed that it is impossible to disengage the boat until it is fully afloat, and that no matter how much the craft may rock, sway, or swing against the ship's side in descending.

Patented April 29, 1873. For further particulars address the inventor, Mr. Charles A. Enell, 307 Walnut street, Philadelphia, Pa.



ENELL'S AUTOMATIC AT DETACHING APPARATUS.

THE INDIANA STATE EXPOSITION.

Indianapolis, during the coming fall, is to be the location of an exposition of the industries and manufactures of the State of Indiana. Whether or not the fair, in comparison with the similar shows to be held in St. Louis, Louisville, Chicago, Kansas City, and other points, will realize the anticipations of its projectors in being the finest exhibition in the Western States, it all events deserves the credit of being organized in a thorough and substantial manner, and after a system which, it seems to us, might be profitably followed in all future local displays. A committee representing the State conferred with another delegation from the capital city, and the joint body decided on the amount necessary to secure the State from any loss. This sum, fixed at $100,000, was guaranteed by the leading firms and individual citizens of Indianapolis; and, thus founded on a sure pecuniary basis, the preparations for the enterprise were begun; committees were sent to other cities to obtain information regarding cost and construction of buildings, and then plans were submitted and fixed upon. The State fair grounds were ready at hand, so that no land had to be purchased. The buildings are now completed, and they afford a grand aggregate of over four hundred thousand square feet of exhibiting space. There is to be a fine collection of paintings in the art department; and a marked feature of the exposition will be a museum of natural history, archæology, mineralogy, etc. The central portion of the buildings is a substantial brick structure, two stories of 20 feet each in hight, 308 feet inl ength, and 150 feet in breadth. The edifices on the east and west are in the form of a cross, and are 200 × 200 feet.

Liberal premiums are offered to the exhibitors in the horticultural department. There are two lists, one each, respectively, for amateurs and professionals, which include almost every thing in the line of fruits, flowers, and plants grown in Indiana. James Vick, the Rochester florist, offers prizes to the amount of $150 on flowers grown from seed purchased of him.

In the mechanical department, every facility will be afforded for a thorough and complete determination of the merits of the articles contributed. All machinery will be in motion. Ample space and power will be furnished, free of charge. The driving engines will be in operation one week or more previous to the opening of the exposition, so that machinery may be adjusted and in proper running order on opening day. The main line of shafting will be speeded at 200 revolutions per minute. Pulleys will be 20 and 24 inches in diameter. Other sizes of pulleys will be put on the shafting, if furnished by exhibitors three weeks previous to the opening of the exposition.

Twenty thousand dollars, payable in cash, gold and silver medals, and diplomas of new and elegant design, are offered in premiums for articles mentioned in the premium list, obtainable on application. Saw mills, reapers, mowers, threshers, separators, and grain drills will receive no award, for the reason that it is not practicable to have such thorough tests and examination of their merits as will be just to the exhibitor. The board will, however, provide every necessary facility for their display, and propose, as an inducement to manufacturers and dealers in these articles, to appoint an examining committee, composed of members of the board, who will give each article of this kind such consideration as will enable them to report their respective merits for publication in the annual reports. We also learn that, by special request, no premiums will be offered for fire and burglar-proof safes, bank and safe locks, sewing machines and musical instruments.

The fair opens on September 10, and closes on October 10.

To Purify Tallow.

In order to obtain tallow quite free from smell, and to preserve it for a long time without becoming rancid, the following simple process, says the *Chemical Review*, may be used. The fresh tallow is melted in boiling water, and when completely dissolved, and consequently hot, it is passed through a linen filter—it is then boiled along with the water and carefully skimmed—then rendered solid by cooling and washed with water, and lastly separated from it carefully by pressure. It may be melted at a moderate heat and preserved in earthen vessels, covered with a bladder, paper, or good closing lid. If the linen filter is not thick enough to keep other ingredients from passing through besides the liquid tallow and water, it is better to repeat the filtration. Tallow thus obtained may be used for ordinary food, for pomades by the addition of pure olive oil, for salves and plasters, by the addition of white wax, and may be kept well preserved for a time, as free from smell as when first prepared.

Asbestos Piston Packing.

From an address, by J. G. Gibbon, before the London Association of Foreman Engineers, it appears that the name of this indestructible compound is derived from the Greek word *asbestos*, which, translated, literally means unburnable—a title which is justly earned by this extraordinary substance. Asbestos is a mineral; it is found in nearly every part of the world, and occurs in distinct veins and seams, usually in the serpentine formation of rocks. In order to procure it, it is necessary to mine in regular form, and to work the seams by blasting and tunneling. The manufacture of asbestos steam packing is at once a simple and beautiful process. The raw material is brought to the manufactory in considerable quantities from different parts of the world. It comes in sacks, and resembles most closely chips and blocks of wood, although of a beautifully white color. The fragments are picked apart and reduced to a fiberous condition like jute, or flax, or cotton. The material once properly opened up, it is, by means of simple and ingenious machinery, formed into packing of the usual market sizes. The machines themselves are as easily attended to as are weaving looms. As to what has been really accomplished by this packing, I have no direct evidence to offer, but from the sample I have here I think it does not seem to possess a good fiber; and that when the flaxen twine which binds it is cut, it will become very much like cotton waste. I am inclined to think, therefore, that when the glands get heated and the flaxen twine is cut through, it will blow out like charred flax, and have no elasticity. However, I am here to be corrected in my opinion, if I form a wrong one, by those who can offer contradictory evidence. A large screw steamer lying in the West London Docks has just replaced the whole of its packing by asbestos.

Uncomfortable Car Seats.

Why do not the makers of street cars contrive a seat back that will be comfortable? Do their customers (preferring "short fares") order the cars to be made so as to discourage long riding? It would seem so, unless the painful curves of the seats are specially contrived to accommodate the humps of wirework and newspapers, so much affected by the women folk. Certain it is that the human form divine, male or female, has no curves to correspond with those set for the weary traveler to lean against. Only by making a hoop of himself can any normally shaped human being get his spine to touch the seat back where it ought to find support.

A caustic Briton declares it to be a characteristic of the genuine American that he always wants to sit on the small of his back. To judge from the ordinary structure of car seats, one would think his sole desire to be to hang himself up by the shoulder blades, the only certain line of contact between the sitter's back and the seats invariably crossing that portion of the body. Below that line, you can usually stuff a book or a bundle, or even a small satchel, with ease and comfort.

In many cases the original perversity of the seat back is hightened by fastening a ridge of wood so as to increase the gap between the hollow of the sitter's back and the opposite curve of the seat. If the same board were placed six inches lower down, it would make some approach toward affording the passengers a back rest where it is most needed.

The Compass in Iron Vessels.

Captain R. B. Forbes, of Boston, Mass., states that the compass in iron ships is specially affected in certain localities on the coast of Nova Scotia, which accounts for the loss of steamers in that region. He further says that, in spite of corrections, applied in England, whereby iron ships may be safely navigated in a given course approximately west-south-west and east-north-east, when they come to head more to the north or south by several points on the American coast, their corrections, good on the coast of England, are valueless in some ships. It is well known that the heeling of the iron ship, the rolling, the pitching, the concussion of the waves, have an important effect upon the compass—hence, nothing but constant observations of the sun at noon and the north star can insure a correct course.

W. P. H. suggests placing a box in the corner of a room for the purpose of destroying a rat or mouse. Let there be room enough for the vermin to get behind the box, and a little pressure will crush the offender against the wall.

Journalism.

There are three papers published in this country, which, taken together, are adapted to furnish a liberal education to any person who will read them conscientiously and intelligently. These are the New York *Tribune*, the *Nation*, and The SCIENTIFIC AMERICAN. The first is distinguished as the very Bayard of newspapers—without fear and above reproach. Its news is accurate, comprehensive, well arranged; and it is written in excellent English. The *Nation* we admire as a literary journal. Though its political articles are admirable specimens of candid and able writing, its reviews of books are more characteristic and distinctive. The SCIENTIFIC AMERICAN is least known of the three papers mentioned, for the reason that it is popularly supposed to be designed for specialists. Nothing could be further from the truth. In the same sense that the *Tribune* is only a newspaper and the *Nation* only a literary journal, the SCIENTIFIC AMERICAN is only scientific. It is worth, to the man of common school education, twice over more than any rival journal in the United States, and it will teach no man to despise the English language, or to regard less the pursuit of knowledge—for its own sake, and for what it will bring. What we have written is wholly unsolicited testimony to the worth of three papers that come to this office; it is given from the purest motives, and without the slightest idea that it will be of service to anybody, except those persons whom it may induce to subscribe for one or all of three excellent journals.—*Interior.*

THE TURKISH TREASURE PAVILION AT VIENNA.

Among the one hundred and forty special buildings, in addition to the main exhibition edifice, pertaining to the Vienna World's Fair is the Treasure Pavilion of the Sultan of Turkey, or King of the Ottomans. The pavilion is in the form of an oriental kiosk. The domed within ceiling is painted in arabesques, and pendant from it are five large golden walls. Here may be read the history of the Sublime Porte from the days of the conqueror of Byzantium, Mahmoud II., to the present Padishah, Abd-ul-Aziz. The golden throne of Nadr-Shah is here, which was renowned in the East before the peacock throne of the Great Mogul at Delhi was dreamed of. It is marvelous in its workmanship, large enough for a coach, and weighs four and a half hundredweight. It is enameled in celadon, green and crimson, and its patterns of arabesquerie are in rubies, emeralds and pearls. Above it hang the turban and armor of Sultan Murad, heavy with gold and gleaming with jewels. Near it are the horse caparisons of Selim III., with the heavy Mameluke stirrups and Arab bit of solid gold, encrusted with diamonds. Scabbards, where nothing but diamonds can be seen; cinctures of diamonds; bowls of China porcelain, their patterns marked out in gold and reset with rubies; clocks encased in diamonds and glistening with crescent moons and stars; hookahs with golden bowls, and chibouques whose amber mouth pieces are encircled with rings of diamonds, gleam and glisten everywhere.

The value of the Turkish treasures contained in the pavilion is estimated at $27,500,000.

Finishing Stereoscopic Transparencies.

The method adopted by many, of fitting up transparent slides for the stereoscope by mounting them with a plate of ground glass is very far being a good one. The coarse granularity present in a picture when in juxtaposition with ground glass is totally subversive of the fine details.

Thin paper has been tried as a backing for stereoscopic transparencies, but no sample that we have seen is free from objection. It is true that when it is used the granular appearance peculiar to ground glass is no longer present; but paper has a kind of texture and unevenness peculiar to itself, which is very far from being pleasant; and when such a quality of paper is used as shall be homogeneous, it possesses so much "body" as to seriously interfere with the transmission of light.

The requirements of a body that shall act in the most perfect manner as a backing for stereoscopic slides are homogeneity, a requisite degree of translucency, and facility of application. The great manufacturers of transparencies in France thought they had provided a successful rival to ground glass by the introduction of "ground glass varnish," that is, a varnish which, instead of drying bright and transparent, dries dead and, therefore, more or less granular. A varnish composed of wax dissolved in chloroform is a type of this class of varnish. But none of these ground glass varnishes answer well for the purpose in question; while, however, they are quite as good as, in most instances better than, ground glass, they are still inferior to what they should be. A backing of a far superior kind to any of those now in general use may be made by means of white pigment, emulsified with one or other of several substances that we shall name presently.

Carbonate of lead forms a good pigment for the purpose. It is known as white lead, and flake white. The carbonate of commerce usually contains a large proportion of sulphate of barytes, which, however, does not affect it for this purpose. Some samples of carbonate are more opaque than others. It may be made of a fine translucent character by precipitating a solution of either acetate or nitrate of lead by a solution of carbonate of soda, by which carbonate of lead is precipitated and acetate or nitrate of soda left in the solution. When this is washed—at first with water, and then with methylated spirit—and is added to plain collodion, an emulsion is obtained which, when poured upon a plate of glass, forms a layer of great smoothness and uniformity, and as free from apparent grain or texture as a plate of opal glass.

Another fine white, known as "miniature painters' white," is obtained by adding dilute sulphuric acid to an acetic or nitric solution of litharge, and washing the white precipitate. There is a fine and permanent white known as "alum white," which makes a beautiful emulsion with collodion. It is known by some as "Baumé's white," and no difficulty ought to be experienced in obtaining it under one or other of these designations. Ordinary Spanish white we have not found to answer well; but pearl white, sometimes called "Fard's Spanish white," makes a useful pigment for our purpose. It is the trisnitrate of bismuth, and in he favourite pigment used by ladies who do not feel satisfied with the degree of whiteness imparted by Nature to their complexions.

When one of these pigments is mixed with collodion and is applied either to the picture itself (although, without an intermediate layer of gum or india rubber, this cannot be done) or the face of the protecting glass, next to the picture, the transparency will then have a charm it never previously possessed. The most delicate tints will be seen with even greater distinctness than if a backing of opal glass were employed; and the operation can be conducted with great celerity and at a trivial cost, for the quality of the collodion need not be taken into consideration.—*British Journal of Photography.*

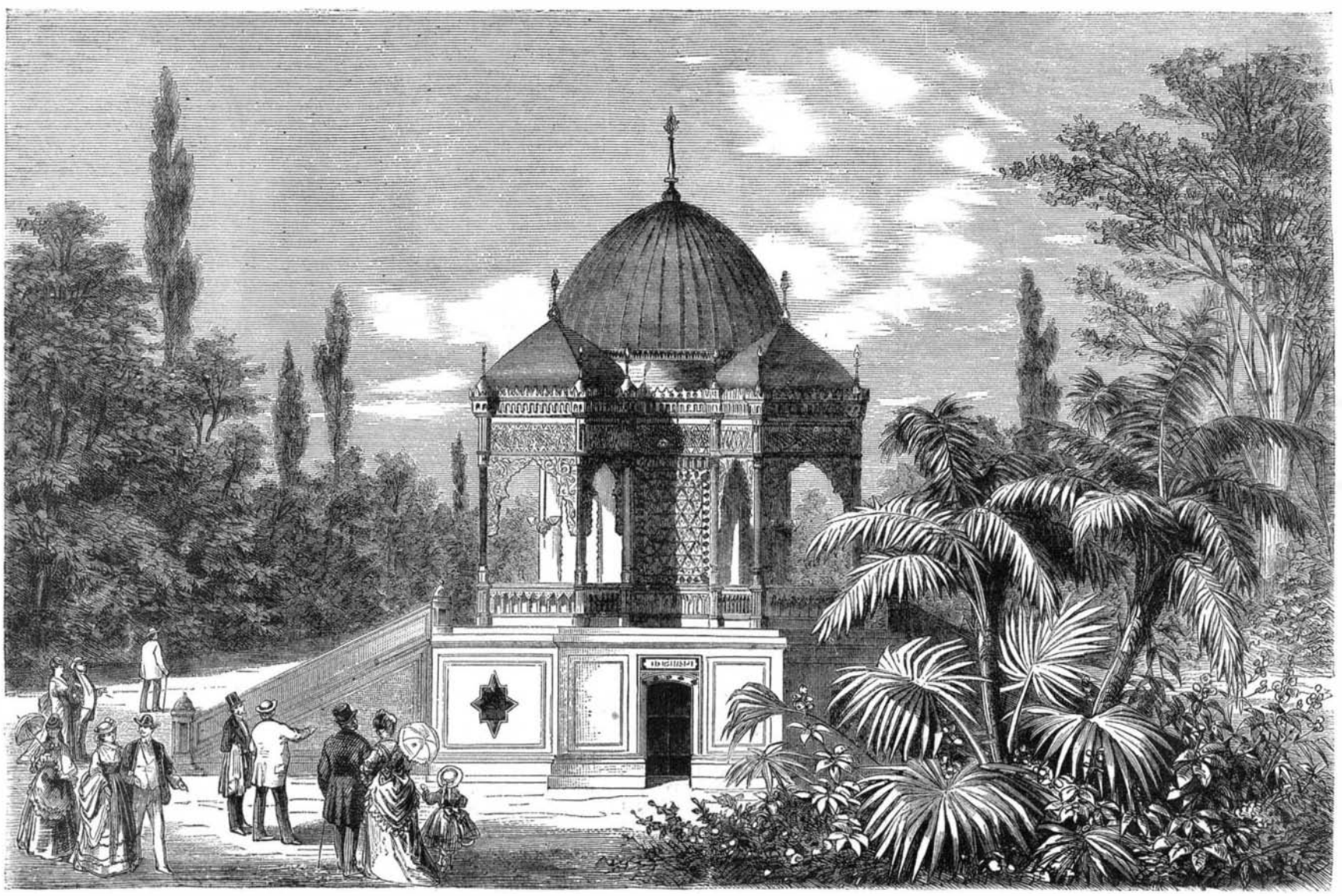
Boiler Explosions.

R S. H. writes to deny the possibility of the formation of an explosive gas in a steam boiler, and states his belief that the small quantity of water injected at a time, by a feed pump, could never cause an explosion, even if some of the plates were red hot. Further, a red heat would, he says, assuredly start the seams and cause leaks so as to extinguish the fire before water could come in contact with the plates. He asserts that high pressures are much more dangerous than people generally believe, even if the boilers are unusually strong; and he cites, as an instance of the manner in which safety valves are overloaded, a case on the Union Pacific Railway, in which the engineer tied down the valve lever of a new Baldwin ten wheeled engine; in a few seconds the boiler burst, and six inch axles were torn in two by the explosion.

Ship Canal through Syria.

T. L. F. writes to point out the possibility of constructing a ship canal along the valley of the Jordan, the advantage in the route being the low level, which is beneath that of the Mediterranean. There is no doubt or the possibility of such a work, but its magnitude, and the fact that the Suez canal is already in operation between the two seas, will probably deter capitalists from aiding the scheme.

CORK JACKETS FOR STEAM BOILERS.—M. Chevallier, a French engineer, has adopted cork for the jacketing of boilers and other parts of machinery. Cork is known to be an excellent non-conductor of heat, and these cork jackets are said to diminish the outward radiation by 15° C. The cork is cut in the form of staves, and these are united together by tongues, as in the case of flooring boards, so that the lines of junction are protected, while the cork staves are easily removed when the necessity occurs. Portions of one of these jackets, which had been on a boiler at work for fifteen months, were exhibited the other day at a meeting of the Paris Society for the Encouragement of the Arts, etc., and were not found to have been in any way affected by the heat of the boiler.



THE TURKISH TREASURE PAVILION AT THE VIENNA EXPOSITION.