

The experiments by the French company were made in a mine at Gardanne, where a tunnel 800 meters (or half a mile) long had already been pierced. The motive power was at a distance of one-quarter of a mile from the mouth of the tunnel, and the power was conveyed to the Brunton machine by an endless chain.

The first trials were devoted to determining the best form for the cutting disks, and, although the life-time of those first used was only during one foot of advance, the form was so improved upon that they finally lasted during a progress of fifteen feet. It was then found that the machine did not work in a straight line, but would vary its direction and seriously strain the machinery. This was overcome by using the spirit level and other means of rectification. The improved machine was then tried for effectiveness, and, although its progress was satisfactory, it hardly came up to the sanguine anticipations of the inventor. In the best trials the progress made varied between $4\frac{3}{4}$ inches and $6\frac{1}{2}$ inches per hour. It was evident that the motive power transmitted was insufficient. Investigations upon this point brought out that of the 51 horse power of the original motor, only 12.4 horse power were transmitted to the tunneling machine, leaving a net loss of 38.6 horse power. Unquestionably if this large loss can be avoided the progress of the machine through the rock will even surpass the expectations of Mr. Brunton.

INFECTED CIGARS.

The occurrence of occasional cases of syphilitic sore mouth, among cigar smokers unwilling to admit any other source of contagion than the cigars they use, gives rise from time to time to sensational and possibly alarming newspaper reports of cigar smokers' perils. Several articles of this character are now before us. To one who does not smoke cigars the alleged perils from syphilitic taint seem to be grossly exaggerated, for two reasons: cigar smoking is extremely common among respectable people, on the one hand, and, on the other, the disease in question (syphilitic sore mouth) is by no means common among such people; while the probability that the relatively few victims who charge cigars with their misfortune may have been infected in some other way is certainly not small. The assertions of sensational reporters refute themselves by trying to prove too much.

Nevertheless it must be admitted that the indiscriminate smoking of cigars without the intervention of a holder is not a nice practice, especially when we take into account the large number of cigars made by untidy people in untidy tenement houses, and the disgusting practice which is said to prevail in them of finishing the cigar "with a lick."

It is asserted that over five hundred syphilitics are or lately were engaged in cigar making in this city; and the fact is notorious that the tenement houses in which cigar making is largely carried on shelter some of the lowest, filthiest, and most commonly tainted classes in the world. The thought of putting into one's mouth an article possibly handled by such people is certainly not a pleasant one. It is on the score of cleanliness, therefore, quite as much as on that of sanitary precaution, that the cigar holder should be used by all who smoke cigars, unless they know positively who made the cigars they smoke, and have confidence in the cleanly conditions of their manufacture.

The case reported in the London *Lancet* by Dr. Mannsell, of Liverpool, is enough to show that the danger of syphilitic infection by cigars is not wholly imaginary, although there is nothing in the report to show that such infection actually occurred. The case was that of a young girl with a syphilitic sore on her lip; and after describing it, Dr. Mannsell says:

"Independent altogether of the further progress of the case, or of the question as to how she became possessed of the sore, the interest of the case (and a melancholy one it is for smokers), centers in the occupation by means of which the girl got her living, for she had been pursuing it for a period of three weeks with this sore on her lip. She was employed in a cigar factory, where her work consisted in rolling the outer leaf around the bulk of the cigar, and when she came to finish off the end which is put into the mouth, the custom was to bite off the superfluous material with the teeth, making the ends to 'stick with a lick.' The girl naively supposed that some poison had got from the tobacco into a small crack of the lip. But how much poison is it possible got from the lip among the tobacco? She estimated the number of cigars got through in one day at twenty dozen."

There might not have been any serious peril in the act, still we doubt if any prudent person would choose to put into his mouth any one of the three or four hundred dozen cigars which this unfortunate girl had licked to a finish while her lip was sore.

The cases mentioned by Dr. L. D. Bulkley, of this city, in his paper on this subject read before the American Dermatological Association, seem to carry the possibility of syphilitic infection through cigars a long way toward positive proof; far enough, at any rate, to make the use of cigar holders not an unwise or unnecessary precaution on the part of cigar smokers. While we know that reputable American cigar makers are careful to prevent the untidy practice which seems to have been followed in the English factory mentioned by Dr. Mannsell, and require their finishers to follow more cleanly methods, there remains the unpleasant fact that tenement house workers are not under supervision, and are not by nature or habit inclined to be fastidious in

their own tastes or scrupulous with regard to the tastes of others.

Having no personal knowledge of the comfort to be derived from sucking the end of a roll of tobacco, we are obviously incompetent to advise smokers in this matter; nevertheless we may be allowed to submit the opinion that while the risk of syphilitic taint from infected cigars is extremely small there is still a risk, which the cigar holder is calculated to obviate. If we had to smoke cigars we should prefer to use a holder.

Transit Across the Brooklyn Bridge.

At a recent meeting of the trustees of the Brooklyn Bridge, a resolution was offered providing for the appointment of a committee to consider the question of the means of transportation over the bridge. This enormous and enormously costly structure being nothing more than the greatest railway bridge of its sort in the world, it is time, the editor of the *Sun* properly says, for its managers to begin the discussion of the methods of conveying freight and passengers across it.

We were promised last spring that the bridge should be completed by the next Fourth of July, but there have been delays which may put off its opening several months later. At any rate, the structure is now receiving its finishing touches, and we begin to get some idea of what it will be when it is done. Standing on the elevated railroad station on the east side of Chatham street, near the City Hall, a clear view from tower to tower and over the approaches may at last be obtained.

No one who takes the pains to look at that view can fail to be impressed with the magnitude of the work. It is indeed a stupendous structure as we see it, and yet much of its heaviest and most costly work, that spent on the foundations, is beyond the sight. And all this labor and expense have been laid out on the building of a single railway bridge between New York and Brooklyn; on what in all probability will practically prove to be only a connecting link between the elevated railway systems of the two cities.

The bridge will unquestionably be used by a large share of the people who travel to and from Brooklyn and New York, and for them will prove of great convenience; but it will be only one line of communication. If the wants of the people of Brooklyn were thoroughly satisfied, we should need not one bridge, but several. With but one existing, the ferries will continue to be used by a great proportion of the travelers, and perhaps very generally by the wagons going to and coming from Brooklyn. Loads drawn by horses are likely to cross chiefly by ferryboat as now, and people who live near the ferry landings on the other side and are employed near those in this city, will find it more convenient to use the old method of communication.

But for people living on the outskirts of Brooklyn, or who have occasion to use the rapid transit on the other side of the river, steam locomotion across the bridge will be a great gain. We may expect, therefore, that the opening of the bridge for use will be followed by the extension of the population of Brooklyn and the steady advance of the limits of that city. It will have an effect analogous to that produced on our upper wards by the establishment of rapid transit.

It is probable that large locomotives, traveling at a high rate of speed, will be used to carry over passengers. The project of drawing the cars with cables is not favorably received by engineers, and the superior advantages of employing locomotives are urged. The bridge can sustain them in entire safety, and greater speed will be obtained by their use.

How to Have Ice Next Summer.

A great many people do without ice in the summer—though the ponds and streams at their doors furnish an abundant supply every winter—simply because they imagine that an expensive icehouse is needed to hold the ice. A gentleman who once labored under the same delusion, describes in the *Tribune* the experience by which he was led to store his summer supply of ice successfully, without an icehouse, after paying dearly in disappointment, loss of ice, and loss of money, through having "too much icehouse." He was convinced of his error by the circumstance that the more pains he took with his icehouse the more rapidly his ice melted, while a neighbor who had no icehouse at all always had plenty of ice. The practice of the latter was simply to pile his ice in a square body under a cowshed having a northern exposure, the first layer of ice being raised above the ground so as to secure good drainage, and the whole covered thickly with sawdust. Boards set on end around the ice pile served to keep the sawdust in place. The gentleman referred to says:

A pile of ice six feet high, eight feet wide, and eight feet long will make three hundred and eighty-four cubic feet. And this is enough for the use of an ordinary family for the table and to cool the cream, etc. Six team loads fill an icehouse which contains about four hundred cubic feet. The blocks should be cut as smooth as possible and square, so they will fit closely, and then ice must be chopped up fine and crowded in between the pieces so as to make a solid mass. The closer the ice is packed, and the more solid the mass is united together, the better it will keep. When an icehouse is too close, there is a great deal of condensation, which makes the whole contents wet and dripping, and causes the ice to melt rapidly. The air must be kept as dry as possible, one secret of keeping ice being plenty of ventilation. The more ice there is in a pile the better it will keep. A small quantity must be covered deeper and

thicker than a large mass. A large mass will almost keep itself. It does not require the protection of sawdust, but straw or a double wall of boards will be ample. Every person who makes butter ought to have ice. It will more than pay for use in the dairy, and then for the family it is a luxury every provident man should supply.

Electric Light Wires.

We give below a letter from Mr. James Harrison, of the Board of Fire Underwriters, describing a singular accident occasioned by electricity from an electric light wire. In shifting this wire on the top of a building, it was accidentally brought into contact with a small telephone wire that led into an adjacent building, and the electrical charge inflamed the thread covering of the telephone magnets. This is a species of accident that can readily be prevented by covering the electric light wires or the telephone wires with insulating material, or using a return wire on the electric light circuit.

The rapid extension of both the telephone service and the electric light service in cities will probably put an end to any dangers like the above, as it is found that insulation of the wires is necessary to insure the best results, whether for lights or telephones, and covered wires are therefore taking the place of the uncovered wires.

Mining Operations in Great Britain.

The report of the Inspector General of Mines in Great Britain for 1879 has just been published. The number of persons engaged in mining operations in the United Kingdom was 523,870. The total number of serious accidents amounted to 843, and the number of deaths resulting, 1,037, a diminution as compared with 1878 of 39 in the number of accidents and 453 in the number of deaths. There was an average of one accident for every 621 persons employed, and a death for every 505 persons.

In the twelve districts under the Regulation Act of 1872, for the coal mines 476,810 persons were employed in or about the mines, of whom 385,179 were below the surface, and 91,631 above; of those above, 4,842 were women.

The products of the mines for the year were: 133,720,393 tons of coal; 9,387,766 tons of iron ore; 1,455,003 tons of potter's clay; and 803,207 tons of mica. The amount of coal produced was 1,108,330 tons more than in 1878, while the other items were less by the following amounts: iron ore, 1,359,461 tons; potter's clay, 170,583 tons; and mica, 10,055 tons.

Fire Caused by an Electric Light Wire.

To the Editor of the *Scientific American*:

I venture to call your attention to an occurrence which took place at No. 4 Maiden Lane very recently. In the office of Messrs. Silcox & Co., No. 4 Maiden Lane, is a telephone communicating with their factory, No. 14 Maiden Lane. One day, either Monday or Tuesday last, some person on the roof of one of the intervening buildings dropped an electric light wire upon that of the telephone wire of Messrs. Silcox, bringing the two wires in contact. The effect rather astonished the people in the office. Flames burst forth from the telephone instrument on the wall, producing such an intense heat as to entirely destroy the magnets. Can you, through your valuable journal, give us a possible reason for this?

Suppose the same thing should occur at Ridley's, or Lord & Taylor's, or any other establishment having telephones. In most of these establishments there is a large amount of open stock lying and hanging in every direction. It occurs to us that if there is a danger of similar accidents in these stores, it will be apt to throw the *show window* fire traps into the shade.

JAS. HARRISON,
Superintendent Bureau of Surveys, New York Board of Fire Underwriters.

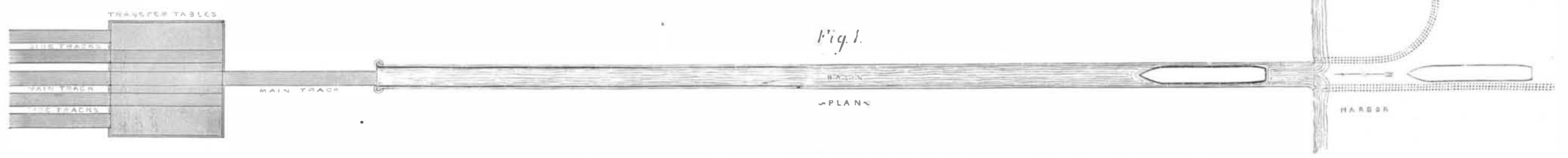
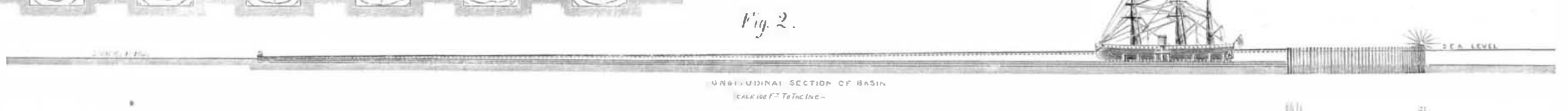
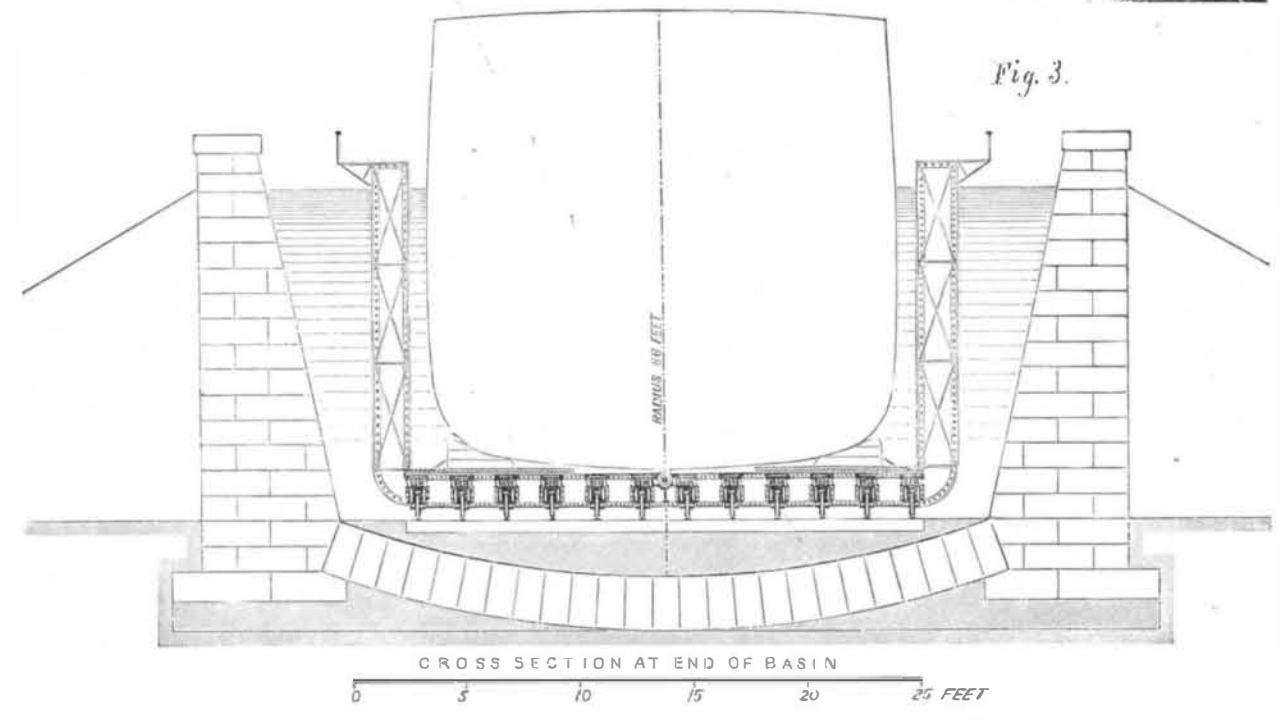
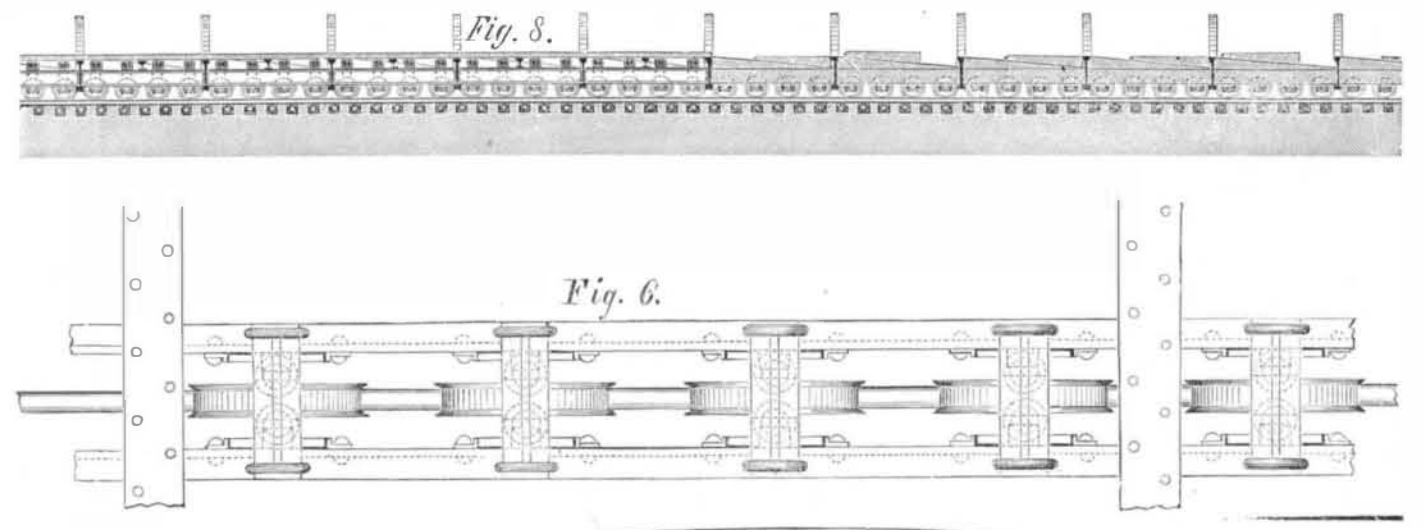
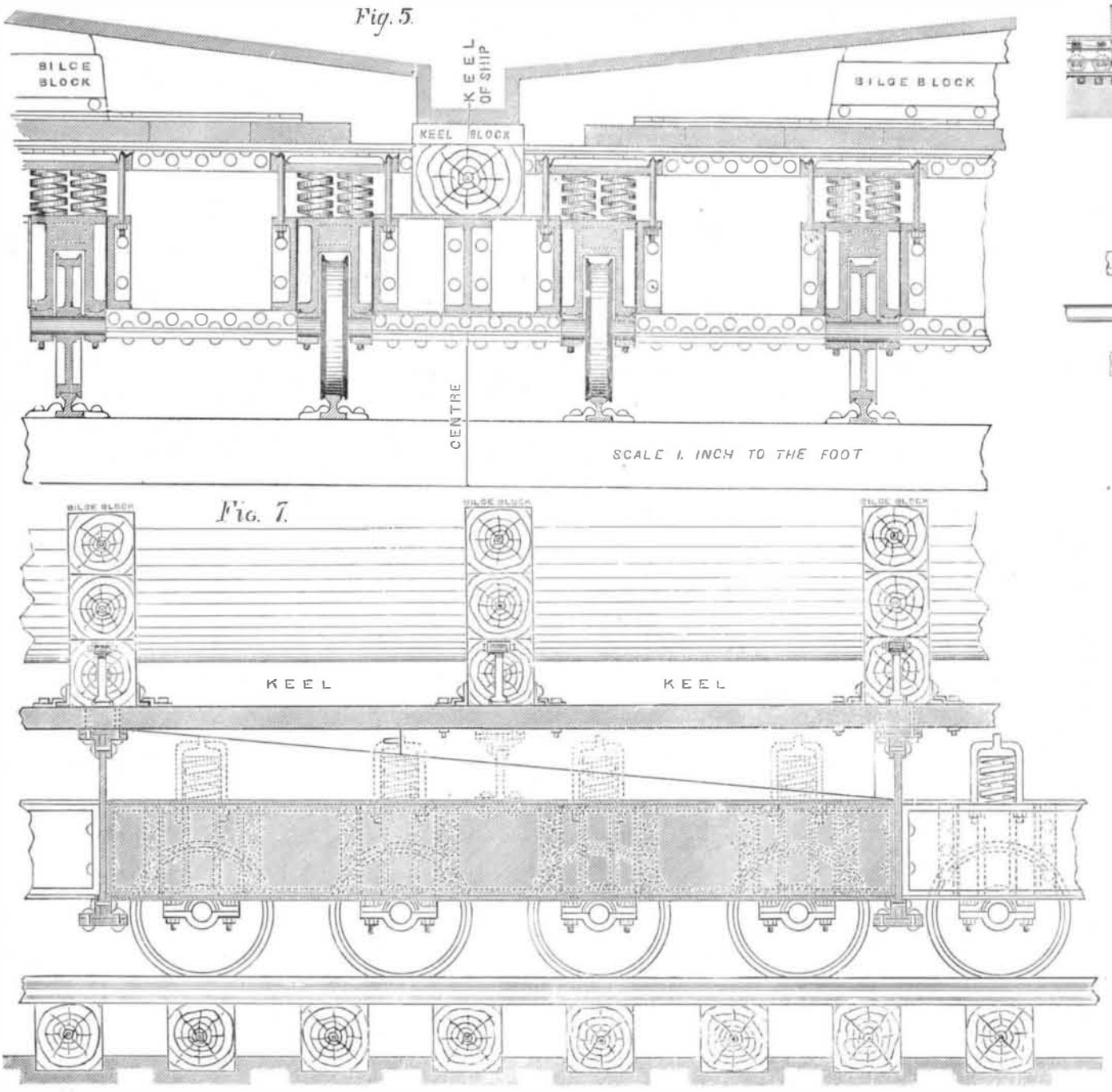
No. 115 Broadway, New York, October 21, 1880.

The Universal Grinder.

Messrs. Newell & Chapin have on exhibition at the Fair of the American Institute, their patent universal grinder. The grinder consists of hard iron or steel disks with beveled edges, locked together upon a shaft composing a cylinder with a series of angular grooves. Upon the sides of the disk are radial cutters or teeth. Another shaft with similar disks is so placed that the disks of one cylinder fit into the spaces between disks on the other. This machine will grind phosphates, barytes, lead plumbago, gold ore, quartz, plaster, shells, bone, wheat, corn, and other materials required by the manufacturer or farmer. The manufacturers exhibit an interesting collection of minerals and cereals ground by these mills, which shows that they are adapted to a wide range of uses.

POLICE TELEPHONES.

Chicago leads the way in adopting telephones for general police uses. Experimental telephonic stations have been established at various points in one important district, and relays of mounted officers are kept in waiting at a central station. Reliable citizens are furnished with keys to the telephone boxes nearest their residence. To prevent false alarms the keys are numbered, and cannot be withdrawn from the lock until released by a key carried by the policeman on that beat. When anything goes wrong in a district, the alarm is sent to the central station, and explanations are given through the telephone. In case of serious disturbance a large bell is sounded, and every officer on post runs to the nearest box to receive orders.



MR. EADS' GREAT SHIP RAILWAY FOR THE AMERICAN ISTHMUS—DETAILS OF CONSTRUCTION.—[See page 308.]

The Cause of the Seawanhaka Disaster.

An important clew to the cause of the disastrous fire on the steamer Seawanhaka, last June, has been disclosed in the breaking up of the metallic skeleton of the wreck. What was left of the steamer, as it lay on the sunken meadow off Randall's Island, East River, was purchased by Mr. Matthew H. Gregory, of Red Bank, N. J., who is now engaged in recovering the iron and copper. In pursuance of this work the shell of the starboard boiler has been stripped off, disclosing the fact that the outermost of the eight large circular flues of the boiler had burst at the point where it joined the back flue sheet. A *Herald* reporter, who had visited the wreck in company with Mr. Gregory, says that the quality of the iron of that part of the boiler was evidently very poor.

"Originally the iron of the flue was three-sixteenths of an inch thick, but in some places near the break it is not now more than one-sixteenth of an inch. The break gave every indication of an explosion. The force which broke it was evidently from the inside of the flue, since the jagged edges turn outward. A few inches from the place of the break the flue has at some time been patched, a fact which has not been developed by the official examinations. The patch is riveted to the flue, and covers a space of about half a foot. Until some better reason is put forward the presence of that patch will be taken as an argument for the weakness of the iron.

"The hole above described was not more than eight inches from the patch, and the wearing out process must have been going on for a considerable time. Mr. Gregory could not say how much the break had to do with the accident, but an expert could easily determine. If the break occurred before the fire, it certainly is large enough to have admitted the water and caused a back draught. That a back draught created the fire is the opinion of four-fifths of the experts who have testified since the catastrophe."

A New Military Telegraph Line.

The signal service has just completed a telegraph line across the northwestern territories from Bismarck, Dakota, to Dayton, Washington Territory, crossing the Rocky Mountains by the Sohon Pass. For the transaction of commercial business it has offices open at the following points: Bismarck, Rapid City, and Deadwood, Dakota; Bozeman, Helena, and Deer Lodge, Montana; Spokane Falls, Colfax, Almota, Pomeroy, and Dayton, Washington; and Lewiston, Idaho.

Chicago Manufactures.

Few people have any idea of the rapidity with which Chicago is becoming a great manufacturing center. The statistics gathered by the Secretary of the Board of Trade for the forthcoming census report show 3,752 manufactories in the city, giving employment to 113,507 operatives, and representing a capital of over \$80,000,000. The value of the output annually is \$249,000,000; value of material used \$178,000,000; wages paid, \$37,000,000.

NEW NURSING BOTTLE.

The body of the bottle shown in the annexed engraving is made in two parts, one fitting into the other at their junction, the external one being provided with an internal flange for receiving the packing ring, against which the edge of the inserted part rests. Upon one part of the bottle is formed a bead which runs around it spirally, forming a screw thread which is engaged by a metallic ring fitted over an external flange formed on the other part and capable of drawing the two parts firmly together against the packing ring.

The stopper through which the tube passes is inserted from the inside of the bottle and cannot therefore be drawn out accidentally. The nipple, as will be seen by reference to the small sectional view, is held in place by the shield which is slipped over the portion of the nipple bulged out by the bead formed around the end of the neck of the tube. This forms a very secure fastening for the nipple.

The body of the bottle has an inwardly projecting ridge which insures the greatest possible depth of milk for the inner end of the tube.

This bottle may be readily taken apart for cleaning, and avoids the imperfections found in other bottles.

For further information address the inventor and patentee, Mr. E. A. Barton, 348 Notre Dame street, Montreal, Canada.

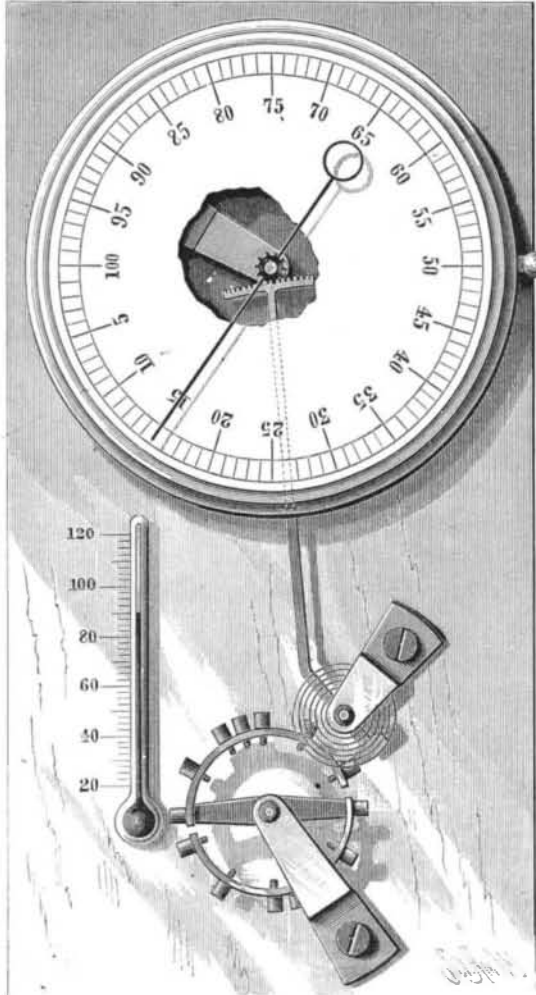
Plan for Catching the Express Trains.

M. Hanrez, of Paris, is the author of a method of taking up carriages by a train *en route*, in order to avoid stopping trains at stations to take passengers up. A "waiting carriage," fitted with a steam engine with special gear and space for passengers and luggage, is placed on a siding at the station, and picked up by the train as it goes past. The latter, by means of a hook on its last carriage, catches a ring supported on a post, and connected with a cable wound on a drum in the waiting carriage. Thereupon the drum

begins to unwind, and in doing so compresses a system of springs, while the carriage is moved at a rate gradually increasing to that of the train. The engine of the carriage then winds in the cable, the train and carriage are connected, passengers are transferred from the joined carriage to the train, and *vice versa*, then the two are disconnected, and the engine of the carriage working on the wheels brings it back to the station whence it was taken.

APPARATUS FOR ADJUSTING BALANCE WHEELS OF WATCHES.

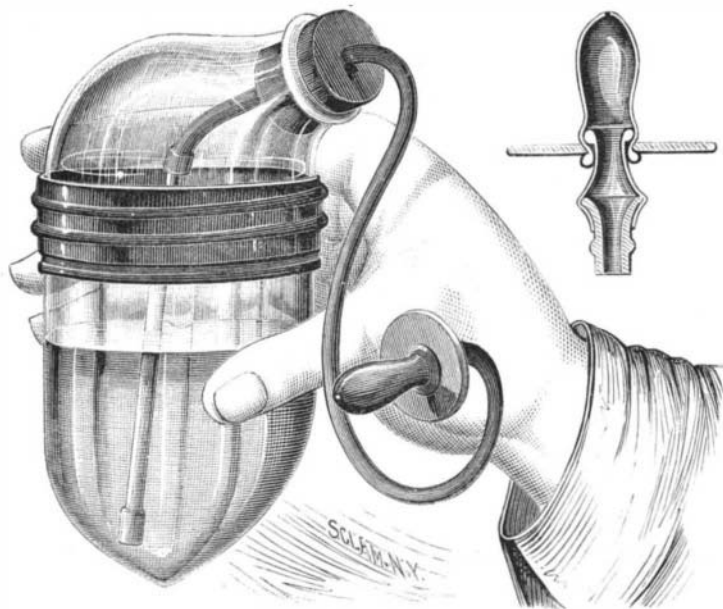
The engraving shows a device for indicating any alteration



IDE'S APPARATUS FOR ADJUSTING BALANCE WHEELS OF WATCHES.

in the form of the balance wheels of watches, chronometers, and other horological instruments by changes of temperature. The invention consists of a holder for the balance wheel, a multiplying lever, and an index actuated by the lever. The short arm of the lever touches the periphery of the balance wheel, and the longer end carries a curved rack which engages a pinion on the arbor of the index.

By means of this mechanism the slightest change in the



IMPROVED NURSING BOTTLE.

form of the balance wheel is indicated by a movement of the index. A thermometer is mounted on the instrument, so that its indications may be readily compared with those of the index.

The inventor proposes to make the instrument double, so as to test both sides of the balance wheel simultaneously.

This invention was recently patented by Mr. F. F. Ide, of Springfield, Ill.

SOME one has said, what thousands have observed, that there is nothing keeps longer than a middling fortune, and nothing melts away sooner than a great one. Poverty treads upon the heels of great and unexpected riches.

The American Apple Crop.

It is gratifying to be able to record that, notwithstanding the failure of the crop of apples in this country, we are to have abundant supplies from America. Accounts from Boston report the crops to be the largest for many years, perhaps to the extent of 40 or 50 per cent. Up to June 30, 1880, the shipments from Boston to England amounted to 173,379 barrels, of a money value equal to over £70,000. It is expected that with the heavy crop this season the exports for the current year will nearly double those figures. Already large supplies are coming to hand from New York, the Anchor Line steamers arriving at Glasgow last week having over 5,000 barrels, which were sold at moderate prices for the early time of the year. The fruit, as a rule, is of excellent quality, and when it arrives in good sound condition will keep for a considerable time.

Many grocers consider it advantageous to add green fruit to their general stock, and the public begin to find out that they can purchase from the grocer at a cheaper rate than from the fruit merchant. In these times when the grocer is beset on every side by opposition from "stores" and "wholesale retailers," etc., it behooves them to look around for fresh articles for sale whereby they may recoup their loss. To those who have not already done so we would say: Add the green fruit business to your trade, and we are of opinion that you will not have any cause to regret it, provided the business be conducted with care and discrimination, and only such articles purchased as are found to be in demand in their respective localities.—*London Grocer.*

Fast Horses.

The standard trotter is one that can cover a mile in 2:30. It is said that less than 600 of all the horses raised and trained in the United States have this record. The number that can trot in 2:50 bear the ratio of 1 to 2,383 horses raised. As a business the breeding of fast horses is therefore very much of a lottery; and when we recall the fact that the high prices which famous colts have brought have rarely been received by the men who raised them, the prizes in breeding and training trotters are few and uncertain.

MECHANICAL INVENTIONS.

Mr. Eugene H. Angamar, of New Orleans, La., has patented a simple and effective apparatus for freeing railroad tracks from snow and ice by heat, more especially street railroads; and the invention consists in a truck fitted for running on the track and supported on hollow wheels, which are fitted with grates for burning fuel, and perforated so that the wheels may be highly heated.

Mr. Hilliard B. Smith, of Stephenville, Texas, has patented an improvement in wind wheels which consists in a novel arrangement and combination of wings or gates in a casing outside and independent of the wheel, whereby provision is made for adjusting the position of the wings, and consequently regulating the speed of the wheel, according to the force of the wind.

An improvement in rotary blowers has been patented by Mr. Charles A. Smith, of Philadelphia, Pa. This invention consists in certain novel details of construction and arrangement of parts which cannot be readily described without an engraving.

Messrs. Conrad Eimbeck and Fritz Wehrmann, of New Haven, Mo., have patented an improved coupling for connecting the forward axles and the bodies of buggies, buckboard wagons, and other vehicles, so constructed as to give the axle a free vertical and horizontal play, and thus better adapt the vehicles for use upon rough, uneven, and sideling roads.

An improved machine for framing timber has been patented by Mr. Richard H. Watson, of Leadville, Col. This machine is intended to accomplish by power the work of framing timber used in mines, shafts, tunnels, and similar underground works. The inventor makes use of a suspended carriage or frame fitted for movement in vertical guides and carrying two horizontal saw arbors fitted at right angles. This is combined with a bed carrying adjustable head and tail blocks for holding the timber and presenting it properly to the saws. A winding drum and friction pulleys feed the saws, and devices of novel character center and clamp the timber.

An improvement in that class of windmills in which the wheel is inclosed in a cowl, has been patented by Mr. Albert S. Dimock, of Hutchinson, Kan.

An improved lifting jack has been patented by Mr. John Paar, of New York city. The object of this invention is to construct a jack that can be made to press both upward and downward at the same time, or to operate either upward or downward, as may be desired.

Wintering Flower Roots.

The roots of many useful and ornamental plants, such as cannas, dahlias, and gladiolus, may be safely wintered in dry soil by means of external coverings. But as they do not require light during the winter it is safer to lift and store them in a dry cellar or building from which frost is excluded. We find them to keep best, says an agricultural writer, packed in a soil just moist enough to keep the roots from swelling.