ing international treaties which will embody similar suggestions, and that these amendments will be presented at the forthcoming meeting of the representatives of the nations concerned, to be held at Brussels next December. One of these amendments would restrict the articles which are patentable in this country, so that no foreigner can patent an article in the United States which he cannot patent in his own country, and all the amendments appear to have more or less of the retaliatory flavor to which we have already referred.

It is to be hoped that the rumor is not well founded, or at least that the subject matter of the amendments is not as reported. There was a time when international discrimination existed in the matter of fees and taxes; but, fortunately, all such agreements were subsequently revoked, and the tendency of later negotiations has been in the direction of throwing open the several patent courts in the most liberal international spirit. It seems to us that the proposed amendments would be a decidedly retrograde step and one entirely at variance with the generous policy which has characterized our Patent Office in the past and has contributed so largely to its success.

We are in thorough accord with the third suggestion of the circular that we should have separate courts for adjudication of patents, with the object of expediting patent litigation.

If amendments are to be offered at the forthcoming conference, they cannot be too seriously considered, and no resolution should be placed on the table that has not received the most widespread and thorough discussion. We are glad to note in this connection that at the meeting of the American Bar Association, at Cleveland, the committee of fifteen was requested to consider such proposed amendments as are intended to be made at Brussels, and make recommendations to the Secretary of State, or head of other proper government department, as to the instructions to be given to the delegates from the United States to this conference.

THE SEVENTH INTERNATIONAL GEOLOGICAL CONGRESS.

BY HORACE C. HOVEY.

About a thousand geologists were in session recently for eight days at St. Petersburg, Russia. They adjourned on September 5. The printed official list, in which some changes were afterward made by reason of additions and absentees, may be taken as fairly representing the make-up of the congress. Russia, of course, furnished the largest number of members, 271 in all. Germany stood next with 187 delegates. Then came the United States of America with 113 names. From France came 89; from Great Britain, 72; from Italy, 51; from Austria, 76; from Switzerland, 23; from Belgium, 24; from Sweden and Norway, 14; and the remainder from Spain, Holland, Servia, Denmark, Portugal, Roumania, Australia, India, Japan, Transvaal, New Zealand, Canada, Mexico and the Argentine Republic—twenty-four nations in all, and probably more when the final list appears. Amid so many languages some one had to be selected as the official medium of communication and record, and that distinction was unanimously accorded to the French tongue. Yet as not a few who are eminent in science are not equally so as linguists, much liberty was allowed in the discussion, and a few papers were read in English or German. Unfortunately for most of us, the daily reports by the press were in Russian, a language whose intricacies we have not mastered beyond the requirements of the hotel, the railroad and the street. The immense treasures of knowledge, especially in the various sciences, that are now locked up in the Russian language ought, by translation or otherwise, to be made accessible to the remainder of the civilized world. As we explored the mazes of the great museums of St. Petersburg, Moscow, Kazan, Ekaterineburg and other Russian cities, and found most of the specimens labeled and described in Russian, we felt regret that, besides the vernacular, they could not also have given us in French or in Latin the knowledge that we so much desired and generally found it hard to obtain. It should be added, however, that the committee of arrangements generously distributed for our benefit guide books (in French) and other helpful literature, as well as numerous maps and other aids, besides the verbal information so freely and patiently given in answer to our myriad questions on every imaginable topic. Especial mention should be made of the voluminous guide book prepared expressly for the excursions before and after the session of the congress, a thick octavo in thirty-four parts, self-bound, so that any one part or more could be extracted for use and easily returned to its place again. We found many citizens in the large places who could speak French or German, and here and there one familiar with English. But in exploring more rural regions, like those along the Volga and amid the Ural Mountains, we found the mass of the people speaking no other than their native tongue, and wondering in their simplicity why we could not speak it as well as they, or at least well enough to answer their civil and perfectly natural inquiries as to our welfare and our wants. Much of our intercourse with the natives had to be by pantomime, and it is wonderful how many ideas can be exchanged by that primitive means of communication.

The president of the Geological Congress, His Imperial Highness the Grand Duke Constantine, who is also the president of the Imperial Academy of Sciences, opened the sessions by a graceful address of welcome, speaking of the attractions and resources of the great country whose honored guests we were, but also recognizing fully the international character of our organization. The display of gold and scarlet and the brilliant uniforms of military officers present at the opening dazzled our republican eyes. The best we could do was to wear our dress suits and make the most of the silver medal with red, white and blue ribbons attached to it, the simple insignia of the Geological Congress; its heraldry a hammer and mallet crossed in a wreath of oak leaves, and its motto the Latin words, "Mente et Malleo;" and on its obverse another wreath, encircling the legend, "Rossia, 1897." The acting president was Dr. A. D. Karpinsky, the director of the geological survey; and the general secretary, Dr. Th. N. Tschernyschew, geologist in chief. Dr. James Hall, of Albany, N. Y., was named as the first of the three honorary presidents, the other two being Prof. Capellini, of Bologna, and Prof. Renevier, of Lausanne. Vice presidents from the various nationalities represented were also appointed, forty in all, some one of whom usually presided at the daily sittings of the Congress. Those from the United States were Profs. Marsh, Emerson, Frazer and Emmons. Seven assistant secretaries were appointed, who found the office no sinecure. Mention must also be made of the diligence of the young men from the university, who served on the bureau of information, and whose patience we taxed in many ways, necessary and sometimes unnecessary.

Early in the meetings of the council Prof. Gaudry, of France, extended an invitation from that nation for the eighth meeting of the International Congress, to be held in Paris in A. D. 1900.

The invitation for the ninth meeting, in A. D. 1903, was brought by M. Tietze, on behalf of the Austrian geologists, to be held in Vienna.

Both these invitations were unanimously accepted with applause. While undoubtedly the great majority of those gaining membership in this International Congress are worthy of the distinction, it has been objected to that a few are enrolled who have either been noted in chemistry, engineering, or some other science not included under the general term "geological," and now and then some one not known in any branch of science. To meet this difficulty the American geologists offered, through Prof. Emmons, a resolution that, hereafter, membership shall be reserved for those who are approved by the principal geological societies or institutions of the countries to which they belong. Other ways of meeting the matter were also suggested.

The daily meetings were held in the large hall of the Zoological Museum of the Academy of Sciences, which was beautifully decorated for the occasion.

One of the important questions discussed was as to the best methods of the classification of geological strata. Every student of geology has found himself more or less confused as to the terms in which the formations of different parts of the globe are described. There is an imperative need of revising the nomenclature and much has recently been written on the subject. Among those who took part in this discussion were Profs. Renevier, Loewinson, Lessing, Frech, Zittel, Bertrand, Karpinsky and Pavlow. The conclusion was in the form of a resolution advising geologists to rest on the ground of the historic method of classification, with the endeavor to make it gradually "more and more natural." To this it was added that the council should name a special commission whose duty it should be 'to study the principles of classification, in the spirit of this resolution." This same subject was more fully discussed in the general session, where highly important suggestions were offered, especially by some of the Russian geologists, growing out of their observations of the mineralogical composition and structure of the rocks found amid the Ural Mountains. Lengthy and valuable memoirs were presented to the Congress concerning various aspects of geological nomenclature, to which more full recognition may be given in some future communication. The conclusion reached seems to be perhaps the best that can be done at present, but there is a strong and growing demand for something better than the so-called "historical method," which, as was well remarked by Dr. Karpinsky, is wholly artificial. What is needed is a system natural, practical and uniform.

The business meetings occupied the morning; but the afternoon of each day was given up to the reading of scientific papers and their discussion. The following are the titles of some of the most important: "On the Glacial Period in North America," by Prof. Upham, of Minnesota, and "On the Direction of the Flow of Glaciers and the Origin of Moraines," by Prof. H. F. Reid, of Johns Hopkins University. These were followed by two papers by Mr. Lindonall, on "The Cause of the Ice Age," and "How is the Mammoth Frozen in North Siberia?" Mr. Marsden Monson, of California, offered a paper on "The Evolution of Climates." Papers on "Orography" (or mountain making) were read by Messrs. Meunier, Sacco, and Prinz. Prof. Meunier also gave the result of his studies concerning the platinum region of the Ural Mountains. Dr. Tillo gave his views as to the remarkable depression of the center of the Asiatic continent, and also on certain magnetic anomalies of the center of Russia in Europe. Dr. Makowsky spoke on the existence of the great mammalia, the mammoth and rhinoceros, the huge bones of which are found in such comparative abundance in Russia, using the superb materials collected to explain his paper. A communication on the fossil reptiles of Perm and Wologda was offered by Mr. Seeley. Other papers and addresses were presented, all of which, either in full or by abstract, will be published in the proceedings of the society. The writer is aware that this is an imperfect resumé of the proceedings and deliberations that absorbed the attention of some of the most noted geologists of the world, and it is his intention hereafter to review some of them more in detail. He will also give some account of the remarkable geological excursions made in connection with the Congress, occupying many weeks and covering many thousands of miles. They were planned with great care and managed with ability. They gave those who availed themselves of the privilege an opportunity to see practically the whole of Russia in Europe and a small portion of Russia in Asia, and to get some idea of the immense territory and vast resources of the empire of the Czar. Everywhere the citizens came out en masse to welcome us, and frequently with music and banners and sumptuous banquets. The respect with which they treated their national guests was uniform, whether shown by prince or peasant. The cities of St. Petersburg and Moscow led the van in their costly and regal hospitality, but did not really exceed what was done by some of the smaller cities less widely known. The doors of the Summer Palace at Peterhof were thrown wide open for our reception, and the banquet spread in our honor in these imperial halls, amid marvelous fountains and rare paintings and inspiring music, was a feast never to be forgotten. The mayor of St. Petersburg also received us in the City Hall; the Grand Duke gave a reception to a select number at the Marble Palace, and there were numerous more private manifestations of Russian hospitality.

The public buildings, the Winter Palace, the Ermitage, with its marvelous treasures of art, the Bergacademie, with its renowned collections of specimens in paleontology and mineralogy, and, indeed, every place of beauty and learning and historical interest, parted its doors for us at the sight of our simple silver badge. This also was a talisman permitting the use of the camera without interference or hindrance. As a result hundreds of photographs of rare, curious and interesting objects were taken, and it is safe to say that in no city, from St. Petersburg to Ekaterineburg, could any stray kodaker easily find a roll of films or box of plates remaining, unless the exhausted supply has been replenished during our stay. The market is swept clean. Pictorial fruits will be abundant as soon as they have had time to ripen.

Perhaps the reader may be interested to know how long it takes to go from New York to Moscow when one is in a hurry. A cablegram from Dr. Karpinsky decided me to join the excursion to the Ural Mountains that was made before the Congress met at St. Petersburg. I sailed by the next steamer, which happened to be the Campania, of the Cunard line; reached Liverpool in six days and London by midnight; took a morning train by the Flushing route, and arrived at Berlin on the morning of the eighth day, where I rested for twelve hours; crossed the Russian frontier at Alexandrowo with the usual delay for inspection of baggage and passport; and by noon of the tenth day the gilded domes of Moscow flashed into view. By the official tables the entire distance from New York to Moscow, by the route taken, extends 5,000 miles; thus making the average rate of daily travel 500 miles for the ten days, including stops for about twenty-four hours en route. Our flying glimpse of England in harvest time; of Holland's luxurious gardens and picturesque cottages and mansions; of Berlin's ripe yet modernized magnificence, prepared us by way of contrast for what we were to see in the proud and strong Russian empire, where the Occident and Orient so strangely and wonderfully commingle.

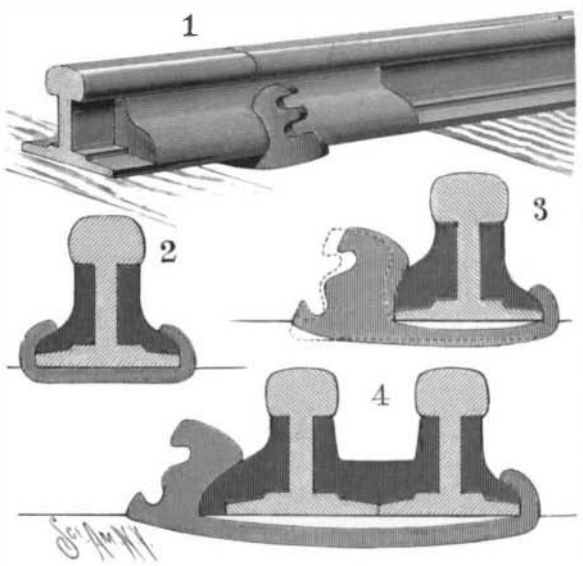
As France taxes bicycles and tricycles, the number of machines used in the country is known exactly. On January 1, 1897, there were 329,814 taxed, an increase of nearly 74,000 over 1895, which had shown an increase of 53,000 over the preceding year. The revenue obtained in 1896 was 3,272,339 francs. Paris department, the Seine, heads the list with 62,892 bicycles, paying a tax of 626,916 francs.

High Kite Flying.

The highest recorded altitude ever reached by a kite was obtained on the afternoon of September 20, at the Blue Hill Observatory. The top kite reached the height of 10,016 feet above sea level, or 8,386 feet above the summit of the hill. The ascent began at noon, and the highest point was reached at seventeen minutes past four, when seven Hargrave kites were held by nearly four miles of wire. An instrument for recording the temperature, humidity and pressure was hung about 130 feet below the highest kite. At the highest point reached the temperature was 38 degrees, while at the ground it was 63 degrees. At the height of 4,000 feet the humidity rose rapidly; at 7,000 feet the humidity was almost at the point of saturation; at 8,000 feet it began to fall, and at the highest point it was extremely low. At the ground level the humidity remained low during the entire ascent. The instruments and kites were brought down at 6:40 P. M., having been more than a mile above the hills for over five hours.

IMPROVED RAILS AND RAIL FASTENINGS.

The accompanying engraving illustrates some improvements in railway rails, fish plates, and means for holding them to the rails, which form the subject of a patent issued to James Johnston, of No. 13 Public Square, Bradford, Pa. The use of these rails involves certain changes from the ordinary method of track making, the rails being anchored to the roadbed by their middles. They are held in line by track spikes, and the fish plates are designed to prevent up and down play at the ends of the rails, having no other function. The rail and fish plates are shaped to correspond with one another for this purpose, and the rail is further altered on the margin of its flange for the purpose of making a solid guard rail combination. The inventor claims that with this construction the track will not creep, and the rails will not be subject to the usual principal causes of breakage, as there will be an absence of pounding and clicking at joints, and greater safety in guard rails—all to be had without increased expense, as what is spent on anchors and milled rails will be made up in saving of fish plates, nuts, bolts and labor. Fig. 1 represents the rails tied together by the fish plates and clamps, Figs. 2 and 3 being sectional views, and Fig. 4 representing a section through the guard rails, showing the spacing block and fish plates employed. The fixing of the anchors in the roadbed must be done with absolute accuracy. If thirty foot rails are to be used, and it is expected that they will expand one-fourth of an inch under highest temperature met with, then the anchors will be placed at thirty foot, one-fourth inch centers apart. In ordinary situations a good tie will be a sufficient foundation for an anchor, but on grades, side hills, or other difficult situations, other security, such as piles, drive pipe, crib work, or masonry, must be provided. The rails will be made with an indentation in the flange, in the exact center, so that after the anchors are once correctly placed, it will be only common labor to put in the rail and secure it with a soft iron key hammered down flush. Being thus laid, the ends of the rails will always move to and from the centers in contraction and expansion. All joints will be equally open, and rails cannot crowd



JOHNSTON'S RAILWAY RAILS AND RAIL FASTENINGS.

one another; in fact, they should never quite touch. In the design of the rail on section the ordinary pattern is followed, but it is made heavier by the addition of ribs to make the web square with the head and flange, and the outer margin of the flange is raised and made heavier in order that rails placed side by side for guards may have a bearing against one another. The rail is preferably finished in a milling machine, in order to obtain true angles and surfaces, and the band or clamp with which the fish plates are held in place will cost little compared with the cost of bolts, nuts, and nut locks ordinarily used. These combinations are all secured in place by bands, which are passed under the rail and turned up on both sides, and should any of these details fail, or appear to be insufficient at any time, the ordinary methods now employed may still be used.

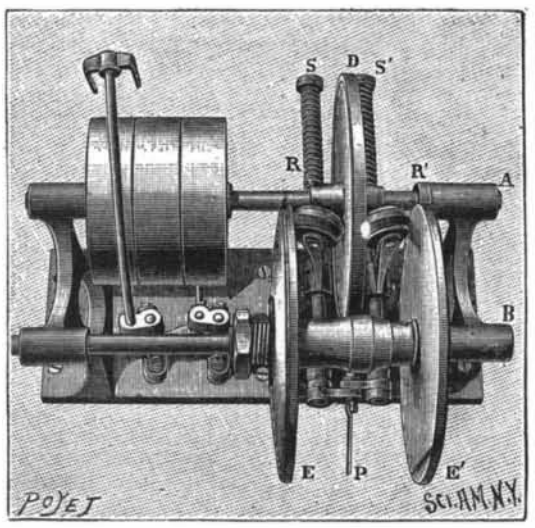


Fig. 2.—THE OSGOOD FRICTION CLUTCH.

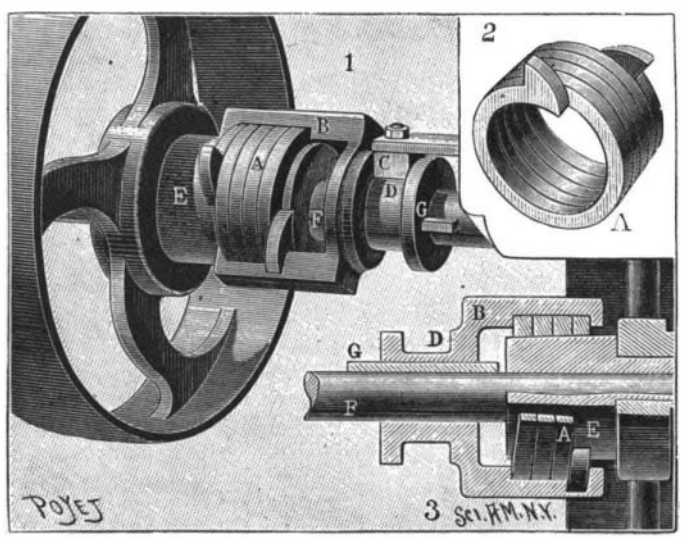


Fig. 1.—THE LINDSAY SPIRAL COUPLING CLUTCH.

MECHANICAL POWER TRANSMISSIONS.

We have recently had an opportunity of studying two new systems of transmission, about which we shall say a few words.

The first of these (represented in Fig. 1) is a Lindsay coupling clutch. The pulley that it is desired to set in motion is keyed upon a cone, E, which is solid, provided with bearings and loose upon the shaft, F. Upon this cone there slides another and elastic one, A (No. 2), consisting of a steel spiral which is provided with lugs at its extremity. The number of spirals and the section vary according to the power to be transmitted. The arms of a balanced piece, B, abut against the lugs, and the piece is provided with two tappets that are in contact with the spiral, and also with a groove, D, in which moves a slide, C, that may be maneuvered from a distance by means of a lever. The piece, B, is fixed to the shaft, F, by means of a key, G. In order to throw things into gear, it suffices to push forward the block, C, when the piece, B, will also be moved forward and carry along the spiral, A, which will slide freely and bear against the cone, E, and set it in motion. It will be seen that it is possible to easily graduate the setting in motion through a maneuvering of the lever; and that it is also possible to cause the elastic cone to move forward upon the solid one as slowly as may be desired. It is possible, too, to limit the power transmitted by not shoving the elastic cone home. It is, in fact, only when the latter is perfectly in gear that the full power for which it is calculated is transmitted. The throwing out of gear is done very easily by a contrary maneuver. Let us add that the two cones should always be lubricated. In order to protect it from dust, and for various other reasons, the elastic cone is inclosed in a tight cast iron box. The transmission may be reversed according to circumstances. Upon one extremity of the driving shaft is keyed the cast iron cone, and upon this is placed the elastic one. In this case the solid cone revolves freely in the interior of the other when the driving shaft is in motion. These couplings are constructed in two sizes, one of which permits of operating at all angular velocities up to 2,000 revolutions a minute, while the other is adapted for heavy motions and revolutions of feeble angular velocity. These apparatus have the advantage of throwing into gear progressively, without any shock and at all angular velocities. The throwing out of gear is just as easy, and is instantaneous and complete.

Let us point out another possible utilization. As the elastic cone is provided with lugs, the motion may be transmitted in opposite directions to the shafting to be driven, when the driving shaft is actuated in one direction or the other. Supposing that we have two motors actuating one shaft in common through pulleys provided with couplings having a double motion, it will be possible to render regular the running of these two motors one by the other. The coupling may also be so arranged as to prevent one motor from carrying along the other.

Sometimes it is necessary to have transmissions of variable velocity. Fig. 2 shows us the principal arrangements of the Osgood system. A shaft, A, which receives motion from the pulleys to the left, carries a disk, D, to the left and right of which are placed two friction rollers, R and R', that present bevel faces at their rims. These rollers may be easily shifted by tightening the springs, S and S', more or less by means of the rod, P. At the sides of the rollers are arranged two other disks, E and E', that actuate the same shaft, B, that transmits the motion. The rollers, R and R', rub through one of their faces against the disk, D, and through the other face against each of the disks, E and E'. These latter are therefore set in motion, but with a much greater angular velocity, and one that varies according to the position occupied by the rollers. The velocity is maximum when the rollers are in the center and minimum when they are at the periphery.—La Nature.

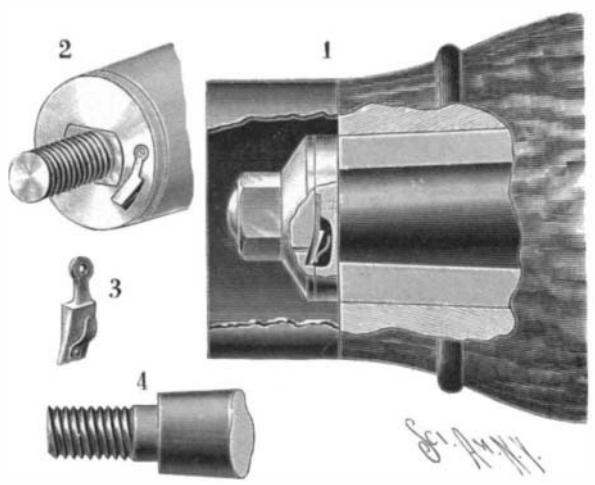
A Lesson in Economy.

Consul Germain writes from Zurich, in regard to a plan recently introduced in the public schools of several European cities. In Brussels, the children attending public schools were requested by their teachers to gather up, on their way to and from the school, all such apparently valueless objects as old metallic bottle capsules, tin foil, tin cans, paint tubes, refuse metals, etc., and deliver their collections daily to their respective teachers.

In the period from January 1 to October 1, 1895, or within eight months, the following amounts were collected: Tin foil, 875 kilogrammes (1,925 pounds); old paint tubes, 100 kilogrammes (220 pounds); bottle capsules, 2,007 kilogrammes (4,415 pounds); scraps of metal, 555 kilogrammes (1,221 pounds); total, 3,537 kilogrammes (7,781 pounds). This apparent rubbish was disposed of and the proceeds applied so as to completely clothe 500 poor children and send 90 sick ones to recuperation colonies, and there still remained quite a balance, which was distributed among the poor sick of the city.

A VEHICLE AXLE IMPROVEMENT.

The construction shown herewith, which forms the subject of a patent recently issued to Simon J. Harry, of Washington, D. C., affords novel means for preventing the cap nut from turning. Fig. 1 illustrates the application of the improvement, portions of the hub being broken away. The axle, spindle and box may be of ordinary pattern, but the outer end of the spindle is threaded, as shown in Fig. 4, and has a seat for a collar with central opening squared on two sides, as shown in Fig. 2, where the collar is represented in place, having on its outer face a spring pawl. The pawl, shown in Fig.



HARRY'S HUB ATTACHING DEVICE.

3, fits in a suitable recess in the face of the collar, and its point projects to engage a shoulder forming the end wall of a recess in the inner end of the cap nut, locking the latter from accidentally turning off by jarring or the backing of the vehicle. To release the pawl, a slender rod, nail or other suitable implement may be passed through an opening in the nut, by which the point of the pawl may be pressed back and the nut released.