

such places with costly steel bridges, two of the most notable of which are located respectively below Cozens' Hotel and just below Fort Montgomery. The former is 210 feet long and the latter 290 feet, and they are only two instances out of many where this expedient had to be used. Illustrations of this work and a description of the difficulties of railroad building in the Highlands were given in the SCIENTIFIC AMERICAN of January 26, 1884.

We refer the reader to these facts because they suggest a probable explanation of the recent disaster on the opposite side of the river. An examination of the site shows that the natural surface of the rock dips abruptly toward the river. The original single track roadbed was constructed about half a century ago. Subsequently a second track was added on the river side and a retaining wall, laid dry, was built up, which acted both as a sea wall to protect the embankment from the wash of the river and as a retaining wall to hold the material of the roadbed in place. That it had to do the work of a retaining wall is evident from the fact that the filling was carried up to the top of the wall, which would therefore be subject to the lateral thrust of the embankment.

The fact that the embankment has carried the traffic safely for forty years has led the company to suggest that some violent external cause, such as a derailed engine or dynamite in the hands of malicious parties, caused the wreck. But while the long continued stability of the roadbed makes its sudden collapse more puzzling, it cannot be taken as proof that the wall carried a sufficient margin of stability through all these years. If the friction between the roadbed filling and the sloping surface of the underlying rock was sufficient, but only just sufficient, to hold the embankment in place, it only needed the saturation of the material by exceptionally high tides—such as were occurring at this time—and the concussion of a heavy express train to start the slide.

The New York Central holds a well merited reputation for the excellence of its roadbed and equipment. If the careful examination which is being made shows that the wreck was due to the cause above suggested, it is probable that a regard for its own interests and those of the public will lead the company to reconstruct its embankments in all places where the shelving rock may imperil the safety of the roadbed.

**AN INTERESTING SOCIOLOGICAL EXPERIMENT.**

An interesting sociological experiment has been inaugurated in New York City. The housing of men in moderate and reduced circumstances has always been an interesting and important problem. Many attempts have been made in that direction, but in nearly every instance the buildings have been so arranged that they did not attract a desirable class of people, or the architecture, decoration—lack of decoration—or general effect was to give the house an institution-like appearance, with no semblance of refinement, comfort or home. Mr. D. O. Mills was interested in this problem, and at last resolved to venture a large fortune in the erection of a superb hotel for men with small incomes. In the beginning it must be said that there is no charity connected with "Mills House No. 1" on Bleeker Street, New York. The man pays for what he gets, but unlike the frequenter of the ordinary lodging house he gets all he pays for. He has a clean, comfortable room, furnished with a well appointed bed, the floor carpeted and the windows curtained and shaded, for twenty cents a night. Well equipped lavatories, shower baths and luxurious reading and smoking rooms are at the disposal of the guests of the house without extra charge. A good restaurant furnishes meals at the lowest possible price.

Lodging houses in the lower part of New York will not suffer by the opening of the Mills House, because the class of men who frequent them will not be entertained there, but it is expected there will be enough men in moderate circumstances who desire a comfortable home at a minimum price to fill the 1,560 rooms which the house contains. So satisfied is Mr. Mills of this that he is now erecting on the east side a similar building at Rivington and Clinton Streets. Mr. Mills, who is a very successful man of affairs, may be trusted to make no failure in an investment of this kind. Unfortunately, philanthropy is usually divorced from business principles, and the mischief that this does is incalculable, and the result is often that the masses are pauperized, whereas they might be benefited and made self-respecting by enabling them to help themselves. The use of wealth for bettering the conditions of life under such circumstances as will secure to capital its due return is a beneficent experiment which has hitherto been imperfectly tried in New York or elsewhere.

The Mills House No. 1 has a frontage of 200 feet on Bleeker Street. It is ten stories in height and is built of white brick and Indiana limestone. The architect is Mr. Ernest Flagg, who has been entirely successful in designing this hotel. The house is built in two parts, each in the form of a hollow square with two courtyards reaching to the top and ending in skylights. These courts are lighted and heated and comfortable chairs are provided, and each court is ornamented with

palms and plants. The windows of the sleeping rooms on the court give light and air, and are provided with grilles and lace curtains, no window glass being used. The rooms on the outside of the building have windows and curtains. The various floors are reached by means of elevators. The rooms are, of course, very small, just large enough to contain a bed and a chair. They are all separated, however, and are lighted over the partition, there being no lights in the rooms. Though the rooms are not luxurious, they are very comfortable. No better bedding can be found in any hotel in New York. Lockers in the basement allow for the storage of the effects of the guests.

The entire front on Bleeker Street is occupied by a series of tastefully decorated parlors which would not disgrace a first-class hotel. A large collection of well-selected books is already in place. Great washrooms are provided with hot and cold running water. The most modern form of baths with hot and cold water are free to all guests. A laundry is provided in the house, and the men may, if they desire, wash their own clothes, facilities being provided for this purpose. The dining room is in the basement and is intended to furnish cheap meals of a good quality.

The Mills House No. 1 was opened on Wednesday, October 27, in the presence of a large number of invited guests. The exercises included a prayer and address by Bishop Potter, of the Diocese of New York, and addresses by Ex-Mayor Abram S. Hewitt and Dr. Chauncey M. Depew. They all spoke warmly in favor of such a use of capital, which does not pauperize old or young men, but which tends to make them self-respecting. The erection of a building of this kind is indeed the truest kind of philanthropy.

**AN URGENT PATENT OFFICE REFORM.**

We recommend to the careful perusal of our readers the admirable letter upon the question of Patent Office reform which will be found elsewhere in this issue. The high authority from which it proceeds and the unanswerable arguments with which it abounds should serve to bring home to the inventors and manufacturers of the country the urgent necessity for combined action, with a view to securing the necessary reforms at the forthcoming meeting of Congress.

The wearisome delays of which such correspondents as Mr. Heath have from time to time complained are not more harassing to the inventor than they are to the various Patent Office officials, whose hands have been tied and whose best efforts have been crippled by the parsimonious policy of Congress in the matter of appropriations. This parsimony would be more intelligible if the Patent Office were a losing investment for the government; but in view of the fact that this department is netting the government a clear \$300,000 a year and that there is a neat surplus of \$5,000,000 to the credit of the Patent Office in the Treasury, the reluctance of Congress to grant the modest requests of Commissioners for an increased appropriation is a crying injustice both to the inventors and the overworked staff of the office.

The request for more generous appropriations is so reasonable that the failure of Congress to grant it can only, we think, be due to indifference or want of information as to the workings of the Patent Office. The surest remedy will be for the great body of inventors throughout the country to make the matter a personal one—as it surely is—and bring their individual and united influence to bear upon the senators and representatives with whom they are personally acquainted.

In pleading their case and that of the Patent Office—the two are identical—we do not know of any better brief to put into their hands than the clear and forceful letter to which reference is herewith made.

**A RECORD PATENT ISSUE.**

The simultaneous issue of one hundred and twenty-five patents to a single individual has caused The Patent Office Official Gazette of October 27, 1897, to assume proportions which make it by far the largest of its kind ever issued. Up to this date the largest issue of the Gazette contained 194 pages. The present issue contains 288 pages. In making it up the Norris Peters Company, according to the Washington Star, used 250 reams of paper and made 252,000 impressions, the usual number of impressions for The Gazette being 140,000. To meet the emergency the government printing office had to telegraph for extra type, and sixty extra men were put upon the work.

The increased bulk of the issue is due to the insertion of the batch of 125 patents above mentioned to Milo G. Kellogg, of Chicago, Illinois, who has assigned the whole set to the Kellogg Switchboard and Supply Company, of Chicago.

The application for the first of Mr. Kellogg's patents was filed April 27, 1887, and the others followed at intervals up to March 9, 1895, which is the date of the last of the 125 applications. A remarkable feature is that every one of them relates to the same subject, namely, improved ways of constructing and operating switchboards for telephone exchanges. The final government fee on these cases amounted to \$2,500. This

constitutes the largest check ever paid into the Patent Office at one time for government fees, and it is almost needless to add that the 125 patents is the largest number ever issued at one time to one inventor.

Apart from the interest which attaches to the Kellogg patents, on account of the features above mentioned, they should serve to remind inventors of a fact which they too often overlook, but which sometimes seriously affects the value of their patents. We refer to the disinclination of the average inventor to file applications for modifications. Too often they are content to lay stress upon a particular form of the device, and merely make mention of its various modifications, whereas the modifications should form the basis of separate applications. It is only in this way that the inventor can secure the most complete protection. Mr. Kellogg has carried out this principle to its fullest extent, and while there will probably be few subjects that will call for anything like the same number of applications, this notable issue is an object lesson which may be commended to the thoughtful consideration of inventors at large.

**THE AGE OF WATER POWER.**

It is stated that during a recent interview in Canada Lord Kelvin asserted his belief that the time would come when the greater part, if not all, of the waters of Niagara would be utilized for industrial purposes; and that on being asked if he would not regret the loss of the grandeur and beauty of the falls which would result, he stated that in view of the vast industrial benefit to be gained, he would not regret it. Whether the distinguished scientist was correctly reported or not, there are good grounds for believing that the future will see the new, or rather newly developed, source of energy utilized for industrial power purposes to a degree that will make it only less universal than coal and the steam engine. Time was when water was the leading source of energy for the power necessary to drive the machinery of mills and factories; but the cumbersome and otherwise unsatisfactory nature of the old under or overshot wheel, and the necessity for locating the factories where the power was generated, was a severe drawback to its usefulness. The introduction of steam, with its advantage of being generated wherever the factory might be situated, led to the disuse of water power in almost all cases where coal was available.

The advent of the dynamo and the motor opened a new and wider sphere of usefulness for water power. It gave it something of the mobility of steam power, and unwound the chains which had tied it down to the banks of the rivers and streams. The water wheel gave place to the turbine, and electrical transmission has carried the silent energy to distant cities and the scattered centers of industry. And who shall place a limit to the distance that may be covered? The recent developments of electrical science point to the possibility of transmitting the stored energy of our rivers and waterfalls to vast distances with but a trifling loss; and with the improvements which analogy teaches us to expect in this comparatively new branch of engineering, we may look for its successful competition with steam in districts far removed from the source at which the power is generated. When this time shall come, it is quite conceivable that Niagara will be depleted of its waters, if the authorities are so utilitarian as to allow it.

The statistics of the present state of the art show that it is advancing with rapid strides. America leads the world with a total installation of over 70,000 horse power. Switzerland comes next with 32,000 horse power. France has 18,000 horse power, and the great power plant at Rheinfelden, Germany, will give Germany the fourth place with about 17,000 horse power. Italy has nearly as much, and Norway and Sweden are each credited with 15,000 horse power. In Great Britain there is a total installation of about 4,000 horse power. These figures suggest that the development of its water power may have a powerful influence in rearranging the centers of industry throughout the world. With the exception of the United States, the best natural water power is located in countries that are deficient in coal beds, and, on the other hand, the leading manufacturing countries, as a rule, are deficient in water power. Switzerland, Italy, Norway and Sweden have in the new system a powerful ally that will assist to bring them well to the front as industrial nations. To the United States, which already possesses enormous deposits of coal, the full development of her natural water power will mean the more speedy coming of that commercial supremacy which is already well within its grasp.

L'ELECTRICIEN, Paris, quotes from the Optician, London, an account of an invention by a man named Wilcox, in which a minute incandescent electric lamp is fastened to a pen near its point in order to illuminate the writing. "A little reflector," it says, "placed behind it, prevents the light from dazzling the eyes and directs it toward the paper. This arrangement . . . may be applied also to a pencil or to any instrument of the same sort."