

erted on the levers at high speeds. Any size iron or wood friction pulleys may be used for light power and moderate speed, by simply placing the pulley on one of the coupling hubs, or the friction disk may be applied direct to pulley hubs, but this plan should never be used for high speeds or heavy powers. The clutch applied to a quill upon which a pulley can be mounted, or as a cut-off coupling, will do heavy work, and may be run up to speeds of five thousand revolutions a minute.

British Strikes and Lockouts in 1895.

The annual report of Mr. J. Burnett, of the Labor Department of the British Board of Trade, on strikes and lockouts, "shows that there were 876 disputes resulting in stoppage of work during 1895, and these involved 263,758 workpeople, as against 1,061 disputes and 324,245 workpeople in 1894. As regards results, 303, or 34.6 per cent, of the disputes ended in favor of the workpeople, as against 35 per cent in 1894; but in these successful disputes 24 per cent of the persons affected during the year were involved, against 22.1 in the preceding year. The aggregate number of days lost in 1895 was 5,542,652, compared with 9,322,096 in 1894 and 31,205,062 in 1893. The average duration per head of disputes in 1895 was 21.6 days, as against 29.5 in the preceding year. The value of the aggregate number of working days lost, worked out as wages, would amount to about £1,120,000, compared with £2,000,000 in 1894. The percentage of persons concerned in the disputes of 1895 which were settled by conciliation or negotiation was 74.8, as against 56.7 in 1894."

The Effect of Shading the Soil.

According to Lancaster (*Ciel et Terre*, March, 1896, xvii, p. 22), some experiments have been made by A. Buehler, which may be summarized as follows, says the Monthly Weather Review: Four broad plats of ground were selected, situated near each other; one was left freely exposed to the sun and wind, while the three others were shaded by horizontal wooden trellises placed around each plat and about 40 centimeters above the ground. The sunlight was cut off from the ground by the shadow of the trellis to a different extent for each plat, viz., one-quarter for plat No. 2, one-half for No. 3, and three-quarters for No. 4. In each plat, at 5 centimeters below the soil, a thermometer was buried; there was also placed in each plat an evaporimeter and a vase of sheet iron filled with clay in which 1,000 grammes of water had been poured. Observations were taken every three hours, with the following results: The shaded soil experienced less cooling by radiation at night time and less warming by sunshine in the day time. The plat, No. 4, three-fourths of whose area was shaded, showed a temperature 10 per cent lower than the unshaded plat, No. 1; the lowering of temperature was most decided at noon and 3 P. M. As to the nocturnal cooling, the differences between the various plats were only 2° C. at the maximum, which explains why plants under a trellis are less exposed to frost than plants that are not thus protected. During rainy weather the differences in temperature were very small, rarely more than 1° C.; the shaded plats had a temperature a little higher than the unshaded, but during dry weather the shaded plats were warmed up more slowly. The relative evaporation from the plats was as follows: No. 1, unprotected, 100 per cent; No. 2, one-quarter covered, 88 per cent; No. 3, one-half covered, 71 per cent; No. 4, three-quarters covered, 62 per cent. Evaporation was most rapid from noon to 3 P. M. The observations all relate to a soil that is not covered with vegetation. If the soil had been cultivated, the temperature and the evaporation would have been diminished still more.

In France, wagon tires vary from three to ten inches in width, usually from four to six, depending upon the weight of the load. Were such tires compulsory in America, the present good roads movement would receive a tremendous impetus.

A PORTABLE ELECTRIC DRILLING MACHINE.

In these days of labor saving machinery there are few fields in which greater ingenuity has been shown than in the manufacture of portable machines for boring, drilling and similar shop and yard work. The great convenience of the modern portable power-driven tools has rendered them specially valuable in ship building, boiler making, and other kindred manufactures. We have been favored by Mr. F. Kodolitsch, managing director of the Austrian Lloyds Steam Navigation Company's Arsenal of Trieste, with photographs of a type of very compact portable electric drilling machine which has been at work at the Arsenal in Trieste

special work occurred when the cast steel blades of a propeller were covered with Muntz metal sheets. Hundreds of holes had to be bored in the cast steel for receiving tap screws for holding the lining, and few of these holes were in the same direction. By the use of a drill running 180 revolutions, driven by a one horse power motor, all the holes necessary for lining one blade of a propeller eighteen feet in diameter were bored by one man and a boy in two days.

It is in the shipyard, however, that these drills have proved extraordinarily useful. In addition to the work of boring holes, they are used for countersinking, cutting out side-lights, scuttles, hawsepipe holes, boring out stern post bushes by means of boring bars, and for replacing plates out of the outside bottom of grounded ships.

The machine has also been successfully adapted for expanding boiler tubes in water tube boilers, and Messrs Yarrow & Company, of London, have several of them at work. It is stated that on actual trial where seventy tubes a day could be expanded by steam power at these works thirty tubes per hour were expanded by the use of the portable expander.

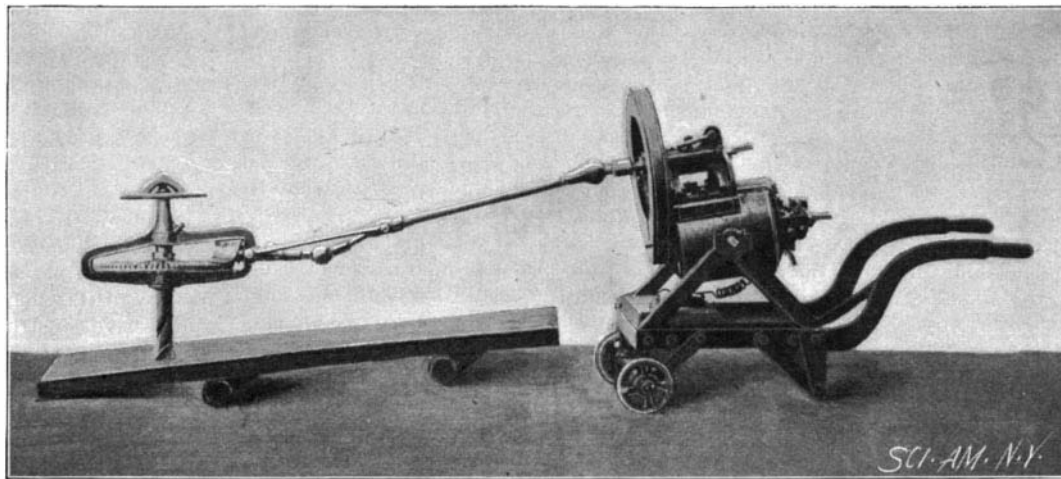
Award of Royal Society Medals.

At the anniversary meeting of the Royal Society, the Electrical World, the award of the second Royal medal to Prof. Boys for his researches on measuring minute forces, by his invention of the mode of drawing quartz fibers, and by his discovery of their remarkable property of perfect elasticity. Prof. Boys used a combination of thermo-junction with a suspended coil in a galvanometer of the usual D'Arsonval type, a combination first devised by D'Arsonval himself, and by this means Prof. Boys developed the idea in the micro-radiometer, an instrument, according to Sir Joseph Lister, rivaling the bolometer in the measurement of small amounts of radiation. In the case of the Rumford medal the council made a new departure by awarding the medal in duplicate. As stated by President Lister, many physicists have studied the luminous and other effects which take place in a vacuum tube, but the extension of the field of inquiry to the external space around it is novel and most important. This extension has been due to two men—Prof. Lenard and Prof. Roentgen. Although differences of opinion exist as to the exact meaning and cause of the phenomena discovered by Lenard and Roentgen, few will dispute the theoretical interest which these discoveries embody.

The Davy medal was awarded to Prof. Henri Moissan for having accomplished the isolation of fluorine in a state of purity, and for his researches at extremely high temperatures by the aid of the electric furnace. President Lister stated that it is impossible to set bounds to the new field of research which has thus been opened out, and the electric furnace has now become the most powerful synthetic and analytical engine in the laboratory of the chemist.

Eyesight of Iron Workers.

In the mining and foundry district of Bochum, Prussia, Dr. Nieden reports having treated during the years 1885-94, 5,443 patients engaged in such occupations, of whom more than 68 per cent were cases of injury to the eye in their calling—iron and foundry workers showing a large predominance in this respect over miners. Of 3,723 iron and foundry workers treated for eye injuries, 2,805 were for the left eye and only 1,639 for the right, or a relative proportion of 56 to 44; and as a similar proportion held good in each separate year, the conclusion arrived at is that in such work the danger to the left eye is really greater than that to the right. Even more marked, in fact, was the proportion in respect to the severe cases, the left eye being quite lost in seventeen cases, the right eye in seven. It is urged, therefore, that in iron workers the loss of the right eye should be calculated as the more serious, inasmuch as the individual then runs a greater risk of injuring the remaining eye than when he has lost the left.



ELECTRIC DRILL, SHOWING MOTOR, JOINTED SHAFTING AND DRILL.

for over three years, and has given great satisfaction. It will be seen from the illustrations that the motor, with its gearing, is pivotally suspended in a yoke, which is carried on a suitable hand truck or carriage. At the arsenal of the Austrian Lloyds Company, where 2,000 hands are employed, it is rarely that any holes are drilled with the obsolete ratchet. A network of electric wires extends over the yard, and each shop is provided with a number of special drilling machines, with the necessary electrical connections. When any holes have to be drilled in a piece of work, the portable drill is wheeled to the spot, and the wires attached. In this way the time formerly occupied in carrying the work to the drilling machine is saved.

As instances of the economy of these machines, we are informed by Mr. Kodolitsch that where ten flexible shaft drills were formerly used in the boiler shop, four elec-



PORTABLE ELECTRIC DRILLING MACHINE AT WORK ON STEM OF LARGE STEAMSHIP.

tric boring machines now do the same amount of work, with less hands than were formerly necessary. In the fitting shop they have saved much time and money in the handling of heavy work. An instance of this occurred when a marine condenser weighing twenty-four tons was planed on one side, the necessary holes being simultaneously bored on the other side with portable drills. The seats for the air pumps were finished at the same time with a boring bar driven by one of the electric boring machines. This heavy piece was put on the planing machine as a rough casting and completely finished ready for erection before it was removed. Another instance of the handiness of these machines for

Deep Waterways Commission Report.

The Deep Waterways Commission, which was appointed by the act of 1895 to make a preliminary investigation of the possibility of opening a deep waterway from the great lakes to the sea, has made a detailed report which has been forwarded to Congress by the President. In a letter accompanying the report he recommends to Congress that proper provision be made for carrying on the work of preliminary examination and that the commission be continued for the purpose of securing all necessary information.

After recounting in detail the work of the commission the report gives its conclusions seriatim as follows:

"1. That it is entirely feasible to construct such canals and develop such channels as will be adequate to any scale of navigation that may be desired between the several great lakes and the seaboard, and to conduct through the same domestic and foreign commerce, and that, in our opinion, it will be wise to provide for securing a channel of a navigable depth of not less than 20 feet.

"2. That, starting from the heads of Lakes Michigan and Superior, the most eligible route is through the several great lakes and their intermediate channels and the proposed Niagara Ship Canal (Tonawanda to Olcott) to Lake Ontario, and that the Canadian seaboard may be reached from Lake Ontario by way of the St. Lawrence River, and the American seaboard may be reached from Lake Ontario by the way of the St. Lawrence and Lake Champlain and the Hudson River, or by way of the Oswego-Oneida-Mohawk Valley and the Hudson River.

"3. That the alternative routes from Lake Ontario to the Hudson River require complete surveys and a full development of economic considerations to determine their relative availability.

"4. That a moderate control of the level of Lake Erie and of the Niagara River above Tonawanda may be justified in connection with the Niagara Ship Canal; the determination in this matter to rest on a full examination of the physical conditions.

"5. That the policy should contemplate the ultimate development of the largest useful capacity, and that all works should be planned on this basis, and that the actual execution should conform thereto, except in so far as the works may, without prejudice, be progressively developed with the actual demands of commerce.

"6. That it is practicable to develop the work in separate sections and the several sections in part by degrees, each step having its economic justification, so that benefits shall follow closely on expenditure, without awaiting the completion of the system as a whole.

"7. That the completion of the entire system as quickly as proper projects can be matured and economically executed is fully justified.

"8. That the Niagara Ship Canal should first be undertaken and incidentally the broadening and further deepening of the intermediate channels of the lakes, the same being in the logical order of development, and also requiring the least time for consideration."

The commission had neither the time nor opportunity to make a close estimate of the cost of the work. Its recommendations are summed up as follows:

"1. That complete surveys and examinations be made and all needful data to mature projects be procured for: Controlling the level of Lake Erie and projecting the Niagara Ship Canal; developing the Oswego-Oneida-Mohawk route; developing the St. Lawrence-Champlain route; improving the tidal Hudson River, and improving intermediate channels of the lakes.

"2. That the collecting and reducing of existing information, supplemented by reconnaissances and special investigations, be continued until the general questions have been fully covered.

"3. That a systematic measurement of the outflow of the several lakes and a final determination of their levels shall be undertaken.

"4. The complete surveys and investigations, with measurements of the outflow of the several lakes and full investigation of collateral questions, will cost not less than \$600,000 and require some years of time.

"It is probable that the measurement of the outflow of the lakes and the final levels can be as well done through some other agency, and this item may be taken at \$250,000, to be expended through a series of years, and this should be at once undertaken, on account of the prevailing low water of the lake system, which cannot be expected to continue.

"The specific surveys and investigations are in themselves estimated at \$350,000, and will take two or three years, and of this not less than \$150,000 should be appropriated the first year, along with such additional sum as may be required for measuring the outflow of the lakes, of which \$100,000 should be made available during the first year."

The Canadian government, which is also deeply interested in the question of opening a deep waterway to the sea, had appointed a commission to look into the question; and a joint session of the two commissions was held at Detroit early in 1896, when the ship owners and masters who were gathered at the annual meeting

of the Lake Carriers' Association gave much valuable information.

Recent Patent and Trade Mark Decisions.

Tarrant & Company v. Johan Hoff (U. S. C. C. A., 2d Cir.), 76 Fed., 959.

Infringement of the Trade Mark "Hoff's Malt Extract."—In this case Tarrant & Company obtained the right to manufacture and sell "Johan Hoff's Malt Extract" in the United States under labels and trade marks used in Germany for many years, and which entered into commerce under the name of "Hoff's Extract." The defendant, Johan Hoff, became the agent in the United States for a malt extract made in Germany by Leopold Hoff. He used the words "Hoff's Malt Extract" on his labels and advertisements, affixing, however, a perpendicular side label with the words "Manufactured by Leopold Hoff." It was held that the defendant had no right to use the words "Hoff's Malt Extract" unless it was preceded by the word "Leopold" in a conspicuous place, and that the perpendicular side label was not sufficient to prevent the deception of the public.

False Statement in Labels.—While false representations in a label will prevent a manufacturer using such labels from being enjoined because of the infringement, such, however, is not the case where the statements, while not strictly accurate, are entirely immaterial.

P. H. Murphy Manufacturing Company v. Excelsior Car Roof Company (U. S. C. C. A., 8th Cir.), 76 Fed., 965.

Metal Car Roof.—The Murphy patent, No. 414,069, for an improvement in car roofs, has been held not to be infringed by the Jennings patent, No. 446,780, on the ground that the "angle strip," which is the chief element of all the combinations in the former, is omitted from the latter.

Limitation of Claims.—A patent to one who has made a slight improvement on devices that perform the same function before as after the improvement is protected against those only which use the very improvement he claims, or mere colorable evasions of it.

"Foreign Art."—The art of covering the roof of a car with sheets of metal is so nearly, if not completely, identical with that of covering a house with the same material, that there could be no invention in using one for the other, unless some radical modification was required to adapt it to the new use.

Mechanical Equivalents.—The "angle strips" in the Murphy patent, No. 414,069, is a copy of the metal ribs in the Hawthorne patent, No. 386,316, and the mechanical equivalent of the triangular strips in the Smith patent, No. 143,471, the ribs of wood in Morsell's patent, No. 165,113, and the bars of metal in Naylor's patent, No. 1,321.

Omission of an Element of a Combination.—The unquestioned rule is that the absence from a device alleged to infringe of a single essential element of a patentable combination of old elements is fatal to the claim of infringement, and where the patentee introduces an element into each of his claims and makes it the first element, it cannot be eliminated in construing the claims.

Campbell v. Richardson (U. S. C. C. A., 3d Cir.), 76 Fed., 976.

Garment Hooks.—The De Long patent, No. 462,473, is limited by the words "substantially as described" to the form of hooks shown and described, that is, one in which the free end of the wire is carried to "the rear end of the shank and there formed into an eye," giving to the hook three eyes by which to attach it instead of two, as formerly.

Construction of Claims.—Where a claim contains the words "substantially as described," and such claim in its terms is old, but the part of the device to which such claim relates, as shown and described, is new, the claim should be construed, by reason of the phrase "substantially as described," to cover the invention described, unless that would conflict with the terms of the claim. The fact that such construction of the claim makes it coterminous with the other claims in the patent is immaterial, for that is a fault in the language of the claims, and similarity of claims in a patent is not unusual.

Brunswick-Balke-Collender Company v. Phelan Billiard Ball Company (U. S. C. C. N. Y.), 76 Fed., 978.

Pool Ball Frames.—Patent No. 288,879 for a pool ball frame, with rounded corners made with layers of wood bent in a triangular shape, has been held to be void, because it required nothing more than mere mechanical skill.

Foster v. Wertheimer (U. S. C. C. N. Y.), 76 Fed., 979.

Glove Fastener.—The Foster patent, No. 279,980, has been construed and held valid as to the exact combination shown.

What Amounts to a Patentable Difference.—In this case it was held that an improvement in the glove fastener, consisting of the rearward extension and elevation of the head and neck of a former device, by means of which the tightening of the glove is made easier, the fitting more perfect, and the fastening more secure, amounts to a patentable difference. While the

size of these parts is so small that the differences seem very little, yet the change in the mode and effect of the operation of the parts is quite considerable.

Infringement.—The defendant's fastener contained the features of the plaintiff's improvement in the same relation to each other, but in somewhat different form, except that the front of the head and the glove material were brought close together by raising the plate below instead of inclining the head above, so that in operation and effect the parts are the same and infringe.

Independent Electric Company v. Jeffrey Electric Manufacturing Company (U. S. C. C. O.), 76 Fed., 981.

Mining Machine.—The Lechner patent, No. 432,754, for a mining machine, which combines a traveling frame, an endless belt cutter, an auxiliary cutter operating in a different plane, and a holding projection adapted to follow such auxiliary cutter into the incision made thereby and to form a holder to operate against the thrust or force of the band cutter, has been held valid and infringed as to its first claim.

Effect of Impracticability on the Validity of a Patent.—The mere fact that a machine constructed on the lines of a patent was a failure does not affect the validity of it, when it appears that the failure was due to defective construction, not to the peculiar improvement patented, and that successful machines were afterward made.

Assignment of Future Inventions.—Where a patentee conveys an interest in his patent and any and all improvements which he may thereafter acquire or invent in connection with and in any way appertaining to the improvement patented, the assignee thereby acquires no interest in a subsequent invention for a distinct machine which works on a principle radically different from that of the former patent.

Contract to Assign Future Inventions.—Where an inventor agreed to convey an interest in several inventions and in any improvements thereon made in the future and in the patents for such improvements, and afterward another agreement was made in writing whereby such assignee was to have an interest in certain patents, nothing being said about improvements, and a suit was brought for a specific performance of the latter agreement, it was held that the rights of such party under the two agreements were merged in the decree and he had no claim under the contract to any future patents or improvements.

Dedication of Invention to the Public.—Where applicant for a patent shows an improvement but does not claim it, and before the patent was issued another application was filed by the same inventor in which he claims such invention, the presumption that what is shown or described in the patent and not claimed therein is dedicated to the public, does not arise.

Owen v. Ladd (U. S. C. C. Conn.), 76 Fed., 992.

Gong Bell.—The Owen reissue patent, No. 10,348, for a gong bell having in combination the novel element of a curved and bent vibrating standard, if valid at all, has been held not to be infringed by a gong in which the standard is neither curved nor bent, and is cast solid with the base.

Delay in Suing for Infringement of Patent.—The delay of over ten years in bringing suit, after charging infringement and it being denied, is such laches as to prevent recovery against one who in the meantime succeeded to the alleged infringing business.

England, America and the Metric System.

British and American consuls agree in reporting that the foreign trade of their respective countries would be greatly benefited by the adoption of the metric system of weights and measures, says the European edition of the New York Herald. With the exception of England and Russia, all European nations use the system; and, in view of the convincing testimony taken by the committee of the House of Commons last year, its adoption by England at an early day seems probable. The United States years ago legalized the use of metric weights and measures, but did nothing to enforce their use. Just now her merchants are working to increase their trade with the countries of Central and South America, and as all these use the metric system, there is a growing pressure for its formal adoption by Congress. The House of Commons committee asserted that the use of the metric system would save one year's schooling of all the children in the United Kingdom, and houses engaged in foreign trade testified that its adoption would enable them to get on with fewer clerks. In America the local weights and measures used in the various States are particularly numerous and confusing, and the substitution of the uniform French system for all of these would be of inestimable benefit.

ACCORDING to Engineering, some recent researches by Captain Abney show that the light of the starry sky is to that of the full moon about as 1:44,000. The latter is usually considered to be about as 1:600,000 to that of the sun at noon, so that we receive over 13,000,000 million times as much light as from the stars, taking both hemispheres into consideration.