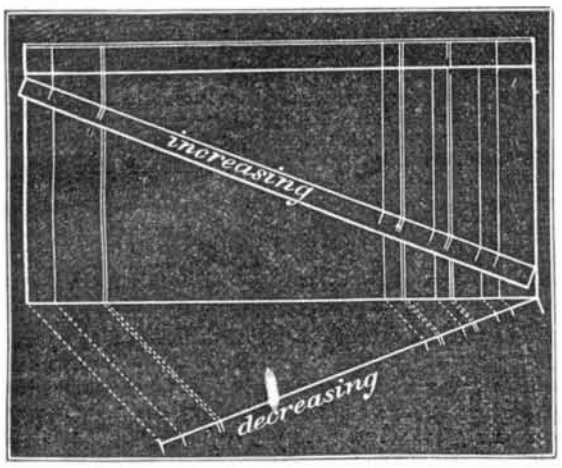
the experiments with it could be found, but Mr. Couch was present when the experiments were made. It is strange that the navy department should so far neglect the interests of American inventors. The Armstrong fuze is, doubtless, more perfect in construction, but the principle is the same in both. Sir William Armstrong was handsomely paid by the British government for this invention. THOMAS TAYLOR.

New York, June 29, 1868.

Reducing and Expanding Lines.

MESSRS. EDITORS:—I send herewith a simple mode of changing the scale of any pattern of ruling. You will see that it provides both for increasing and decreasing the scale while preserving the proportions. I cannot think that a



thing so simple could have escaped the notice of professional men, yet I have never met one person who knew it. Perhaps if given in your excellent paper it may interest some of your readers. J. S. B.

Springfield, Ill.

[This method of reducing or enlarging lines we had supposed was too well known to require a published example, but we find frequently that many items of useful knowledge, long in use, are new to our correspondents, and at the risk of being considered behind the age we reproduce them as a means of instruction.

In the diagram the parallelogram may be considered a sheet of paper ruled. If it is desired to rule another but wider sheet, preserving the same relative proportions, it may be done by placing a slip diagonally across the sheet and marking on it the points where its edge intersects the ruled lines, then placing it squarely across the wider sheet, and ruling from the points as marked. For instance, if the original sheet is six inches across and the proposed sheet nine inches across, cut a strip nine inches long and place it on the six-inch sheet at such an angle that its ends shall agree with the edges of the sheet, then make the marks and transfer to the nine inch sheet. The contraction is done in reverse order, as shown by the diagram. It is evident that this plan is applicable to many uses. Draftsmen and others who use pen and pencil know its value.—EDS.

Adjustable Gears--Gears Without "Backlash."

MESSRS. EDITORS:—In Vol. XVIII., No. 15, page 228, there is a call for the invention of a gear which shall have no "backlash." I have been experimenting since that time, and think I have overcome this objection. It is evident that whatever be the form of the tooth, there will be "backlash" after the gears have become worn. I have resorted to a double arrangement to accomplish my purpose. Fig. 1 represents a section of this gear; A represents the gear proper and B a ring fitted to A and secured to it by the bolts. C, which pass through slotted holes. The proportionate width of the face of the gear and the face of the ring may vary with the amount of work to be done by each. Fig 2 is a side view of a section of the gears. The letters are applied to the

Fig. 1

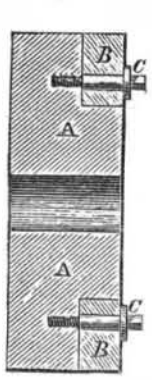
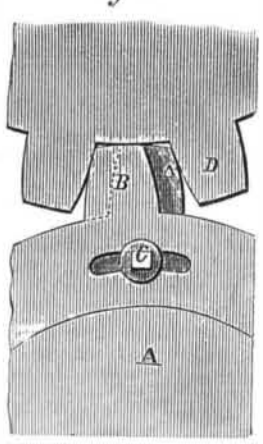


Fig. 2



same parts as in Fig. 1. The ring, B, with teeth on it the same as the teeth on A, being adjustable, can be moved about the center of A, sufficiently to make the teeth on A touch one side of the space between two teeth on a gear with which it meshes, while the teeth on B touch the opposite side of the same space. Only half the gears of a train need be of this kind. D is an ordinary gear, the teeth of which mesh with those of A. J. M. M.

[Objections will be raised to this method of overcoming the play or backlash of gearing because of its cost and its difficulty of adjustment We give, however, a diagram of our correspondent's plan, as in some circumstances the device may be found available and perhaps efficient. We have lately seen a gear which we consider superior on account of its cheapness, and fully as efficient. It is simply a double or treble gear, the teeth of which interpose with the spaces, so that when one relaxes its hold the others engage and keep up a thorough and intimate connection. The wear, alluded to by our correspondent, being divided among two or three sets of teeth, is very little in the aggregate, and the action of the teeth is very smooth and even.—EDS.

Eyeless Axes.

MESSRS. EDITORS: Reading an article, in your paper of the 1st, on the manufacture of edged tools in the United States, remind ed me of a story which may interest some of your readers. My authority for its truth is a member of the Chicago Board of Trade, who stated that he had *seen* several of the "tools" which were the heroes of his tale, that runs as follows:—

"When the great Eastern Rail Road from Michigan to Detroit was being built, the manager of the work, having a just sense of the superiority of the design of American axes over the English, caused a wooden model of one of Collins, best to be sent to Birmingham with an order for several thousand to be made for the use of the workmen who had to "blaze the way" through the immense forests of Upper Canada. Unfortunately he neglected to put on eye in his model, and in due time, received an exact duplicate of the same in the shape of a car load or so of highly finished and well tempered axes with *no hole for a handle.*

My informant stated that he had seen a quantity of eyeless axes lying in a warehouse opposite Detroit. C. B.

Nerves Uniting.

MESSRS. EDITORS:—In looking over some back numbers of your valuable paper I find, page 323, Vol. XVIII., that Mr. Eades (a dentist in Ohio who mentions a few intersting cases of teeth being extracted and afterward replaced) makes the following remark: "What is singular about it is that the nerve, after having been broken, should again unite. I do not see how this could be possible."

Permit me to remark that the *vis medicatrix naturæ* acts on nerves and brain matter as well as on muscle, bone, and skin, and that it is a well known fact in surgery that a nerve divided, either intentionally or by accident, will reunite as well as any other structure. The operation of dividing the facial nerve for the cure of neuralgia or tic douloureux has often failed to accomplish the cure intended, for this very reason; and some surgeons have even removed a piece of the nerve of about an inch in length, in order to prevent its reuniting, and the consequent return of the pain. Dr. Willard Parker, of this city, even testifies to a case where the nerve reunited in spite of the removal of a portion of it, and even of that part of the jaw bone through which the channel of the nerve passed. P. H. VANDER WEYDE, M. D.

New York city.

BLASTING WITH NITRO GLYCERIN.---COMPARISON OF THIS SUBSTANCE WITH GUN COTTON AND GUNPOWDER.

From a paper read a short time ago by Edward P. North, C. E., before the American Society of Civil Engineers, of New York city, we make the following extracts on the properties and uses of nitro glycerin. It appears from a statement in another column, that Mr. Nobel, the inventor of the substance, has not been able to control it within safe limits, as his own works were recently blown up:

I have been led to introduce to your notice the subject of this paper (nitro glycerin, or Nobel's blasting oil), because its application to blasting is comparatively new, and, consequently not generally known. As over three-fourths of a tun has been used on the New Canaan Railroad, of which I am now in charge, I may, perhaps, be able to convey some ideas of information and interest. I have, however, to regret that no accurate accounts of the comparative cost of quarrying with powder and nitro glycerin have been kept on this road, and that I can only give impressions as to the cost. It may be as well here to give a little sketch of nitro glycerin, and to compare it with powder and gun cotton.

Gunpowder is composed of a variable quantity of nitrate of potassa, sulphur, and carbon (charcoal), the nitrate of potassa being replaced in cheap powder by nitrate of soda.

Gun-cotton was discovered by Prof. Schonbein, about 1846, and its manufacture was almost immediately commenced, but never with financial success until lately.

Nitro glycerin was discovered in 1846, by Sobrero, but nothing was done with it until 1863, when Alfred Nobel patented its application to blasting. Gun cotton and nitro glycerin are made, the one from cotton and the other from glycerin, treated with nitric and sulphuric acid, the action of the sulphuric acid being, in each case, to intensify the action of the nitric. In the case of gun cotton, cotton which has a formula of C_{12}, H_{10}, O_{10}, is dipped into a mixture of three parts of sulphuric acid and one of nitric acid, by weight. Some of the oxygen in nitric acid goes to the hydrogen, forming water, and the formula stands C_{12}, H_7, 3 (NO_4), $O_{10}+6HO$, three parts of the hydrogen in the cotton being replaced by three parts of nitrous acid. On its explosion, it is all resolved into gases, namely:

		By volume.	By weight.
Carbonic oxide	CO	28.95	29.97
" acid	CO^2	20.82	33.86
Light carbureted hydrogen	C^2, H^4	7.24	4.28
Hydrogen	H	3 16	0.24
Nitrogen	N	12 67	13.16
Carbon	C	1.82	1.62
Steam	HO	25.34	16.87
		100.00	100.00

Leaving no residue. According to Von Lenk, in blasting, one pound of gun cotton is equal to 6,274 pounds of powder. According to a commission appointed by the French government, the explosive power of gun cotton depends, in a measure, on the degree of compression, and, in the mean, is about three times that of gunpowder. When uncompressed, it will burn more freely than gunpowder but by compression its rate of burning can be bought below that of gunpowder. Gun cotton, according to Prof. Abel, when well made, can be kept for a long time without undergoing change, and can be transported as safely as powder; but when impure and acid, a gradual decomposition takes place, the result of which is an explosion.

Nitro glycerin is made by treating glycerin, which has the formula C_6, H_5, N_3, O_{18}, with nitric and sulphuric acids, as in the case of cotton, and the chemical reactions are nearly the same, it being in both a case of the substitution of nitrous acid for a part of the hydrogen. By explosion, according to an article in the London *Mechanics' Magazine*, September, 1865, one volume of oil is converted into 429 volumes of carbonic acid, 554 volumes of steam, 39 volumes of oxygen, and 236 volumes of nitrogen—1,298 volumes in all, for one volume of liquid oil, being thus theoretically, five times more effective than its bulk in gunpowder; but by the greater amount of heat generated by the explosion, and the consequent higher tension of the gases, it is really thirteen times more effective by bulk, and eight times by weight, than the same. The United States blasting oil company, in a pamphlet published by them, assert that nitro glycerin has thirteen times the strength of powder by volume, and ten times by weight. It is a lightish, yellow, oily liquid, with a specific gravity of 1.6, nearly insoluble in water, not volatile, taking fire at 360° Fah., and freezing at from 40° to 36° Fah. When impure and acid, it decomposes spontaneously, with an escape of gas and the formation of oxalic, C_4, O_6 2HO, and glyceric, C_6, H_6, O_8, acids. Under these circumstances it is liable to explode.

My attention was first called to the use of nitro glycerin by the fact that our contractor, Lawrence W. Myers, was losing money, on account of the extreme hardness of the rock in one cut, and its wetness in another. As I advised the use of nitro glocerin, I, of course, took a great deal of interest in its success, loading and firing a great many of the holes myself. I will give a sketch of the circumstances and results as they appeared. In one cut, which in its deepest part was about 12 feet, the rock was mostly feldspar and mica, in large crystals; but it was very wet, springs forcing themselves up through the bore holes, so that they could not be puddled. Here the fact that nitro glycerin was entirely unaffected by water rendered it particularly valuable. The mode of procedure was this: A single hole was put down to grade about the center of the cut, a foot or two further back from the face than the depth of the cutting, so as to have the line of least resistance a vertical one; from five to eight pounds of nitro glycerin were poured in. A tin cartridge about four inches long, and three fourths in diameter, filled with powder, into which a waterproof fuse was introduced, was put into the nitro glycerin, and the hole filled with water. These charges were very effective, in some instances loosening over 100 cubic yards, so that it could be readily barred out, while that immediately around the charge was burned to a soft white powder. The quarrymen said it had turned to lime. About 50 per cent. of the rock was usually so fine as to be readily thrown into carts without sledging or block holing, while that furthest from the charge was in masses of two or three cubic yards.

In the other cut, which for about 50 feet was 21 feet deep, and contained about 8,000 cubic yards, the rock was very hard feldspar and quartz, so that sometimes drills were used up faster than one to an inch. In this cut it was found better to have the line of least resistance a horizontal one. There was no grain to this rock, it not splitting or breaking more readily in one direction than another. This cut was worked from both ends, one foreman using small holes, and, of course, more of them, while the other sank his holes in the center, nearly to grade, and tried to throw out the cut at one shot. Though the plan of single holes was not always successful, still, on the side on which it was tried, there was an economy of about 10 per cent. in labor per yard moved, and a slight loss in the quantity of rock per month, which latter item I think due to the fact that too much was put before the single holes, as the rock in the face of the cut was sometimes in masses of 5 or 6 cubic yards, requiring block holing.

The effect of nitro glycerin differs from that of powder in consequence, I suppose, of its greater force and quickness of explosion, in that, that powder, when fired, when the line of least resistance is a vertical one (the bore also being vertical, and the rock homogeneous), will form a tolerably uniform crater, with the sides sloping according to the hardness of the rock. When the line of least resistance is a horizontal one, and not too long, the rock being solid, the blast will throw out what is before it, leaving the back uncracked, and no sign of action below the bottom of the hole.

Nitro glycerin, on the contrary, in the first case, will form a well, and if the rock is not too hard, the bottom diameter will be greater than the top. Nor, as far as I have seen, will the action ever be concentrated on the line of least resistance, but will extend back from the hole and downward to a greater or less distance, according to the hardness of the rock. I think that this action of nitro glycerin, in connection with the fact that its explosive force is uninfluenced by the presence of water, will tend to its being the only explosive agent used in all subaqueous operations; for with any depth of water, it will be unnecessary to drill holes, only to sink a flask of nitro glycerin on the rock and fire it.

In regard to the relative safety of gunpowder, gun cotton, and nitro glycerin, I think the last named is the safest

agent. I do not wish to be understood to underrate the disasterous effects that would, probably, and have occurred from an accidental explosion; only to say that I think, with properly made, unfrozen nitro glycerin, the cans packed in plaster of Paris, as the law requires, it is safer than powder. I speak of its being unfrozen, because during the use of it on this road, from last September until the middle of January, the only instance in which any glycerine was exploded without the aid of powder, was a small frozen piece that was crushed between two stones. Nitro glycerin was placed in the hands of six different foremen, and by them in the hands of the men; was carried unprotected in sixty pound cans up and down the line, frozen and unfrozen, in dump carts; and was generally treated with the recklessness with which Irishmen treat powder. And as blasting material is usually used on roads, it must be the safest of the three; for, as there is no necessity of any tamping but water tamping, if a charge miss fire, there is no solid tamping to cut out—at the danger of the driller's life—as with powder. For if water has been used, another cartridge can be dropped in in a minute; or if sand has been used, a portion of it can be scraped out, and a small charge of glycerin poured in and fired on top of the old charge. Besides which, gun cotton will ignite and explode not only from a light spark, but from a flame, thus making it the most dangerous of the three; while powder, though it cannot be ignited without the aid of a spark, or something red hot, can be ignited by any spark, such as one flying from drills or from rocks falling; and nitro glycerin cannot be exploded, even if ignited, unless confined, and in that case a spark could hardly reach it.

In regard to the accidents that have occurred: the one in New York almost surely occurred from the nitro glycerin having leaked into the sawdust in which it was packed, and oxidation and combustion followed, as surely as if oil had been put on the same sawdust, and it put in a warm place, only the combustion was rather more rapid. I have been informed that the accident at the express office in San Francisco occurred from the same cause. As there is now a law against transporting nitro glycerin in glass, or in any mode except in tin cans, packed with plaster of Paris in wooden boxes, we will probably have no more such accidents.

At Aspinwall, a case of nitro glycerin was dropped into the hold of the steamship; few of us would have cared to have been on the deck when a barrel of gunpowder was treated in the same way. At Bergen, red hot iron was brought in contact with tin and solder that melts at from 360° to 475° F., and nitro glycerin would be of little use as a blasting material if it had not proved disastrous. At the risk of reiteration, I will sum up the advantages possessed by nitro glycerin over gunpowder and gun cotton.

1st, That, being of greater strength, there is a great saving in drillers' wages, as fewer holes have to be made, and the charge of glycerin can be put into the rock much more compactly. For instance, if, to break up a certain rock, 1 foot of depth in the bore hole was required with glycerin, 13 feet would be required with powder, which would necessitate 6 feet of additional drilling if but 1 hole was used; but 13 feet of powder could not be exploded in a 2 inch or 2¼ inch hole so that it would be effective, on account of the slowness with which it burns, so that additional holes would have to be drilled, with in each an allowance of at least ⅔ of the depth for tamping. With gun cotton there would not be so much difference.

2d, That nitro glycerin is not injured, either permanently or temporarily, by water or moisture, which enables us to use water tamping, a great saving of time and risk of life, impossible with either of the others; and it can be stored in damp cellars, or under water, without the necessity of drying it before using, as in the case of gun cotton, or having it ruined, as with gunpowder.

And lastly, the difficulty of exploding it renders it the least dangerous to human life.

EFFECT OF ARSENIC UPON APPLES.

Some years since a man was indicted by the Grand Jury of a western county for an attempt to kill by poisoning with arsenic. He was convicted, and sentenced to be imprisoned, at hard labor, in the State Prison at Auburn, for the term of twenty years, and was subsequently pardoned, his innocence having been satisfactorily established.

It was charged in this case that the arsenic was administered by inserting it into cuts made in the sides of apples, four in number. It was proved that the cuts were made on the 22d of September, and that the apples were laid away in a drawer until the 11th of October in the same year, during which time the accused was absent, and, of course, had no access to the fruit. Nothing remarkable was discovered in the taste of the fruit or its appearance. Two of the apples examined by a professional Toxicologist, had slits in their sides which contained crystals of white arsenic amounting to at least one grain on the cut surface of a single apple. The eating of the fruit was followed by all the symptoms of arsenical poisoning, but, fortunately, by timely measures, death was prevented.

Some doubts having arisen upon the sufficiency of the evidence, investigations were commenced to ascertain the effect of arsenic upon apples and other pulpy fruits. The results of these investigations were as follows:

First, when apples have smooth slits made in them with a sharp instrument, the changes which take place in them are very slight, during an interval of two or three weeks, especially so if they are (as was proved in the case cited) in good keeping condition when the slits are made; Secondly, when arsenic—in the form of arsenious acid—is inserted into the slits, the cuts begin to open in the course of from two to five days; the edges are separated from one eighth to one fourth of an inch, or even more, showing very plainly the white arsenic within. At the same time the skin adjacent to the cut begins to be discolored, and, together with the pulp beneath, turns dark brown, both in appearance and consistency resembling the ordinary slow decay of the apple. This change begins to show itself on the second or third day, and then makes steady and regular progress, extending itself on each side of the cut so rapidly that by the eighth day it attains a width of from five eighths to seven eighths of an inch; by the sixteenth day, one and a half to two inches, and by the twenty-first day, one half or more of the apple will be affected with decay.

The experiments were conducted with great care, upon a great number and variety of apples, and the results were singularly uniform. Experiments upon apples baked with arsenic placed in a slit upon their sides, show that the arsenic, in such cases, is discolored. In the case cited it was proved that one of the apples which was baked had *white* arsenic in it. It therefore must have been inserted after it was baked.

In this case, it will be remembered that the apples were placed in a drawer on the 22d of September, remaining there nineteen days, and as the accused was absent during the whole of that time, the charge could only be sustained upon the theory that he had inserted the arsenic on the 22d of September. If that had been the case the apples would have been unfit to eat upon the 11th day of October, the time when the apples were eaten.

This action of arsenic upon the pulp of fruits contrasts singularly with its action upon animal tissues, which, it is well known, are preserved by its action.

Iodine and Carbolic Acid.

A communication to the *American Journal of Pharmacy* contains a description of a new solution containing iodine, carbolic acid, and glycerin, which is claimed to possess superior therapeutic virtues. The solution is thus prepared: Take of the compound tincture of iodine, forty-five minims; crystallized carbolic acid, fused, six minims; glycerin, eight drachms; distilled water, five ounces.

The iodine color gradually disappears, and the solution eventually becomes colorless The time necessary to complete this change depends on the temperature—at 60° Fah, eight to ten days are required; if the cork of the bottle is secured, and the mixture exposed in a water bath to a temperature of from 90° to 100° Fah., the change will be effected in eight or ten hours. The change takes place as quickly in diffused light as in direct sunshine, provided the temperatures are equal. The solution, exposed to sunshine, becomes somewhat turbid, and deposits a muddy precipitate.

The change is due entirely to the carbolic acid, glycerin alone, under similar conditions, effecting no change in the iodine solution, while carbolic acid acts equally well with or without the presence of glycerin.

The character of the change is probably the transformation of the iodine into iodide of formyle (iodoform) at the expense of the carbon atoms of the carbolic acid.

The solution possesses antiseptic and stimulant properties in a marked degree, and has met with favor as an application in the form of injections, gargles, and lotions "in cases of sore throat, ozœna, abcesses in the ear, and foul or indolent ulcers."

It has also been recommended as an injection in cases of internal hemorrhoides, and by inhalation for throat and bronchial affections. When used for inhalation the glycerin can be omited.

DESTRUCTIVE FIRE FROM FIREWORKS.—The Lawrence Academy, at Groton, Mass., was entirely consumed by fire on the afternoon of the 4th inst. The library, apparatus, etc., were mostly saved. The fire was supposed to have caught from Chinese crackers thrown upon the piazza by a boy. The loss on the building is estimated at $4,000, entirely covered by insurance. A rocket also exploded in the steeple of St. John's Episcopal Church, in Buffalo, on the 4th. The structure was soon afterward wrapped in flames, which destroyed it with all its valuable contents. We trust the severe lessons which are thus annually received will result in the gradual substitution of more sensible methods of celebrating the birthday of American Independence. In marked contrast to the above we notice that on the 4th of July Mr George W. Childs, of the *Philadelphia Ledger*, gave a "Continental Hotel" dinner to about 150 newsboys in the press room of the *Ledger* building.

IT is said that letter envelopes were made about forty years ago, by Brewer, a bookseller in Brighton, England. He employed a pattern made of metal plates for cutting out the sizes, and the demand for the envelopes became so great that he was obliged to employ a London firm to manufacture them.

NEW PUBLICATIONS.

COLLEGE COURANT. Yale.

We are in receipt of the *College Courant*, published weekly at New Haven, Conn. It appears in a new elegant dress and enlarged form, and its prospectus and able list of contributors give sufficient promise of a brilliant future. It has our best wishes.

THE WORKSHOP, No. 5, published by E. Steiger, No. 17 North William street, contains an article upon bookbinding and fancy leather goods, also several ornamental designs for various purposes.

THE ZOETROPE, OR WHEEL OF LIFE.—We have already noticed this unique optical instrument, which has afforded so much amusement to old and young, and although an American invention, its sale has already become quite extensive in Europe. Sets of figures are furnished with each wheel, and the changes which its rotation effects are both amusing and instructive. The Zoetrope is manufactured by Milton Bradley & Co., Springfield, Mass.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

GREASING WAGONS.—But few people are aware that they do wagons and carriages more injury by greasing too plentifully than in any other way. A well made wheel will endure common wear from ten to twenty-five years, if care is taken to use the right kind and proper amount of grease; but if this matter is not attended to, they will be used up in five or six years. Lard should never be used on a wagon, for it will penetrate the hub and work its way out around the tenons of the spokes, and spoil the wheel. Tallow is the best lubricator for wood axle-trees, and castor oil for iron. Just grease enough should be applied to the spindle of a wagon to give it a light coating this is better than more, for the surplus put on will work out at the ends, and be forced by the shoulder-bands and nut-washers into the hub around the outside of the boxes. To oil an iron axle-tree, first wipe the spindle clean with a wet cloth with spirits of turpentine, and then apply a few drops of caster oil near the shoulder and end. One teaspoonful is sufficient for the whole.

TO REMOVE THE TASTE OF NEW WOOD.—A new keg, churn, bucket, or other wooden vessel, will generally communicate a disagreeable taste to anything that is put into it. To prevent this inconvenience, first scald the vessel well with boiling water, letting the water remain in it until cold; then dissolve some pearlash or soda in lukewarm water, adding a lime to it, and wash the inside of the vessel well with this solution. Afterward scald it well with plain hot water, and rinse it with cold water before you use it. The reason for this is the ready combination of resinous matters with alkalines to form compounds soluable in water. The resinous substances of wood, while new, cause a disagreeable taste and odor in substances kept in wooden vessels.

RAILROAD ENTERPRISE.—It is less than half a century since the first railroad in the United States was commenced—the Baltimore and Ohio, in 1828—and now there are forty thousand miles of railway within the limits of the country. The Mohawk and Hudson Railroad, in New York, was the second road built, and the South Carolina Railroad was the third. The road from Boston to Albany was commenced in 1841, and a continuous line of railway between Boston and New York was formed in 1849, by the completion of the New York and New Haven road. The Erie and the Hudson River lines were completed in 1851, the Michigan Southern and Michigan Central the following year, and in 1853 an unbroken line of one thousand miles of railroad between Boston and New York and Chicago was formed. Between 1849 and 1857, there were 15,843 miles of road constructed, and the railroad enterprise gained such an impetus from the success of those eight years that no obstacle has since been able to offer anything more than a temporary check. At the close of the year 1837 there were 1,098 miles of railroad in the United States, and at the close of 1867, there 39,244 miles This gives an average increase of 1,156 miles per year for thirty-three years. The largest number of miles opened in one year was 3,643, in 1856, and the least number was 159, in 1843.

GOLD IN ALASKA.—Reports continue to reach us which tend to confirm the previous statements of important gold discoveries in Alaska. Much excitement is said to prevail in Oregon, Washington Territory, and British Columbia, in consequence of these reports. Specimens of anthracite have been brought to Sitka by the Indians, who report large deposits in the interior. These statements are probably exaggerated, but there is some reason to believe Alaska contains considerable mineral wealth It ought to contain some mineral wealth as it will take considerable to purchase this territory.

PROTECTION OF EYES.—In a recent investigation by an oculist of Breslau, embracing six manufacturing establishments, employing in the aggregate 1,283 workmen in the different departments of boilermaking, blacksmithing, turning, fitting, &c., it was found that 90 per cent. had often been injured in the eye by minute pieces of metal, and that 40 percent. had been under medical treatment for serious accidents to their eyes The whole time lost by the workmen from this cause amounted to 4,726 working days. Ordinary glass spectacles were objected to on account of their liability to be broken, Mica spectacles were tried, and found to fulfill all requirements. The mica used is of the purest kind, very thin, and is curved somewhat like a watch-glass. It is held in a frame which fits closely enough to the eye to prevent the passage of metallic fragments. Mica imparts a pale gray tint to objects, but does not impair the eye. The price of a pair of these spectacles, at Breslau is about 15 cents. If, from want of proper protection, a fragment of metal, wood, or other substance, should get in the eye, it can often be easily removed as follows: Take a horse hair and double it, leaving a loop. If the mote can be seen lay the loop over it, close the eye, and the mote will come out as the hair is withdrawn. If the irritating object can not be seen raise the lid of the eye as high as possible and place the loop as far in as you can, close the eye and roll the ball around a few times, draw out the hair; the substance which caused so much pain will be sure to come with it.

THE ground has been broken on the Pacific and Atlantic railroad at Springfield, Mo. A large number of men are employed, and the work will be pushed with a view of connecting St. Louis and San Francisco by the 35th parallel.

Recent American and Foreign Patents.

MAKING CORES FOR CASTINGS.—Benjamin S. Benson, Baltimore, Md.—This invention consists in an improved device for holding and cleaning the metallic cores used in casting oven pipes, by which such cores can be evenly and thoroughly scraped and cleaned.

VENTILATOR.—J. W. Foard, San Francisco, Cal.—The object of this invention is to furnish an improved ventilator for ships, buildings, cars, etc., which while affording a thorough ventilation to the ship or building upon which it is used, entirely prevents the rain from entering through the ventilator.

FIREMAN'S EXTENSION LADDER.—Robert H. Jones, San Francisco, Cal.—This invention is an apparatus by which, in cases of fires in lofty buildings, the hose can be carried to the top of the building, and there operated conveniently and safely from the ladder. A device is connected by which persons and valuable property can, at the same time, be removed from the upper stories of the building.

HOP POLE.—Luman B. Clark, Bambridge, N. Y.—This invention consists in providing a tapered post of scantling which may be driven into the ground, and which may form a base to which the poles may be attached or rendered detacnable.

MILL STONE.—Peter Zimmerman, Delaware Water Gap, Pa.—This invention consists in the arrangement of a bail or suspending apparatus for the stone so as to possess the quality of a universal joint, whereby, although the faces of the stones may not be perpendicular with the spindle, the jarring and pounding action of the parts usually occurring when rigidly connected together will be avoided.

STOVE OR HEATER.—F. S. Zumstein, Evansville, Ind.—This invention has for its object to furnish an improved stove for railroad cars, steamboats, hotels, houses, etc., which shall be simple in construction, will keep the fire in full operation from six to twenty-four hour without its being necessary to attend to the fire, and which may be used with perfect safety on railroad cars, as the stove is so constructed as not to be liable to be broken and to scatter the fire should an accident happen to the car.

PRUNING AND HARVESTING HOOK.—John Stark, Thomasville, Ga.—This invention relates to an improvement in hooks for harvesting and cutting up corn and also for pruning trees, and it consists in making the hook or cutting edges in two or more parts united together.

SELF-DETACHING PULLEY.—Jesse E. Gustin, Elmira, N. Y.—This invention relates to an improvement in pulleys used for raising heavy weights whereby the same are made self-acting or so arranged that the position of the pulley can be changed and the load dumped automatically.

STEAM PRESSURE ALARM.—David McFarland, New York City.—Two patents have been granted on this invention which relates to a new and simple device to be connected with a steam boiler for sounding an alarm when the steam within the boiler exceeds a certain pressure, and also for sounding an alarm when the water descends to a certain level.