

FAIRBANKS, MORSE & COMPANY

CATALOGUE No. 49

MODERN MINING MACHINERY AND SUPPLIES

RELIABLE GOODS IN ALL LINES

MAIN OFFICE
CORNER FRANKLIN AND MONROE STREETS
CHICAGO, ILLINOIS, U.S.A.

LIEBER AND WESTERN UNION CODES

CORRESPONDENCE IN ALL LANGUAGES

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MINNEAPOLIS, MINN., 220 NICOLLET AVENUE
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THIS COPY IS

NO. 1886

OF

MINING CATALOGUE

NO. 49

ISSUED IN 1901

BY

FAIRBANKS, MORSE & CO.

PRESENTED TO

AETNA DYNAMITE

AETNA
DYNAMITE

Nitroglycerin is by far the most powerful explosive known, and in its free state is extremely sensitive, dangerous to handle and violent in its action.

Aetna Dynamite is a combination of nitroglycerin with other explosive ingredients, and in appearance resembles common putty. It is put up in strong paper shells or cartridges which, previous to filling, are dipped in melted paraffine. The standard size cartridge is $1\frac{1}{4}$ inch diameter and 8 inches long; many other sizes are made and regularly carried in stock. The smaller sizes, having a diameter of $1\frac{1}{4}$ inches or less, are packed in pasteboard boxes containing 10 pounds each. Five of these pasteboard boxes are enclosed in a strong wood case which can be as conveniently handled and shipped as any other merchandise. Cartridges of $1\frac{1}{2}$ inches diameter and larger are packed in sawdust without cartons. A 50-pound case of $1\frac{1}{4}$ by 8 inch cartridges contains approximately 100 cartridges, but we do not guarantee any specified number of cartridges in each case, because the weight of single cartridges varies more or less according to the weight of the material used. Dynamite is sold by weight only.

FUSE



SAFETY FUSE is made in lengths of 50 feet neatly coiled, and of the following grades:

HEMP FUSE, the cheapest grade, is easily affected by damp, and can be used only in perfectly dry work.

COTTON FUSE, the next grade, is less liable to damage by tamping and handling than hemp, burns with great regularity, and is in general use for all dry work.

SINGLE TAPE FUSE is suitable for damp, but not for wet work.

DOUBLE TAPE FUSE is suitable for wet work.

TRIPLE TAPE FUSE can be used with certainty and safety under water.

Safety Fuse is put up in paper parcels, containing two coils of 50 feet each, marked to designate the kind.

These bundles are carefully packed in cases:

Hemp Fuse, 12,000 feet in case. Cotton Fuse, 12,000 feet in case. Single Tape Fuse, 6,000 feet in case. Double Tape Fuse, 6,000 feet in case. Triple Tape Fuse, 6,000 feet in case.

Safety Fuse should always be kept in a dry, cool place.

SAFETY

Very erroneous ideas are entertained as to the danger of handling, storing, and transporting high explosives. It is a fact, susceptible of the most indisputable proof, that Etna Dynamite is much safer in many respects than common powder. Etna Dynamite will not, like gun-powder, explode upon coming into contact with a spark or flame of fire. It will often burn without explosion, when ignited and not confined. During combustion it burns with a light blue flame, and in several instances many thousand pounds have been known to be accidentally consumed without any explosion whatever. When heated it is more sensitive to shocks, and when very hot it is dangerous to handle. It will explode at temperature of about 360° Fahrenheit.



BRANDS AND GRADES

No.	Per Cent. Nitroglycerin.	No.	Per Cent. Nitroglycerin.
4	20	2	40
4x	25	2x	45
3	27	2xx	50
3x	30	1	60
2c	33	1xx	75
2b	35		

Any other sizes and grades made to order.

Nos. 4, 4x and 3—For clay, shelly rock, frozen earth, and light work; and in quarries where rock is to be split but not shattered.

Nos. 3x, 2c, 2b and 2—For moderately hard rock, copper, lead, and other ores, stumps and ice.

Nos. 2x and 2xx—For hard rock, ores, and iron.

Nos. 1 and 1xx—For extremely hard rock, ores, breaking iron and steel, and submarine blasting.

BLASTING CAPS

Blasting Caps or Detonators are thin copper shells, partly filled with a very powerful and highly sensitive fulminating powder, readily exploded by heat, fire or a blow, and rendered worthless by water or damp. They are used, in connection with safety fuse, in exploding dynamite.

Blasting Caps are made in many strengths, from single to quintuple force. Single and double force caps should never be used for exploding dynamite, and triple force caps are not always reliable. For ordinary work in a mild temperature quadruple caps are of sufficient strength, and this is the grade most used; but when below forty degrees Fahrenheit a quintuple force cap is preferable.

To secure the full strength of all dynamite, a thorough explosion is necessary, and at a low temperature it requires a much greater detonating force to explode it than when warm, and when

frozen it can hardly be exploded at all. Great economy in the use of dynamite is insured at all times by using the best cap—one of sufficient strength. The cost of the cap is so small as compared with that of preparing the hole and the dynamite used, that none but the very best should be selected.



Blasting Caps are carefully packed in tin boxes, containing 100 caps each—five boxes in a paper package, and, when prepared for transportation, should always be inclosed in a wooden box, the caps entirely surrounded by dry sawdust, to prevent jarring and secure safety.

Too much care cannot be exercised in handling these caps, and they should never be stored, carried, packed, or shipped with powder or dynamite.

Railroads require that caps be shipped separate from dynamite.

BLASTING BY ELECTRICITY



The use of electricity in shooting blasts, either of common powder or dynamite, commends itself to all who have sufficient work to justify the first outlay for the necessary apparatus; first, by reason of its absolute safety, and secondly, since by firing a number of holes at exactly the same instant of time, the entire and combined strength of the explosive is fully secured.

To fire blasts by electricity, one must have the following:

A blasting machine, which is a small dynamo made expressly for this use and operated by hand.

Enough insulated copper wire, commonly known as leading wire, to reach from the battery to the blast, usually 500 feet; or an *Ætna* cable may be used.

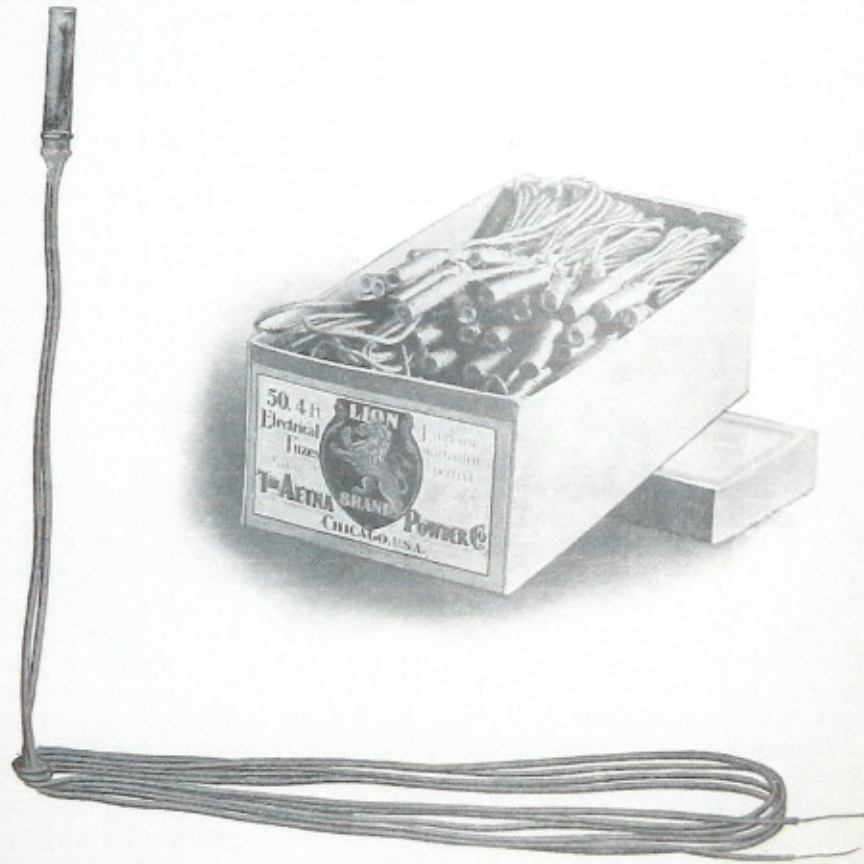
One electrical fuze for each hole to be fired, the wires a little longer than the depth of the hole. Connecting wire with which to connect the ends of the electrical fuze wires, and insulating tape, to protect connections.

LION BRAND ELECTRICAL FUZES

Our fuzes are made with the very best material and workmanship. We use only the strongest caps, which are made to order to exactly meet our requirements. The wires are of the purest copper; the double covering is heavy, and will not strip, and our system of manufacturing and testing is so thorough as to make it impossible for an imperfect fuze to be packed for shipment. We can, therefore, confidently warrant our fuzes to be absolutely perfect when shipped. We keep them in stock, with wires of from four to thirty feet in length, packed in paper boxes containing fifty fuzes. Our fuzes are of two grades—the ordinary quality, or single strength, containing quintuple force caps, adapted to all ordinary requirements, and the extra quality, or double strength, made with sextuple force caps. We recommend the latter for the explosion of *Ætna Gelatin*, and ammonia powder, or ordinary dynamite.

Lion Brand Electrical Fuzes are all of equal electrical resistance.

The cut shows, in section, an electrical fuze nearly of actual size. A shell of copper contains in one end the charge of explosive, composed mainly of fulminate of mercury. The copper wires, entering the shell through a sulphur plug, have a cotton covering, which affords sufficient



insulation for all ordinary purposes, the plug holding the wires firmly in place. The bare ends of the copper wires are connected by a very fine platinum wire or bridge, soldered to and connecting the two ends of the wires, which project into the priming of gun cotton. The bridge is heated to redness or combustion by the passage of the electric current.

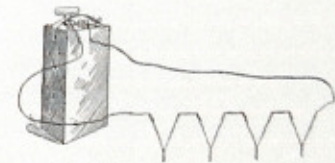
Cotton covered wires are moisture proof, but not strictly water-proof. Gutta-percha covered water-proof fuzes, if required, must be made to order. Such covering is not needed for general work, but only where blasting is to be done in deep water. Never use fuzes made by different manufacturers in the same blast.

PRICE LIST

Double-Wound Insulation. Every one Warranted Perfect.		Ordinary Quality, per 100.	Double Strength, per 100.	Double-Wound Insulation. Every one Warranted Perfect.		Ordinary Quality, per 100.	Double Strength, per 100.
Cotton Covered	4 feet wires . . .	\$3.00	\$3.75	Cotton Covered	18 feet wires . . .	\$ 6.78	\$ 7.53
"	6 " "	3.54	4.29	"	20 " "	7.32	8.07
"	8 " "	4.08	4.83	"	22 " "	8.32	9.07
"	10 " "	4.62	5.37	"	24 " "	9.32	10.07
"	12 " "	5.16	5.91	"	26 " "	10.32	11.07
"	14 " "	5.70	6.45	"	28 " "	11.32	12.07
"	16 " "	6.24	6.99	"	30 " "	12.32	13.07
Leading Wire, common, 500 ft. coils, per ft.				Connecting Wire, 1 lb. coils, or 2, 5 or 10 lb. spools, per lb.		1c.	
Ætna Cable Leading Wire, per coil				Leading Wire Reels, each		\$5.00	
Connecting Wire Holders, each				Battery Testing Lamps, each		4.00	
Insulating Tape, ½ lb. packages						2.00	
						3.50	
						.75	

THE SMITH BLASTING BATTERY

This is a small hand dynamo operated by a rack and pinion movement. It weighs about twenty-two pounds, and the case is fourteen inches high. To fire a blast, attach the leading wires, one to either post, the other ends of the wires being properly connected to the blast. Lift the



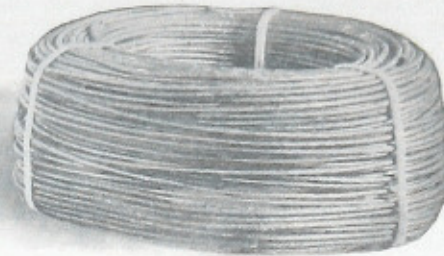
No.	Capacity.	Price.	No.	Capacity.	Price.
3	10 to 20 holes.	\$25.00	4	20 to 40 holes.	\$50.00

toothed bar to its full length, then push it down with all force, bringing the bar to the bottom of the box with a solid thud and the blast will be made. There is also made a "three-post connection" machine which can be supplied if desired. The system of connecting is less simple, and so less desirable than in the regular machine.

It is a good plan to give the bar several strokes just before making connections, to bring the machine to its full strength.

LEADING WIRE

Enough leading wire is needed with each machine to make two leaders of sufficient length to reach from the blast to a safe distance for the person to stand who shall operate the machine. Five



hundred feet is the quantity usually sold, but in some cases a thousand feet are used. Cotton covered wire is generally used. Gutta-percha covered wire will be furnished to order. Our Improved Cable will be found much more convenient than ordinary leading wire.

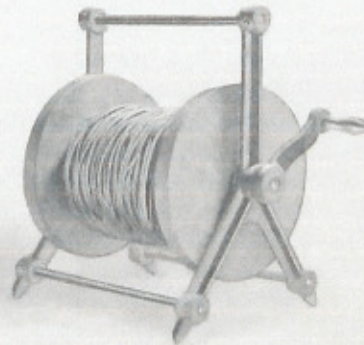
IMPROVED AETNA CABLE LEADING WIRE

This cable is composed of two heavily insulated wires, which are covered and bound together (except for about thirty feet at the end) by another and still heavier insulation, thus making two wires in one cable, leaving at the end two free wires for making proper connections for a blast.



The cable is 250 feet long, in effect the same as 500 feet of single leading wire. The advantage of this cable in economy and convenience will be clearly apparent to all who blast by electricity. The reel shown is adapted for the use of either cable or common leading wire.

LEADING WIRE REELS



This is convenient apparatus for holding leading wire or cable, carrying it about the quarry, and laying it out and taking it up from a blast. It will hold more than 1,000 feet of leading wire, is strong and substantially made and works smoothly. The use of this reel for holding wire will save much damage to the wire and annoyance from snarls in the wire.

MINER'S CANDLESTICK

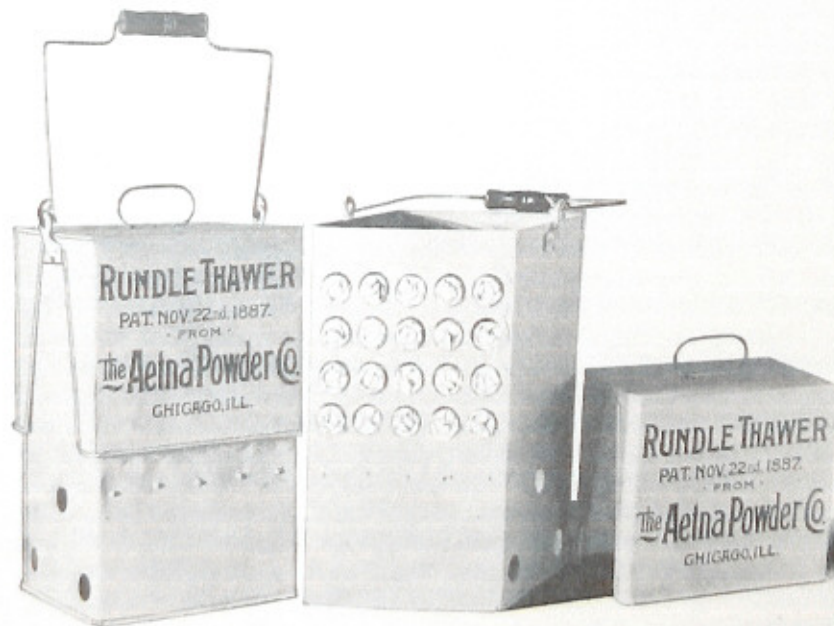
We beg to direct attention to a very complete and convenient Miner's Candlestick, which we have recently put on the market. As shown in the accompanying illustration, the needle and candle tube being jointed, the candlestick, when not in use, may be folded and carried in the pocket.



This is an advantage which we believe is possessed by no other tool for a similar purpose, and in connection with the thoroughness of its manufacture and attractive finish in nickel plate, makes us confident that we are offering the best miner's candlestick that can be had.

FREEZING AND THAWING

All Nitroglycerin compounds freeze at 42 degrees Fahrenheit, and explode when confined at 360 degrees Fahrenheit. When frozen, they are either unexplodable or unreliable and must be slowly thawed before using. Methods of thawing which are both careless and dangerous have been in common practice. These objections are done away with and economy insured by the use of the Powder Thawer which we show here.



DIRECTIONS.—The cover removed, fill the tube basin with water; under the tube chamber put a lighted miner's lamp. Having put the frozen dynamite into the tubes, replace the cover.

Where regular blasting is done, a small house should be provided for the purpose, fitted with a small steam radiator.

The worst plan of thawing is at a blacksmith's fire or any open fire. No explosive of any kind should ever be permitted to enter a blacksmith shop. Even fuse is often injured by being thrown in carelessly among tools.

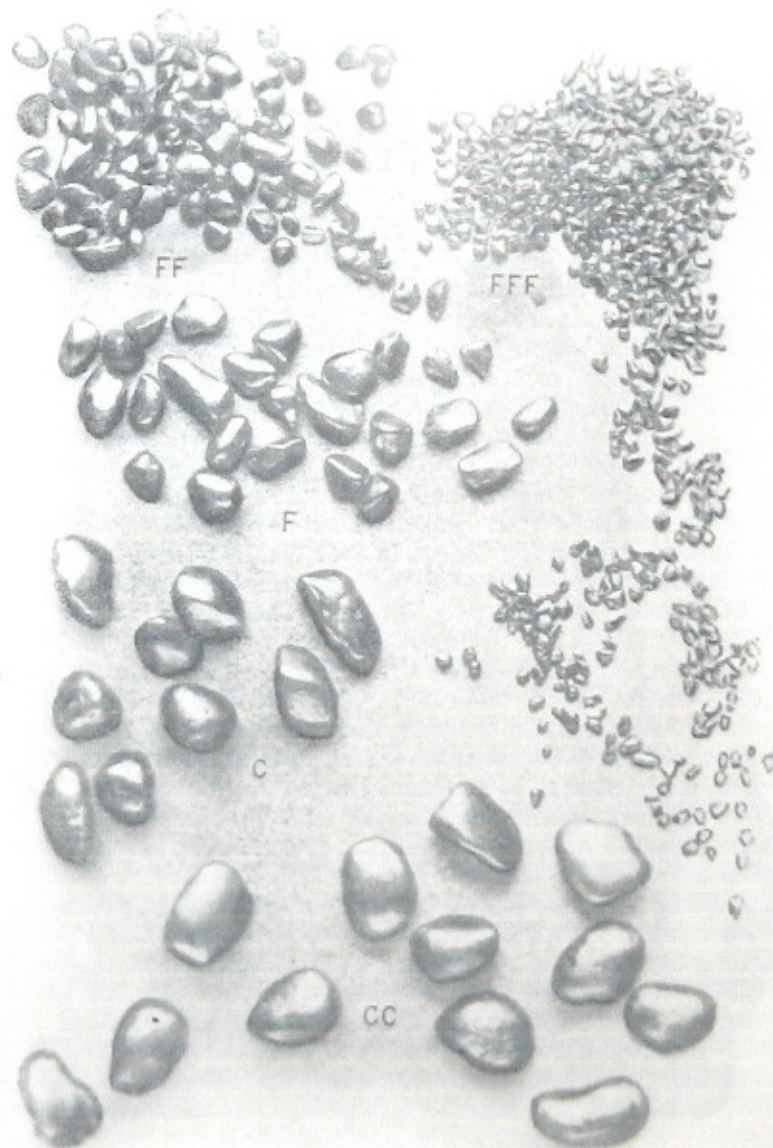
COMMON BLASTING POWDER

"B" BLASTING is the standard explosive used for coal and ore mining, railroad construction and general quarry work.

Its consumption is so large that particular attention is given to this branch of our manufacture, and with evenly assorted, bright, hard grain, and best keeping qualities, we can justly claim that our product is unsurpassed in quality, finish and package.

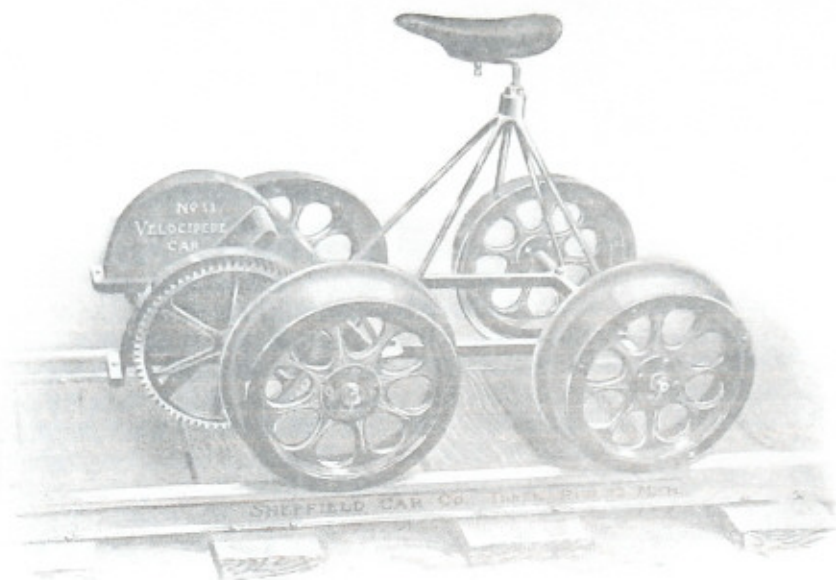
"B" Blasting is packed only in air-tight metal kegs, containing 25 pounds each. We assort ours to five sizes of grain.

Correspondence is solicited from all large buyers, coal operators, ore miners and railroad contractors, with the view to fully meeting their requirements.



SIZES OF "B" BLASTING

THE "BRUNTON" MINE AND TUNNEL VELOCIPEDA



No. 11

This machine is designed for use in extensive mines and long tunnels, and, as every detail of its construction has been most carefully planned and thoroughly tested by years of continuous work under the most trying conditions, we feel confident that it will come into general use as soon as its merits become known. Only the very best material is used in its construction, the frame being of the toughest iron and steel, while the wheels have steel hubs, rolled-steel flanges and wooden spokes; the driving gear is machine cut, the crank shaft is hand-forged, carefully turned and carried in brass journal boxes. The seat is of the well-known "Garford" pattern, extra strong, manufactured to our special order, and adjustable to any height of rider.

This velocipede is so small and light that it can be lifted from the track with one hand, leaving the other free to carry a light, tools, etc.

When seated on the machine there is absolutely nothing in front of the rider, and if the wheels run into a fall of rock or earth upon the track, when going at a high speed, the rider is simply shot forward from his seat, and easily maintains his equilibrium by running a few steps.

On an ordinary track the machines can be comfortably operated at a rate of from 10 to 12 miles an hour, and on a first-class track experienced riders make from 15 to 20 miles per hour, with scarcely any exertion.

HISTORY—The machine was designed by Mr. D. W. Brunton, Manager of the Cowenhoven Tunnel, of Aspen, Colo., who found, after the tunnel had reached a length of over a mile, that altogether too much time was consumed in walking to and from the face. The first machine was built in the Cowenhoven Tunnel Company's shops, and as soon as it was put upon the track its utility as a time and labor-saving device became so evident that the foreman, shift boss and timberman were immediately supplied with machines. The invention was then patented and arrangements made with us for its manufacture.

The mine owners and managers in that vicinity have been quick to see its advantages, and already the machine is in use in the following mines and tunnels at Aspen, Colo.: Cowenhoven Mining, Drainage & Transportation Co., Della S. Consolidated Mining Co., Bushwacker Mining Co., Park-Regent Mining Co., Empire Mining Co., Mineral Farm, Compromise Tunnel, Percy Tunnel Co., Aspen Mine, and also in the Revenue Tunnel and Virginius Mine, at Ouray, Colo.

"KEETLEY" TUNNEL CAR



These cars were originally constructed under the direction of Mr. John H. Keetley, superintendent Ontario Tunnel, Park City, Utah, and were in that work a source of great economy and convenience, the Company being able to push the work much faster after their construction than before. The grade of the Ontario Tunnel is 3 per cent, and these cars were regularly run up the grade with eight miners on at a speed of twelve miles per hour and down at twenty miles. Two men regularly took up a load of 1,500 to 2,000 pounds of material at a speed of eight miles per hour.

They can be worked on a much steeper grade than the above, and in an opening of 3½ feet wide and 5 feet high.

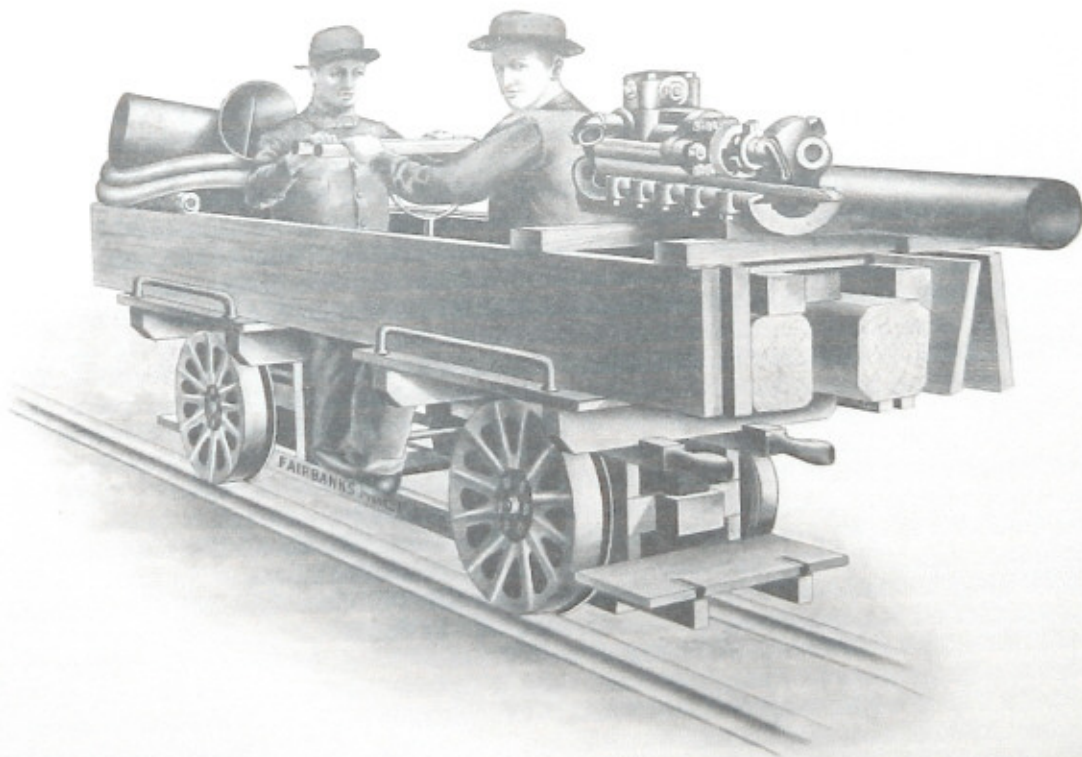
They are of great saving in handling supplies, as what is wanted can be telephoned for from the end of the tunnel and delivered in one-half the time it could be gotten there with a mule, and this difference of course becomes greater as the work progresses further into the mountain.

THE KEETLEY TUNNEL VELOCIPEDE CAR



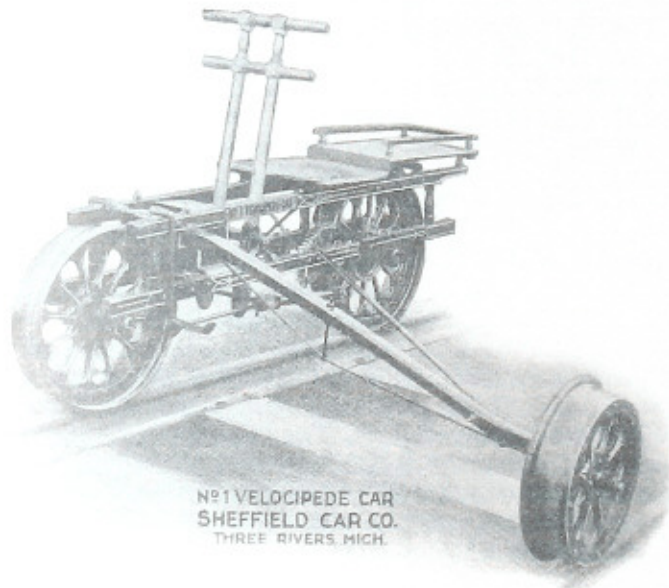
No. 12

This car is adapted to use on track of extremely narrow gauge, and will carry eight persons, four of whom assist in propelling the car, or it will carry a load of 2,000 pounds of material of various kinds. It is easily handled by a single person, if necessary, and can also be run at good speed by one operator. The construction is such as to get the greatest amount of power and at the same time have the utmost available room for carrying capacity. The above cut well shows the general design and arrangement of parts, the other illustrating the device carrying a load of miners all ready to go into the mine for their tour of work; also carrying a load of material for use in construction. Timbers, air pipes, hose and drill will be seen in this particular load, the whole weighing over 2,000 pounds. Two different styles of cars are built, they differing mainly in the materials of which the wheels are constructed, one slightly the lighter of the two, having wood center wheels, the other wheels rolled from boiler plate steel.



No. 12

VELOCIPEDE CAR



No. 1

Actual weight, 140 lbs.; boxed for ocean shipment, 265 lbs. Can be arranged adjustable from narrow to standard gauge, if desired.

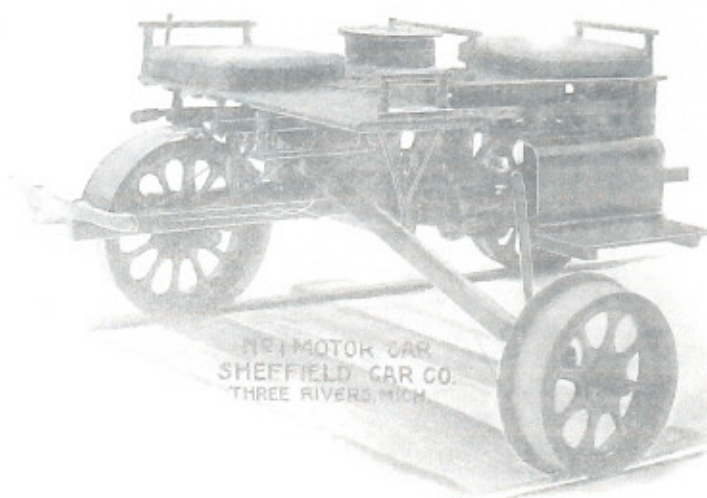
GAUGE OF VELOCIPEDE CARS

All of our Three-wheeled Cars, except the Telegraph Car, can be so made that the arm will be adjustable in the main frame, so that the car can be adapted to run on any gauge of track from three feet up to five, or even a greater gauge, and without any extra expense.

We, however, when cars are ordered and no gauge is specified, understand that they are wanted for standard gauge track, and in such cases send the regular arm for standard gauge, which is not adjustable to different gauges. Parties, therefore, wishing car with arm so arranged as to run on different gauges of track, will please specify same with their order, when arm of this description will be furnished without extra charge. Where the No. 3 or Telegraph Car is wanted with this adjustability, it will be best to order an additional arm and brace rod, which will be \$3.50 extra.

GASOLINE MOTOR CAR

WITH FRONT SEAT UNFOLDED



No. 1

Railway Men, particularly Chief Engineers, Engineers Maintenance of Way, Track and Bridge Inspectors and Roadmasters, have long felt the need of a light and cheaply operated Motor Car, by which they would be enabled to get over the road quickly and make as frequent stops as necessary to permit of close examination of Track, Bridges, Roadway, Structures, etc.

Attempts have been made to fill this want with steam Inspection Cars, but their first cost, the expense of running, the carrying of coal and water for the boiler, the dirt, smoke and heat were so objectionable as to make their extended use impracticable.

That we have satisfactorily solved this question for our railroad friends is best indicated by the very large demand so quickly developed for our Gasoline Motor Car, illustrated above. It fulfills admirably all the requirements of such a car; that is, it is light in weight, simple, safe, economical to operate, convenient, speedy and reliable. Readily handled by one man.

The car weighs about 300 pounds and can be quickly put on and removed from the rails by one man, being so arranged that it can be pushed about on one wheel by lifting up one end.

To start the car is simply to turn on the gasoline, move a lever which connects the battery with the cylinders—the work of but a few seconds. To stop—the gasoline and battery are turned off and the brakes applied.

As it can be started in a few seconds, as frequent stops as desired can be made and no delay experienced when ready to proceed. A speed of over thirty miles an hour can be developed on a straight level track, so the car affords a quick and satisfactory means of getting over the ground. The speed is always under the control of the operator, and the car can be run as fast or as slow as desired.

With this car, officials can make quick and frequent inspections and the work will be a pleasure, rather than a slow, tiresome and disagreeable duty, thus insuring better conditions of roadway, etc., and greater safety to trains. They are being used now where formerly a locomotive and crew were necessary, and of course the saving in one trip of this kind will about pay for the car.

Gasoline and an electric battery supply the motive power. The battery consists of a series of eight dry cells, which with proper care will run the car over 900 miles.

That it is very inexpensive to operate can easily be seen. A gallon of gasoline will ordinarily run the car over seventy-five miles. Provision is made for carrying with the car four gallons, or sufficient for a run of about 300 miles.

It will carry three persons; the operator, who sits in the rear, and two passengers on the front seat, which is shown open in the cut, but which folds up for convenience when not in use.