AN IMPROVED CAR FENDER.

This fender is of inexpensive yet substantial construction, and may be quickly attached to or removed from a car, or conveniently folded up against the dashboard, as shown in the small figure, when not required for use. It has been patented by Mr. Herman B. Ogden, of No. 204 Carroll Street, Brooklyn, N. Y. It consists of two frames hinged together and covered with wire netting, the upper frame having hooks adapted to engage the draught rings on the end of the car formerly used for tow horses, and being supported at the right inclination by chains extending to eyes

OGDEN'S CAR FENDER.

near the top of the dashboard on either side. The frames have abutting meeting rails or cross bars which prevent the outer frame from swinging too low or sagging. Depending from the sides of the lower frame are arms which carry a roller just above the roadbed, which it strikes when unusual pressure comes on the fender, or with the rocking of the car. The fender is so constructed as to come in contact with the roadbed without injury. A forward extension of the fender projects in front of the roller, the side arms of this extension being held in keepers on the side bars of the lower frame. When one is run down by the car, the extension is designed to trip up and throw the person uninjured into the netting, the weight of the falling body then causing the roller to come into contact with the roadbed and furnish a firm support for the fender.

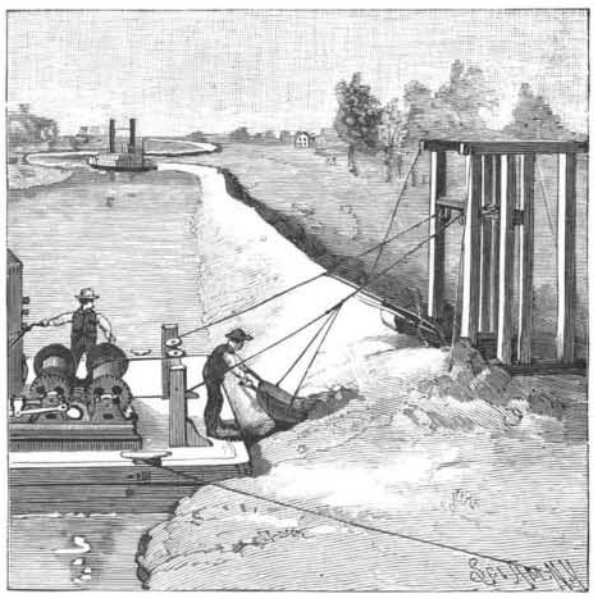
The motor man cannot fail to use the fender at night, as the headlight cannot be put on the dashboard till the fender is down in place. The fender takes up no room when the cars are stored in the sheds, being then folded up out of the way.

THE SPEED OF VESSELS. — Lloyd's latest publication shows that out of the 13,000 steamers recorded in the "Registry," only 45 vessels have a speed of 19 knots and above, and of this number 18 are credited with a speed of 20 knots or over. Of the former number 25, or more than half, were built on the Clyde, while of the 20 knot boats 12 are Clyde built, 3 have been constructed in other parts of the kingdom, leaving 3 for abroad. Foreign builders constructed a dozen of the 45 of 19 knots and over, but, on the other hand, foreigners own 20 of these 45. The remarkable fact is that of the 20 knot boats 9 are paddle steamers and 9 twin screw, none being single screw. For high speeds, therefore, the single screw is of the past; and it might also be said that the side paddles are giving way to twin screw propulsion. The difficulty hitherto has been the draught of water available, the paddle requiring less water in which to work than the screw propeller, which must be completely immersed. But when it is remembered that in action the screw propeller is similar to a wheel revolving, it will be understood that by increasing the revolutions it is possible to reduce the diameter and still get the same speed. A few years ago 90 revolutions was high; now 200 is exceeded in several vessels and 400 has been reached in torpedo craft.

Another circumstance which makes the screw preferable is that it has, as a rule, only half the slip of the side paddles. Slip is used in the same sense as in the case of a locomotive wheel. The slip of a 20 knot paddle steamer is 26 to 30 per cent the forward motion, against 13 to 15 per cent in a twin screw steamer. Again, the proportion of weight of machinery to the total weight of the steamer is less in a screw steamer, since more has been done to lighten the parts than with the paddle engine. In the latter 8½ I. H. P. has been got per ton weight, in the former 11 I. H. P. per ton. In a paddle steamer 45 per cent of the total weight goes in engines; in a screw steamer, where more provision is made for cargo, only 31 per cent of the total is for machinery.—Glasgow Herald.

AN EXCAVATOR FOR USE ON RIVER BANKS, ETC.

The illustration represents an apparatus of simple construction designed to be especially effective in forming embankments along rivers, etc. It has been patented by Mr. John P. Griffin, of Cincinnati, Ohio (southeast corner of Sixth and Smith Streets). The driving engine, on any suitable flatboat, is connected by gears and readily operated clutches with two drums on which wind the ends of a rope extending outward over pulleys held in a suitable framework on the stern of the boat, the arrangement being such that as the rope is wound upon one drum it is unwound from the other. The rope extends from the boat up the embankment and passes over pulleys in a suitable framework held in place by anchor ropes, the framework being of such description that it may be readily shifted to new positions along the embankment. On the up and down runs of the rope are attached branch ropes connected with shovels or scrapers, and when the engine is running, the operator, by means of shifting devices which throw one drum out of gear and the other into gear, causes one of the scrapers to be drawn up the embankment and automatically dumped, while the other scraper is being returned to be filled. Thus the scrapers travel in opposite directions, and are alternately filled and emptied and returned to their place of starting.



GRIFFIN'S EXCAVATOR.

SWAMP MUSIC.

We have already made known to our readers the tentatives that have been made to translate the song of certain birds by musical characters, but such attempts have not been confined solely to the warbling of the songsters that people our groves and fields in the spring. A few observers, from the highest antiquity, have extended these interesting remarks to the original voice of frogs and toads, and, in general, of all the animals that can be arranged under the denomination of inhabitants of the swamps.

Such observations, at their inception, belonged rather to the domain of fancy, and it is not until the second half of the last century that we find notes upon this subject that have an essentially scientific character. Our contemporary Le Naturaliste has recently given an account of these, from which we extract the following passages:

It was the Bavarian scientist De Rosenhoff who was the first to furnish us with valuable information in regard to this interesting question. This writer gives a description, as detailed as it is circumstantial, of the voice of the frog and the noises that it makes, but does not occupy himself with the anatomical and physiological side of the question. The first anatomical and physiological explanation of the vocal apparatus of the animals under consideration was given by a very eminent French scientist, Professor Duges, of the University of Montpellier. On another hand, several eminent naturalists, such as Ekker, Robert Widersheim, Franz Leidig, and Hermann Landois, having become interested in the scientific work of Duges, endeavored to give their respective interpretations of the complicated, as well as interesting, operation of the vocal apparatus of the inhabitants of the swamps. It is to be remarked, moreover, that the physiological explanations of Muller and Landois relative to the constituent parts of the vocal apparatus of frogs and toads are of the highest interest. The others relate only to the anatomical side of the question. If we observe the green frog (Rana esculenta) in the act of croaking, we shall in the first place see two pouches inflating at the sides of the cheeks, and disappearing as soon as the frog begins to "sing." It is therefore useless to remark that the croaking of the frog is connected with the two membraneous pouches just mentioned. But this is only a secondary relation, as has already been shown by Aristotle, who tells us that "the frog emits sounds through its throat."

What, then, is the role of these famous membraneous pouches? They are probably resonators designed to re-enforce the sound, as is done, for example, by the hollow body of a violin. The fact must not be lost sight of that the frog croaks with its mouth closed in producing sounds with the same quantity of air and in causing a continuous circulation of the air of the lungs in the inflated pouches. Hence by reason of the elasticity of the walls of the latter, the air returns to the lungs by way of the larynx. As for the small quantity of air that escapes through the orifices of the nose, that is very quickly compensated for during the short pauses in which the frog begins to respire strongly. It must not be thought that the organism can suffer from so feeble an exchange of air, and this is why: In the first place, in the frog there is a very slight exchange of materials as compared with warm-blooded animals, and, on another hand, respiration is effected likewise through its moist and very delicate skin, which is provided with numerous veins and arteries. Thus, the air, feebly exchanged during the frog's croaking, is driven into the buccal cavity, while the animal's mouth is closed, through the contraction of the muscles of the sides of the body. As the vocal cords approach each other at this moment, the air passing between them separates them, a vibration is produced and a sound is made.

It is to be remarked that the production of the sound is effected by the same process, not only in the inhabitants of our ponds and marshes, but also in all their kin.

A few digressions, of small importance, as for the rest, are to be noted. Thus, in the spotted frog, the membraneous pouches are but slightly developed and are situated near the median line, so as to constitute but a single one.

Now that we are acquainted with the vocal apparatus of these animals, the question is to know in what measure they have interested musicians and artists. As regards this, it is to be remarked that the inhabitants of the swamps have been thoroughly neglected by modern artists, and to such an extent

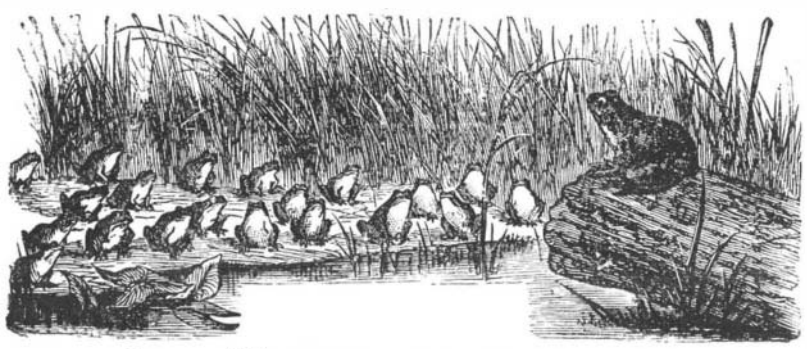


Fig. 1.—MUSIC OF THE GREEN FROG.

Fig. 3.—MUSIC OF THE SPOTTED FROG.

Fig. 4.—SOUND OF THE PELOBATIDES.

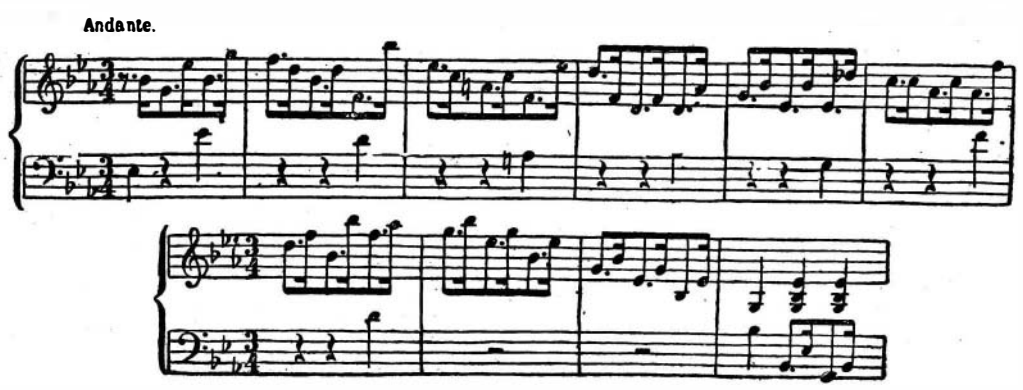
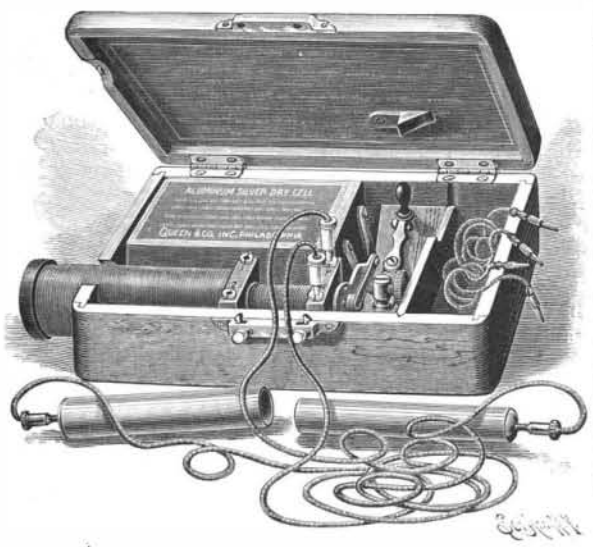


Fig. 2.—HANDEL'S ISRAEL IN EGYPT.

that Haydn, Ramberg and their imitators, who have introduced into the orchestra of their "infantile symphonies" the cuckoo, the quail, the nightingale, and the wild cries of the kestrel, have entirely forgotten the jovial songster of the swamps. Handel alone has taken pity on these animals, and made mention, in his "Israel in Egypt," of the toads and frogs. By his peculiar accompaniment, he imitates in his oratorio the motions and the leapings of the frog. We give the famous passage of the oratorio in question in Fig. 2.



A DRY CELL FARADIC BATTERY.

As regards the notation or reproduction of the noises of the frog, that is not any easy thing to do; far from it. Yet Landois has endeavored to note a few of the "songs" that ring out upon the edges of the ponds and swamps, and it must be confessed that the attempt of this learned author has not been entirely unsuccessful. Thus, the music of Landois, executed by a harsh, youthful voice, is capable of recalling pretty closely the croaking of the green frog. The music in question is given in Fig. 1.

Although the notation of the croaking of the green frog (Rana esculenta) is difficult, the registering of the jerky notes of the spotted frogs and tree frogs is quite easy. The spotted frog, which is generally considered mute, nevertheless utters shrill sounds and plaintive cries when it is struck or when it is attracted by a mole or some aquatic rat. It has none the less a "song," which is quite simple, it is true, at the period of spawning.

It is well to take into consideration the fact that the males alone "sing." We know that the period of spawning with the spotted frog is relatively early as compared with that of the green frog. As soon as the first spring pools appear and the snow disappears from the fields and meadows, the spotted frogs come forth from their winter quarters and proceed to deposit their spawn upon the edges of the ponds. Mr. Zograf reates that in the vicinity of Moscow the music of this frog begins as early as the month of March. Formerly, by reason of the prolonged thaws, the frogs were deceived and made their exit from their winter quarters earlier. The spotted frog does not utter melodies of long duration, as is the case with his relative the green frog, but merely repeats a single note with a surd bass voice (Fig. 4).

As regards the tree frogs and the Pelobatides, their voice is sonorous and clear, and may be compared to the sounds of a silver bell. We would remark that it is, for the most part, representatives of the Pelobatides that, at the beginning of twilight or in the evening, are heard repeating the sound "wok" or "oonk" with a clear and sonorous voice at the margin of stagnant water. This is why these animals are called "wok" by the peasants in certain districts. As their voice very frequently resounds on dark nights when the sky is covered with heavy clouds, the people become frrghtened when they hear the characteristic "wok" and "oonk," for they see a connection between these strange sounds and the tears of the souls of the drowned. It is especially in the isolated villages of Russia that this belief is prevalent. Numerous examples of it might be cited. Thus, the Russian novelist, Ivan Tourgeneff, mentions it in his admirable work, Biejuine Lougue. The sounds of these frogs vary between fa and do (Fig. 4).

It remains for us to say a few words concerning the "music" of toads. Let us say at once that it is very simple and not very harmonious. Here again it is during the period of spawning that the most noise is made. Their songs vary according to the species. Thus, for example, the Bufo variabilis has a harsh, jerky voice, while the B. cinerius emits a sound like that of the representatives of the Pelobatides, although its voice is not so strong. As for the rush toads, the male of which is provided with a vocal sac, and which makes itself heard at the beginning of twilight, they cry now "glookglook" and now "rahrah," like the frogs. Mr. Zograf, moreover, tells us that he has heard them utter a prolonged "Ker-r-r-r-r."

In a general way the sounds of frogs may be registered as follows: "Brekeke-brekeke, krekete! Kpate too-oo-oo! brekete, brekete! brekete, kwarr, brekete, too-oo!"—La Science en Famille.

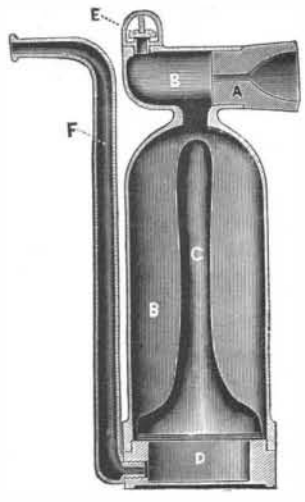
"DRY CELL" MEDICAL BATTERIES.

The illustration represents a new form of "Dry Cell" Faradic Battery, placed on the market by Queen & Co. (Inc.), of Philadelphia. This type is specially adapted for home use (preferably under the advice of a physician) and is extremely compact, convenient to handle, and durable, thus being admirably suited for carrying about when traveling. The cells are sealed, so that there is no leakage of acids, as in older forms, and the battery is perfectly clean and "nice."

Three sizes are made, all mounted in handsome mahogany boxes. Size No. 1 contains two cells and will produce a current stronger than most people can endure, which, however, can be graded down so as to be imperceptible to the most sensitive nature. The change is effected gradually, by sliding the secondary coil on and off the primary. A special switch shuts current off entirely when the case lid is closed. Size No. 2 is larger than the preceding, and contains four dry cells instead of two. There is also a difference in the method of current regulation, which in this style is accomplished by a switch "controller." Battery No. 3 or Physician's Battery No. 1 is the largest of the series, and is amply sufficient for the requirements of most doctors who want a compact and portable apparatus. The cell block contains six cells, which produce a very powerful current. Samples of the batteries were exhibited at the World's Fair and received the highest award for "compactness; range of action; efficiency, and beauty of workmanship." The examining judge was Dr. W. J. Herdmann, of Ann Arbor, Mich. When the cells in any of the above become exhausted (which occurs only after long service), they can readily be renewed at a slight expense, by sending the containing block to the makers.

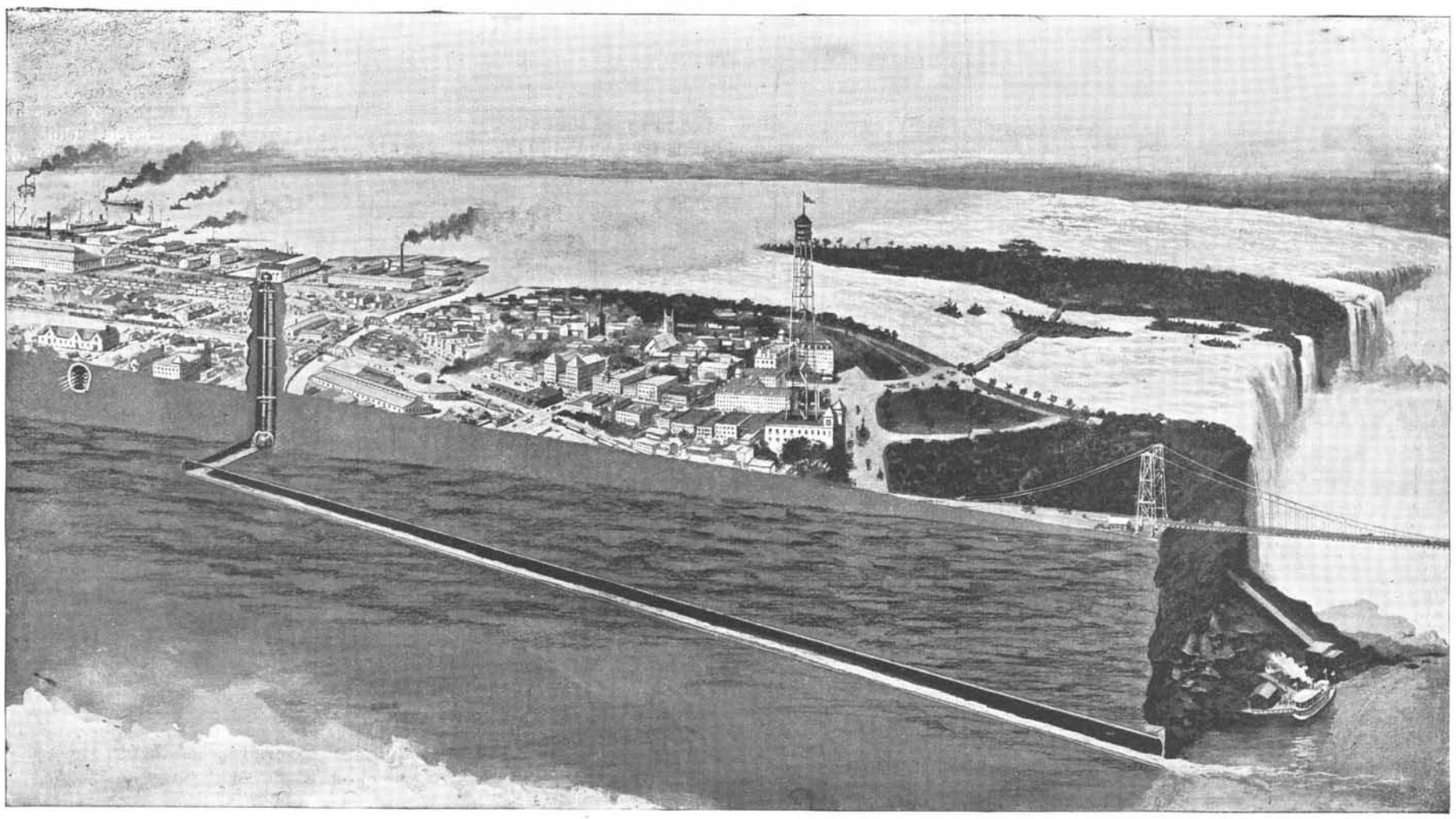
THE HARMLESS SMOKER.

The design shown in section in the illustration, which has been recently patented by Mr. Ryerson D. Gates, of Chicago, has already been introduced to a considerable extent, the object of the device being to break off and cure the tobacco habit. This is accomplished by means of a delusion which does not deprive the "user of the weed" of the pleasure of smoking, but does away with the evil effects of the habit. With it, one smokes a cigar without drawing any smoke into the mouth or down into the lungs, and is at first so deceived by the effect as not to distinguish the difference. A rubber bulb, C, is in free communication with a chamber, D, in the base, with which the stem, F, is connected, and by drawing on the latter the suction causes sufficient collapse of the bulb—which is shown in collapsed form in the picture—to create a partial vacuum in the surrounding smoke chamber, B. This draws the smoke through the small end of the cigar, placed in the tip, A, and when the lips are opened in the natural way the expansion of the bulb forces the smoke out of a valve, E, immediately below the nostrils, but no smoke comes out of the mouth. It is impossible to get any nicotine in the mouth by smoking in this way, and cancer of the throat and similar troubles caused by smoking are simply out of the question.



UTILIZING THE WATER POWER OF NIAGARA FALLS.

In the SCIENTIFIC AMERICAN of March 5, 1892, we gave a full description, with numerous illustrations, of



GREAT TUNNEL AND ONE OF THE WHEEL PITS AT NIAGARA FALLS.