

lent results in fuel economy. Electric cars are holding their own for the particular class of work to which they are specially suited, although the reiterated promise that a new battery of large capacity and high economy will be placed on the market, does not yet appear to have been fulfilled.

Tires carrying some form of non-skid reinforcement bid fair to become the prevailing type of the future. Judging from the disastrous results in the last Vanderbilt cup race, American makers have not yet discovered a thoroughly reliable method of attaching the steel-riveted leather strips to the tires; and, indeed, it was due to the stripping of this reinforcement, that the excellent cars entered by the American contestants failed to make a better showing in that race. The best makes of American tires are showing first-class qualities in every respect, and as soon as we have mastered the non-skid problem, our best cars will be in every respect equal to the best of those turned out in Europe. In the matter of wheels there is a tendency to increase the size, 32 and 34-inch wheels taking the place of the 30 and 32-inch wheels of last season; while the diameters have increased to 3½ inches for the front and 4 inches for the rear wheels.

The prevailing type of transmission from the engine to the rear wheels includes the leather clutch, change-speed sliding gears, and either the shaft or the chain drive, with a preference in the majority of cars for the former. There is room for improvement in the design of the clutch; as is proved by some creditable efforts which are being made in this direction, and which were on exhibition at the Show. Two or three cars show double clutches, of which the smaller (generally metallic) takes hold first and gives the preliminary impulse to the car, while the larger and leather-faced clutch takes hold a moment later, as the car is accelerated to the higher speed. A modification which deserves special mention is that shown on a new racing car, which was built for the Vanderbilt cup race, but was completed too late to enter, in which the bevel gears are carried on a jack shaft, from which the drive is transmitted to the differential by means of spur gears. The object of this arrangement is to avoid any side thrust on the differential. In this particular car, moreover, was afforded an excellent opportunity to study the great refinement of materials and designs which is necessary in producing a modern racing car. The material throughout the car is chrome nickel steel, and the change-speed gears with their shaft, besides several minor parts, such as brackets, have been machined entirely out of the solid ingot.

The friction drive is still making a commendable struggle for recognition, and two or three cars which use this type, including a heavy motor truck, are on exhibition. In one of these there are two friction disk wheels, leather covered, carried on the main drive shaft, while between them is a transverse split shaft carrying two friction drive wheels. By means of a lever, placed at the right-hand side of the driver, the two friction disks can be thrown into the forward or reverse position, while the change of speed is effected by moving the same disks out or in to the center of the flywheel disks—this change of position being effected by a hand wheel located on the steering shaft below the steering wheel.

There are those who believe that the real future of the industry lies in the field of the motor truck. Certainly the displacement of the horse-drawn vehicle by the motor-driven truck is making steady progress. That the latter is destined ultimately to obtain almost exclusive control of the field, is assured by the fact that careful tests of the relative economy of the horse and the motor have shown that there is an average saving in favor of the latter of at least 20 per cent in cost; while over and above this are the many conveniences of storage, cleanliness, compactness, and more easy flow of traffic in congested districts, which may be urged in favor of the motor car. While most of the machines shown were driven by gasoline engines, some very powerful and excellently-designed electric-driven trucks were also on exhibition. One of the handsomest and most formidable of these was a five-ton truck, in which the motors were carried directly on the wheels. The axles and much of the gear of this truck were formed of manganese bronze, the parts being largely of a powerful I-section, and the whole truck showing evidence of a very careful and scientific design. A novelty among the gasoline trucks was one propelled by a two-cylinder two-cycle gasoline engine, which embodied all the best features upon up-to-date touring cars.

Space forbids any lengthy mention of the elaborate exhibition of sundries, which occupied an unusually large space in the Grand Central Palace. One of the most useful and commendable novelties was the provision of a tool and spare parts case, which was built into and formed the back of the tonneau. The whole of the back was covered by a board filled with recesses for the various tools arranged in convenient order. In the center of this board was a compact set

of drawers containing spark plugs, waste, oil cans, and a hundred-and-one small items liable to be needed in an emergency. There was also space for two spare shoes, while at the sides were pockets to contain a couple of spare inner tubes. The whole arrangement was closed in by a couple of hinged doors molded to the curve of the tonneau back.

To automobilists a few comments on the show which opened in Paris on December 7 may not be without interest. From cabled accounts it would seem that this year's show has very little that is new to offer. So far as outward appearances go, the Grand Palais looks very much as it did in 1905. Even last year's stands are used, because new designs would have involved a heavy expenditure. The cars too offer little, if any, novelty. The only striking feature of the show is the lavish use of 6-cylinder motors. Apparently about 75 per cent of the French designers have pledged themselves to six cylinders. The tendency evinced last year of using metal instead of leather clutches is more pronounced than ever. Almost without exception the more powerful models are equipped with metal clutches. Many cars too have been equipped with the live axle or Cardan system of transmission, the live axle being for the most part independent of the transverse shaft. It may be safely said that the live-axle machines outnumber those driven with chains.

THE PATENT OFFICE IN 1906.

The report of the Commissioner of Patents on the business of the Patent Office for the fiscal year ended June 30, 1906, shows that there were received during that year 55,619 applications for mechanical patents, 821 applications for design patents, 172 applications for reissue, 1,938 caveats, 10,888 applications for trademarks, 943 applications for labels, and 438 applications for prints. The number of patents granted, including reissues and designs, was 31,837, and there were registered during the year 10,408 trade-marks, 741 labels, and 354 prints. The number of patents which expired was 20,682, and 5,193 applications which had been allowed were forfeited by operation of law for non-payment of the final fee.

The total receipts of the office from all sources amounted to \$1,811,297.84; and the total expenditures were \$1,538,149.40, leaving a surplus of receipts over expenditures of \$273,148.44, which surplus was turned into the Treasury.

While the act of February 20, 1905 (33 Stat. L., 724), amending the trade-mark law so as to authorize, among other things, the registration of trade-marks used in interstate commerce, became effective under its terms on April 1, 1905, no registrations were made under said act until after the beginning of the present fiscal year. This was owing to the fact that the law requires publication of the trade-marks in the Official Gazette of the Patent Office prior to registration. During the last three months of the fiscal year 1905, 9,710 applications for registration were received, and during the present fiscal year the number received was 10,888. This represents an enormous increase in the work of this character to be performed by the office force; and the number of trade-marks registered during the past year, 10,408, also shows an increase amounting to 500 per cent over the registrations for 1903 and 1904, which were approximately 2,200 for each year. These increases are due entirely to the liberality of the new trade-mark law, which not only makes a wide extension of the class of marks susceptible of registration, but reduces the cost of the proceedings therefor.

From a comparative table of the general operations of the office embodied in the report it appears that during the last seven years there has been an average increase of more than 59 per cent in the various classes of work performed in the office. Yet the increase in the number of employees from 1899 to the close of the past fiscal year was only 11.9 per cent. By the legislative, executive, and judicial appropriation act of June 22, 1906, Congress provided for an increase of 29 examiners of all grades, and of 21 in the clerical force. This increase of course did not become available until after the close of the fiscal year; but it is confidently expected that a gratifying condition of the work of the office will be shown at the end of the next fiscal year. Indeed, it is stated that an improvement in the conditions can already be observed. In this connection the commissioner suggests that, inasmuch as experience has shown that the work of the office has a regular substantial growth in times of prosperity, this condition might well be met by a moderate, regular annual increase in the force of examiners and clerks. The applications of all classes awaiting action at the close of the year were 21,958, as against 16,077 at the close of the preceding year.

Substantial progress has been made in the reproduction of exhausted copies of patents, and practically all printed copies are reprinted without delay upon request. The correspondence, drafting, furnishing of copies of patents and of records have been transacted with a fair degree of promptness, and some improvements in methods in the clerical divisions have been made.

Attention is invited to the fact that, instead of obtaining the illustrations for the Official Gazette from private contractors, in connection with which system the dummy card process has hitherto been used, the entire work upon the Gazette is now executed at the government printing office, and, in the illustrations, zinc etchings have been substituted for the photolithographic reproductions which were made from dummy cards. The change has been found to work satisfactorily. The legislative, executive, and judicial appropriation act of June 22, 1906, made a reduction in the appropriation for producing the Gazette of \$70,000, and it is estimated that at least this amount will have been saved by the change described by the end of the next fiscal year.

The act of June 22, 1906, making appropriations for the legislative, executive, and judicial expenses of the government for the fiscal year ending June 30, 1907, contains the following provision:

"For rent for storage for patent office model exhibit, ten thousand dollars, or so much thereof as may be necessary; and the Secretary of the Interior shall dispose of a part or all of the models of said exhibits, either by sale, gift, or otherwise."

Immediately after the passage of this act, the commissioner of patents was instructed to ascertain what models could be disposed of as required by the act without injury to the interests of the service. From the report of the commissioner, it appears that a very large proportion of the models in the so-called model exhibit of the patent office form a valuable part of the records of the office, and that the disposal of the same would work a grave injury to the service, since reference thereto by the office, by patent attorneys, and at the instance of courts, is frequently necessary. A question also arose as to the effect of the foregoing provision upon section 484 of the Revised Statutes, which reads as follows:

"Sec. 484. The Commissioner of Patents shall cause to be classified and arranged in suitable cases, in the rooms and galleries provided for that purpose, the models, specimens of composition, fabrics, manufactures, works of art, and designs, which have been or shall be deposited in the patent office; and the rooms and galleries shall be kept open during suitable hours for public inspection."

The question was accordingly submitted to the assistant attorney-general of the department as to the effect upon section 484 of the Revised Statutes of the clause in the act of June 22, 1906, above quoted; and the opinion of that officer was to the effect that section 484 was not repealed by the enactment in question.

Thereafter a contract was entered into for the renting of the second, third, and fourth floors of the Union Building in Washington, the building in which these models have heretofore been exhibited, during the present fiscal year at a rental of \$10,000, the amount appropriated by the act. Subsequently, correspondence was begun with the secretary of the Smithsonian Institution to ascertain whether any portion of the models not a part of the records could be placed in the National Museum for exhibition purposes, and if so, which models were desired and could be accommodated in the buildings of the institution. The officers of the institution have indicated their willingness to receive and provide for a portion of the patent office models, and the selection of the models to be transferred to the custody of the institution is now under consideration.

THE CURRENT SUPPLEMENT.

In the SCIENTIFIC AMERICAN SUPPLEMENT, No. 1615, an article is published by Frank C. Perkins on electrically-operated pneumatic hammers in which German, American, and English types are described and illustrated. Dr. Hans Kuzel has invented a process by which the most refractory and obstinate metals can be made into lamp filaments. This process is described by J. Swinburne. It is not an easy task that confronts the amateur constructor of a large induction coil when he reaches a point in his work where he must choose the type of interrupter that he intends to use. Mr. A. Frederick Collins tells in a very clear way just how an independent interrupter can be constructed. His article is accompanied by complete drawings. Full details of construction are given. Some very interesting experiments have been made in Vienna for the purpose of studying the phenomena of fires originating on the stage of a theater, and determining the best methods of safeguarding the audience. The results obtained in this experimental theater are given. Other articles of interest are those entitled "Treatment of Rivers with Shifting Channels," "The Collecting and Testing of Carbonic Acid for the Purpose of Carbonization," "Greenhouse and Conservatory Heating," "The Accessibility of the Pajarito Ruins," "Mars as a Place to Inhabit," and "Gas as a Source of Power." Mr. Craig S. Thoms's article on "How Seeds are Carried" is concluded. Those interested in the gas turbine will find the article on the "Gas Turbine and the Turbine Compressor" of value.