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No. 1041.

For the Week Ending December 14, 1895.

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THE MOTOCYCLE AWARD.

We learn from the Chicago Times-Herald that the judges made the following awards on December 5:

Gold medal won by Morris & Salom. Points—safety, ease of control, absence of noise, vibration, heat, odor, cleanliness, and general excellence of design and workmanship. Duryea, $2,000 (prize), first in race and compactness in design. Mueller, $1,500, second in race and economy. Sturges, $500; Macy, $500; Lewis, $200; Haynes & Apperson, $150; Max Hertel, $100; De la Vergne, $50.

The Morris & Salom "electrobat," which received the gold medal, is an electric carriage and was illustrated in the SCIENTIFIC AMERICAN for November 16, 1895. Only the Duryea and Benz-Mueller carriages went over the course. They are both propelled by gasoline. The Sturges machine is electrical, the Macy, Lewis, Haynes & Apperson, and the De la Vergne carriages are all run by gasoline. The Macy machine is more properly called the Roger machine. The Duryea, the Benz-Mueller, and the De la Vergne motocycles all carried modified Benz motors. The gold medal is very handsome. On the obverse side the medal bears a typical representation of a herald of the days of chivalry. Around the figure surrounding a background of rays is the inscription, "The Chicago Times-Herald Motocycle Contest, 1895." On the reverse, and surrounded by a wreath of bay leaves, is a winged figure of Victory, with pinions extended and holding on her left arm an oval shield, upon which will be inscribed the name of the winner. The medal is composed of 100 pennyweights of fine gold and is valued at $250. The judges of the contest were Prof. Barrett, C. F. Kimball, J. Lundie, and L. L. Summers. The preliminary arrangements were made by Mr. F. U. Adams, the manager of the motocycle contest.

Although the number of contestants in the race was small, still the contest has scientific value, on account of the elaborate tests to which the carriages were subjected, speed not being the only factor which was taken into consideration.

STRIKES IN THE UNITED STATES AND EUROPE.

We have before us the first number of the Bulletin of the Department of Labor, which is to be issued bimonthly in accordance with the law of March 2, 1895. In the preface the editor, Commissioner Carroll D. Wright, sets forth the aim and scope of this publication, as compared with the already existing Annual and Special Reports. It will contain "such matters as cannot in the nature of things find a place in the Annual or Special Reports; but it is confidently expected that, through the Bulletin, the department will be able to bring much of its work closer home to the people." Its aim will be "to furnish to the public" current "facts and information relating to industrial affairs which cannot readily be secured in any other way."

The first number, among other topics, deals statistically with the question of strikes and lockouts in the United States and in certain European countries.

These statistics cover a period of thirteen and one-half years, from 1881 to 1894. During this time there occurred 14,390 strikes, involving 69,167 establishments, and throwing out of employment no less than 3,714,406 employes. The quietest year was 1884, when there were 443 strikes affecting 2,367 establishments and 147,054 employes; the most disturbed year was 1886, when 10,053 establishments were involved and 508,044 employes thrown out of work as the result of 1,432 strikes.

The greatest number of strikes, 18,787, occurred in New York State; then come Illinois, with 12,828, and Pennsylvania, with 10,661.

Out of 69,167 establishments affected, about 90 per cent were in the following industries: Building trades, 26,860; coal and coke, 8,018; tobacco, 5,465; clothing, 4,769; food preparations, 3,817; metals 3,454; transportation, 2,805; stone quarrying and cutting, 2,461; and five others in proportions under 1,000.

During these thirteen and one-half years, 32 per cent of the whole number of people thrown out of employment by strikes succeeded in gaining what they asked; 12·46 per cent only partly succeeded; and 55·50 failed altogether.

From the table marked "Leading causes of strikes" we learn that 42·32 per cent struck for increase of wages; 19·48 per cent for reduction of hours; 7·77 against reduction of wages; 7·59 for increase of wages and reduction of hours; the remaining 22 per cent of the strikes occurring for minor and very varied causes.

The tables from which the above figures are taken are very startling, and they will come as a revelation to many. But the most sensational figures are those which deal with the actual losses incurred during these thirteen and one-half years of strikes and lockouts. The actual wage loss of employes was $163,807,866. It cost the various labor organizations to assist the strikers $10,914,406. The loss to employers was $82,590,386. The corresponding losses due to lockouts were: Employes, $26,685,516; assistance by labor organizations, $2,524,298; employers, $12,235,451.

Summing up these figures, we find that the various labor disputes of the past thirteen and one-half years have cost the country no less than $298,757,923!

Statistics may be dry reading; but they are often, as in this case, very eloquent.

It is pretty well understood, both by capital and labor, that strikes and lockouts are a crude and costly means for the adjustment of employer's profit and employe's wage—but just how costly can only be realized when we look at the appalling loss that is spelled out by the nine figures given above.

The statistics for Great Britain and Ireland cover the five years from 1889 to 1893 inclusive. Of the 4,526 strikes which occurred, 3,428 were reported in detail. They affected 1,852,193 persons. The successful strikes affected 44·5 per cent of this total number; the partially successful 32·9 per cent and the unsuccessful 20·7 per cent. These figures would seem to indicate either that labor is less under the control of capital or that its organization is stronger in those countries than it is in the United States. This would seem to be further proved by the fact that in the three years 1891 to 1893 there were only 35 lockouts, as against 4,526 strikes in the five years 1889 to 1893.

In France during the years 1890 to 1894 there were 1,866 strikes, affecting 7,698 establishments and 500,475 employes. The average of successful strikes was 25·24 per cent; of partly successful, 29·26; and of failures, 44·64 per cent.

In Italy from 1878 to 1891 there were 1,075 strikes, affecting 254,668 employes. Of these, 24 per cent were successful; 47 per cent partly successful, and 29 per cent failed.

In Austria, during the year 1891 there were 104 strikes, affecting 1,916 establishments and 40,486 employes. Of the 104 strikes, 23 succeeded; 26 succeeded partly; and 51 failed.

Population of Canton.

The following particulars are taken from the North China Herald:

In a recent census taken by order of the viceroy at Canton, the inner and outer cities are shown to contain 481 streets and lanes, 24,962 houses, 233 temples, 107,035 males, and 53,975 females. The eastern suburb has 123 streets, etc., 7,627 houses, 61 temples, 23,738 males, and 14,812 females. The western suburb contains 875 streets and lanes, 43,942 houses, 226 temples, 192,249 males, and 87,355 females. The southern suburb contains 65 streets, 3,476 houses, 33 temples, 13,372 males, and 6,402 females.

Altogether there are 336,754 males and 162,544 females, 80,007 houses and 553 temples. There is also the boat population, which, sixty years ago, numbered 80,000, giving, at three persons per boat—much too low an average—a population then of 252,000. This number must be now largely increased, and 350,000 to 400,000 would probably be nearer the mark—children are not included probably. This brings up the population to 1,000,000. In sixty years this population should nearly have doubled itself, and the estimate now given by foreign observers is 1,800,000. A poll tax is levied on persons without house property, and there is a tendency to underrate the number of persons avoiding taxation. The great discrepancy between male and female population is noticeable. It is ascribed to the fact that the wives and families of most of the workers live in the neighboring country villages. The women live in cheap houses in the country, and the girls stay with their mothers till they are betrothed, and then go to their mothers-in-law. While men abound in cities, the village populations are chiefly female. Representative male heads of families live in the villages, and there is sufficient adult male labor to cultivate the fields. The brothers and sons go to the city.

Canton is a city of workshops, printers, carpenters, workers in lacquer ware, sailmakers, silversmiths, braziers, workers in ivory and tortoise shell, painters on glass, on paper, and on silk; glassblowers, firework makers, mat weavers, cloth weavers, embroiderers, paper makers, sugar refiners, fan makers, carpet weavers, makers of china ware, of grass cloth; and jade stone turners. Of all these trades, women only are engaged in embroidery. In addition, men in China cook, run errands, sweep floors, and wait at table. Women only do the washing; hence the marked preponderance of males over females in the city. It may be added that life in the country is much more moral than in the cities, chiefly owing to the family institution being in full operation in the villages.

A CAR load of redwood for use in making lead pencils was recently shipped from Sanger, Cal., for Nuremberg, Germany. Some time ago, experts from Germany investigated the timber resources of the Pacific coast in an effort to find a substitute for cedar, the forests in Europe from which the supply of that wood for lead pencils has hitherto been obtained having become almost exhausted. It is said that the redwood from the east slope of the Sierras is the only wood besides cedar with a sufficiently straight grain to make it suitable for pencils.

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Trolley Improvements Required.

We abstract the following from a recent address by Captain William Brophy, the veteran electrical inspector, before the Electric Potential Club:

I hold that all high potential circuits should be supported on wooden poles and cross arms, and the wires of all low potential circuits excluded from such poles; and I do not believe it best to place such wires on fixtures placed on roofs or other portions of buildings, but if they are so placed, they should be beyond the reach of persons standing or working on the roofs.

I believe the so-called insulating covering in use at the present time for high potential overhead circuits to be worse than a delusion and a snare. I believe it would be better to hang out the danger signal at once, by using bare copper wire, than to continue the use of this flimsy fraud that affords no protection to human life or property, but lures innocent people on to injury and death. Knowing the worthlessness of the material, it becomes necessary to use the best form of insulating supports. The present style of glass insulators is not what is required. Many of these insulators are only so in name. The very best grade of glass or porcelain should be used, and the double or single petticoat pattern, the form best suited to the purpose being that which will offer the greatest amount of dry surface between the wire and supporting pin. These insulators should be supported on wooden pins.

Iron poles on any part of high potential circuits should not be tolerated in any civilized community. They are a relic of barbarism that should be relegated to the scrap heap, and any attempt to patch them up only serves as a thin disguise to the danger that lurks within them. Twenty five to 40 feet of wood between the iron and the ground means that much insulation, while 100 feet of iron only means what the glass insulator, wooden pin and cross arm afford. The waste of energy due to the iron poles on the long circuits on which are placed 125 iron lamp poles is simply enormous—so great that in rainy weather such circuits have to be cut in halves in order to send sufficient current through the lamps. Where such circuits are placed on the modern iron and steel structures, they become a source of danger to persons who have occasion to handle these or other wires on the same or other fixtures. Such circuits should not be run between the branches or through the foliage of trees, but when it cannot be avoided the highest class of insulated wire should be used, and this incased in lead or iron. Any attempt at protecting this insulation from abrasion by covering it with tape or cotton braid is useless.

All that I have said up to this time applies with equal force to direct and alternating current circuits; but there are certain features of the latter that require separate treatment.

As you know, a difference of potential of one, two or more thousand volts exists throughout the entire length of the primary circuit and between it and the earth, so that the danger from derived circuits to ground or from one side to the other is the same at a point one or more miles distant from the dynamo as it is at the brushes. Again, it is necessary for electrical and other reasons to run the wires in parallel and close together, in order that no other wires can be placed between them, and for convenience in making connections to the different transformers. Workmen and others can hardly pass between them without coming in contact with both of them, and for this reason I consider them far more dangerous than high potential series arc light circuits. As before stated, the covering of these wires affords little or no protection to those persons in dry weather, and none whatever during or immediately after rain storms.

If these circuits are to remain above ground, they should be separated so that both cannot be reached at the same time by any person; but this would involve the changing of nearly every existing circuit and a considerable increase in the cost of constructing new ones. Rather than adopt this plan a high grade of lead-covered insulated wire should be used, and when that is done the proper place for them is underground.

What Happens to the Carbon in the Arc Light?

The electric arc light, with its intense, steady brilliancy, is now so familiar an object that few stop to think how wonderful a thing it really is. Here is light enough to illumine many square yards nearly as well as daylight does, proceeding from the points of two little carbon rods as large as one's little finger. What is the state of the carbon in that small spot? Prof. S. P. Thompson, in a recent Cantor lecture before the Society of Arts in London, tells us that it has actually melted there, something that was until recently thought impossible. Moreover, he says that when the light hisses, the liquid carbon is really boiling. The facts that lead him to these conclusions are quoted below from the report of his lecture that appears in Industries and Iron (London, November 1), condensed for the Literary Digest:

"Captain Abney had found the white surface of the luminous crater to be always of an equal degree of whiteness, which obviously means that it is always of an equal degree of temperature. . . . The only thing that could account for there being a fixed temperature for the crater surface was the fact that carbon is at the surface in a state of volatilization; that the carbon is evaporating off from the positive carbon into the arc or flame. At that surface you necessarily must have the temperature at which carbon evaporates, just as you cannot have the surface of ice under ordinary conditions either hotter or colder than the temperature which is taken as zero of the Centigrade scale. . . . My present view of the physical state of the arc crater is that the solid carbon below is covered with a layer or film of liquid carbon just boiling or evaporating off.

"When hissing takes place, a new state of things is set up. If you watch a short, hissing arc, you will see a column of light concentrating itself on a narrow spot, and the spot keeps moving about, and is very unstable in position as well as in the amount of light it gives out. The contracted spot from which light seems to start pits deeper into the carbon. . . . Mrs. Ayrton . . . made the observation that the crater surface, after the arc has been hissing, is found to be literally honeycombed. When the arc is hissing you can see little bits erupted out, and the hissing seems to be comparable to the hissing which takes place in water just when it is beginning to boil. If you have some water being heated in such a way that there is not more than a certain quantity of heat given off from the surface, you have the water evaporating quietly, but you cannot get more than a certain quantity of heat given off per square inch of top surface of the water in that quiet way. If you force more than a certain quantity of heat to pass off per top square inch of the water, you find the water begins to break up internally, and you have bubbles formed below the surface; the surface breaks up, the bubbles are thrown out, and you have a noisy phenomenon. I think you will find there is exactly the same kind of difference between the silent arc and the hissing arc as between quiet evaporation and a noisy boiling. There is a sort of decrepitation, as though solid particles were being torn asunder to make way for something coming out, when the arc is hissing."

Car Coupler Patents.

The Railroad Gazette gives the following: "A decision of some importance was recently rendered in the United States Circuit Court, Northern District of New York (Judge Coxe), in the case of the Gould Coupler Company against Pascal C. Pratt and others (Pratt & Letchworth). The suit was for infringement of the Browning & Barnes patents (owned by the Gould Company) by Pratt & Letchworth in manufacturing the Pooley coupler. The Browning claim in question was for the means of automatically opening the hook (knuckle) and holding it open, in proper position for coupling. The decision is that the Browning patent is valid in the broad claim not only of the specific means described but of any means for automatically opening the knuckle and retaining it open in the coupling position. The Pooley device is clearly an equivalent for the means described in the Browning patent. Browning used a spring and Pooley used a lever, but it is quite immaterial whether the knuckle was opened by a spring, or a lever, or a spiral incline.

"The point is that the Browning patent is good for any means which accomplish the results; but it will be observed that these results are automatically opening the knuckle and keeping it open, and it must be kept open by some other force than inertia or friction. Therefore, the judge says specifically that a device which will automatically open the coupler but does not keep it open may be used without infringing. The court does not define strictly what would constitute automatic opening. It will be seen, therefore, that the Browning claim is pretty strictly limited. The court says that it would not have been so limited if Browning had had the assistance of an experienced solicitor; that is, he would probably not have coupled the opening and the retaining features together and made them vital parts of one claim. Thus it becomes impossible for the court to give the patentee the full benefit of his invention. In the matter of the Barnes patent, it is held that the Pooley coupler does not infringe. The complainant is entitled to a decree for an injunction and an accounting, based upon the claim of the Browning patent; but as the claim under the Barnes patent is not sustained, the decree does not carry costs. We should suppose that this decision would have one very important result—to spread the idea that there are some coupler patents that are worth something.

"The St. Louis Car Coupler Company brought suit in a United States Circuit Court against the Schickle, Harrison & Howard Iron Company, and the suit has just been decided in favor of the complainant, the decision being written by District Judge Adams. The complainant employed the defendant to make about 1,000 couplers under patents owned by the complainant. The order was filled and then the defendant continued to make and sell knuckles of the same form. The Schickle, Harrison & Howard Company claims that it can lawfully make and sell these knuckles to purchasers of the complete coupler who may need them for repairs. The decision is that the patent is a combination patent, including the drawhead, the knuckle and the locking pin, and that the knuckle is the important feature of the combination.

"There is no question as to the validity of the patent; the only question is whether or not knuckles made and sold as has been done by the defendant are repairs within the meaning of the rule which entitles the purchaser of a patented article to repair it when worn out. It is held that a purchaser of a patented article may use it until it is worn out and repair and improve it as he pleases, provided the repair and improvement do not amount to a reconstruction. In the present case the court holds that the knuckle is the chief element in the patented combination and that the use of it to supply the place of worn-out knuckles amounts to reconstruction and is not repair. The decision then is that the defendant infringes and an order may issue for an injunction and accounting."

Meeting of the American Society of Mechanical Engineers.

The sixteenth annual convention of the American Society of Mechanical Engineers was opened December 3 in the society's rooms at 12 West Thirty-first Street, New York City. A large gathering of members greeted Mr. C. E. Billings, the president, when he called the meeting to order. Papers were read on "The Recent Improvement of the Drop Hammer for Forging" and "The Best Material for Filtering Oil, Either for One Operation or in a Series, and the Best Method for the Extraction of Oil from Condensed Steam Where it is Desirable to Use the Exhaust Steam for Boiler Feed Purposes." On the morning session of December 4 the following officers were elected: President, John Fritz, of Bethlehem, Pa.; vice-presidents: F. H. Ball, of this city; Jesse M. Smith, of Detroit; M. L. Holman, of St. Louis; George W. Melville, of Washington; Charles H. Manning, of Manchester, N. H., and Francis W. Dean, of Boston; managers: John B. Herreshoff, of Bristol, R. I.; L. B. Miller, of Elizabeth, N. J.; W. S. Russel, of Detroit; John C. Kafer, of this city; Charles A. Bauer, of Springfield, Ohio; A. C. Walworth, of Boston; Norman C. Stiles, of Middletown, Conn., and George W. Dickie, of San Francisco; treasurer, William H. Wiley, of New York City.

The officers were elected unanimously.

The committee on testing the resistance of fireproofing materials reported progress. The committee intends to build a furnace about the size of a room in an office building, and to lead into the furnace hot burning gas, so as to determine the effect of these temperatures on the various materials which are used to fireproof the iron and steel put in modern buildings. The furnace will be erected on the ground of the Continental Iron Works, at Greenpoint, L. I. A petition to the Paris Exposition of 1900 addressed to Congress was also read, as well as the report on the Zurich Conference upon the unification of methods of testing the materials of construction. Various other papers were read. The closing session was well attended and was mostly devoted to the reading of papers and to discussions. A picture of Ericsson, the inventor of the Monitor, was presented to the society by Prof. F. R. Hutton, the secretary. Mr. Hutton discovered the picture in an auction room on Fifth Avenue. A member of the society said he had seen it hanging on the walls of Ericsson's home when the inventor was alive. The drawings of the steamboat Fulton, made by Robert Fulton in 1813, which, for many years, were in the possession of the Schuyler family of New York, were offered to the society by Miss Louisa E. Schuyler, of Gramercy Park, New York City, and were placed to the right of the president's desk. There is also in the society's room a picture of Robert Fulton, painted by himself, with the aid of a mirror. The society has also a Colonial mahogany table which was owned by him, and on which he is believed to have made the drawings of his steamboat.

A reception and supper at Delmonico's was held on Thursday, December 5. At the closing session, held on December 6, it was decided to hold the summer meeting of 1896 in the city of St. Louis, Mo. Part of each day of the convention was devoted to an inspection of various objects of interest in the city and immediate neighborhood.

Colored Glass Plates.

Glass is cast upon a table and a second layer of glass of a different color then cast upon the first, the thickness of each element of the compound sheet being determined by the vertical height of its allotted roller, by the traverse of which the plastic mass is spread. Designs may be impressed upon the glass through one or more of the several layers forming the compound sheet. The designs are produced by the use of a descending plate bearing the device desired and moving with its lower face strictly parallel to the table. The designs may extend completely through the sheet of glass and the recesses produced may be filled in with colored enamels.—T. Lefévre and L. Michau, Paris, France.

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