

Correspondence.

Inaudible Sounds Made Audible.

To the Editor of the Scientific American:

The phonograph would record sounds too high to be heard by man. By reproducing the sound at a lower speed of the instrument, the pitch could be lowered to any extent necessary, so that we could hear them.

S. P. GARY.

Oshkosh, Wis.

Calculating Capacity of Cisterns.

To the Editor of the Scientific American:

Using Mr. Melzer's example in his communication in your issue of December 15, why does he use the following: 300 inches x 300 inches x 0.0408 = 3672 U. S. gallons?

Rule.—Square the diameter of cylinder in inches, and multiply by 0.0408 = gallons per foot.

SUBSCRIBER.

Rockford, Ill.

Interest Problem in Query 22 of December 15, 1888.

To the Editor of the Scientific American:

Is there not an error in answer 22 of your issue of December 15, 1888? It seems to me that the equation should be  $200 + x - 0.08x = 500$ , and that no interest is to be added to  $x$ , when found, as it was paid in advance by the terms of the problem.

T. B. A.

Hightstown, N. J.

[By a typographical error the multiplication sign (x) was used in our equation for the plus sign (+). Your equation gives the same solution as ours. Interest is certainly to be added, not to  $x$ , but to  $500 - x$ , as the holder of the claim does not by any terms expressed in the problem forfeit his interest on the portion of the capital which is included in the payment of \$200. Interest was paid in advance on the unpaid part only.—ED.]

Wet and Dry Air.

To the Editor of the Scientific American:

I would call your attention to question 36, on page 347, where Mr. W. McP. asks: "Before a rain the atmosphere contains moisture. The atmosphere and moisture weigh more than the atmosphere alone."

You fail in properly answering this question. Your correspondent is laboring under a misapprehension as to the real condition, dry air being heavier than that which is saturated with moisture. See table 17, page 181, of Guyot's Meteorological and Physical Tables, 1884, Smithsonian issue.

Temperature Fahrenheit.	Weight of a cubic foot of dry air in grains.	Weight of a cubic foot of saturated air.	Excess dry air.
0°	603.21 grains.	602.77 grains.	0.44 gra.
32°	563 "	561.64 "	1.36 "
60°	531.97 "	528.62 "	3.35 "
90°	502.32 "	494.23 "	8.04 "

The above shows clearly the true difference.

J. LESLIE CORBETT.

Butte City, Montana.

[We did answer the question properly. Before a rain the atmosphere may be dry or humid, and the specific gravity of the air in many cases has nothing to do with the question of the barometric height. If our readers do not know that dry air is heavier than wet air, it is not our fault, as we have treated the subject fully in our columns. See SCIENTIFIC AMERICAN, vol. 56, page 177.—ED.]

DECISIONS RELATING TO PATENTS.

U. S. Circuit Court.—Eastern District of Wisconsin. THE BUTZ THERMO-ELECTRIC REGULATOR COMPANY vs. THE JACOBS ELECTRIC COMPANY.

Jenkins, J.:

Letters patent No. 222,234, granted December 2, 1879, to Julien M. Bradford, for an improvement in electric heat and vapor governors for spinning and weaving looms, sustained, and held infringed by a second circuit breaker operating on the same principle and performing the same functions by analogous means or equivalent combinations, although the infringing machine may be an improvement on the patented invention and patentable as such.

The mere change in form or an alteration in unessential parts, or the use of known equivalent powers not varying essentially the machine or its mode of operation or organization, will not avail to avoid infringement.

It constitutes an infringement to manufacture for the purpose of use, even if not actually used.

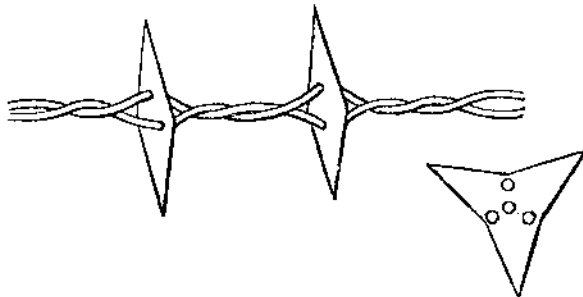
A New Ruling Pen.

An improved ruling pen, by Thomas Bennet, of Philadelphia, Pa., is made with one of its blades movable when under the finger. The pen may be set to make both light lines and heavy lines. If, in the progress of the work, heavy lines are needed, a pressure of the finger on the pen produces them. On releasing the finger, the pen returns to light lines.

THE BARBED WIRE PATENT.

It has long been known to the writer that a patent granted in France, to Louis Jannin, April 19, 1865, No. 67,867, is for a barbed wire fence, which antedates the earliest patents granted in this country for similar inventions. These United States patents were issued: to Hunt, July 23, 1867, No. 67,117; Kelly, February 11, 1868, No. 74,379; and Glidden, November 24, 1874, No. 157,124. The Washburn & Moen Manufacturing Company is the owner of these patents, and, as is well known, has repeatedly won numerous suits in the courts against infringers. A prominent decision was rendered in December, 1880, by Judges Drummond and Blodgett in the United States circuit court for the northern district of Illinois. It was here held that while natural thorns, broken glass, etc., had been used on fences to resist encroachments of animals, no one before Hunt's invention had made a "wire provided with burrs, spurs, or pricks," and that a fence made of such wires was first proposed by Hunt.

In the SCIENTIFIC AMERICAN for January 14, 1888, you call attention to a circuit court decision declaring the patent of Glidden invalid, because as early as 1859 a barbed wire fence had been publicly used. It appears that it required testimony covering some 10,000 pages of type-written matter to establish the defendants' position that the Glidden patent should be declared invalid for want of novelty. I will demonstrate by a few lines of description and a sketch that as early as June, 1865, a barbed wire fence was patented in France in the sense in which such term is understood in this country. Louis Jannin, of Fontenay-aux-Roses (near Paris), deposited a specification and drawing at the French patent office on April 19, 1865, and on June 24, 1865, the patent was delivered, and the papers were open to public inspection. From these papers, seen by me while in Paris, it appears that Jannin proposed to "string barbs on wire and then twist the same in the manner of a cord until the barbs remain fixed in place by the effects of torsion, but in cases where only one wire is pressed through the center of the barb it is fixed by solder." It is stated that the barbed wires are fastened to galvanized iron posts having earthenware bases. The subjoined sketch is



taken from the drawing of the patent, and shows sheet metal barbs.

I contend, in view of Jannin's patent, that the leading barbed wire fence patents, under which such enormous royalties were collected, never had a legal status in this country. In support of such opinion I cite the Supreme Court decision in the case of Gaylor vs. Wilder, 10 Howard, page 477, in which it was held that "a foreign patent for the same thing or a description of the thing in a foreign publication is as effectual to avoid the patent as if the patentee had seen the prior invention. Notice to him is not important."

By bringing the French patent of Jannin for the first time before the American public in your journal, I think I have shown that its disclosure years ago would have been of great benefit and made the broad idea of a barbed wire fence public property.

A. M. TANNER.

Coal.

"It may seem a 'reductio ad absurdum,'" said Professor J. S. Newberry, of Columbia College, in a recent lecture, "to attribute such mighty powers to a substance so common, so sooty, and in some ways repulsive, but a little thought will show us that it is scarcely more interesting in its practical value than in its history. Few of you have realized the magnitude and dignity of the work it is doing in the world, and fewer still have thought that it is really the sunshine of bygone ages, and that it has once composed the tissues of various strange plants, some of which are among the most graceful and beautiful of vegetable forms. Buried in the earth or covered with water, vegetable fiber decays or oxidizes slowly, forming in successive stages of decomposition peat, lignite, coal, anthracite, graphite, the hydrocarbon gases, and petroleum. By regulating and controlling the further oxidation of these we are able to utilize the resulting force as light or heat or motive power.

"To help you to realize the potency of this wonderful substance, coal, let me recall to your memories the measurements of the power evolved in its combustion. It is estimated that with the average engines now in use, about 1,500,000 foot pounds are practically evolved from the combustion of a pound of coal, and are available in the performance of any work done. Now, this is about the power exerted in a day's labor of an aver-

age man. Hence a ton of coal is capable of yielding an amount of force equivalent to that of six and two-thirds men, or of six men and a well-grown boy throughout the year. Or, the annual production of coal in this country and Great Britain is equivalent to a thousand million men working for a year."

Jugglers' Tricks—Practice as Well as Original Aptitude Required.

"I started operations when I was but six years old, playing with the eggs my mother intended for her puddings," said a juggler to a San Francisco Examiner reporter. "These I would throw in the air, catching them on a plate, always with the same result—a smash. This was really my first start. I always juggle with common things, for the simple reason that people go home and try to do it themselves. They will then find out how very difficult an apparently easy trick is. You must commence with small brass balls, making a start with a single ball in the left hand. Every throw leads you to feel the ball better. It is obvious why the start is made with the left hand. It is the more uncertain of the two, and training alone will make it as sure and safe as the right. Now, I will give you a rule for throwing knives in the air. If I have half a dozen, I propel one with just sufficient force to give it half a turn, another gets a whole turn, a third gets a turn and a half, a fourth two turns. I catch them all by the handle.

"One of the best of my many juggling feats is the egg and cannon ball. I catch first one and then the other on a plate. I learned by experience just to time the arrival of the egg on the surface of the plate, and I gather it up gently while it is falling. So it really slips on of its own accord. It is just the same with the cannon ball, though it weighs 33 pounds.

"Paul Cinquevalli is doing a very pretty trick now with a cigar and holder. After a little preliminary in the way of throwing them about, the holder suddenly drops into his mouth, the cigar finding its way into the holder shortly afterward. Then with a jerk of the head the cigar performs a double somersault, and again falls into its place in the holder. But Paul Cinquevalli told me that the most difficult trick he ever performed took him nearly two years before it was in a fit state to be introduced. It was suggested to him one night at supper. The guests insisted upon his giving them something new. So he took up his knife and fork and selected an exceptionally hard potato. He kept the three spinning in the air for some time, then suddenly cutting the potato in two, and keeping all going again until, as a finale, he caught one-half on the knife and the other on the fork. It was, as he said, an exceptionally lucky performance, for he had never attempted it before.

"I should like to tell you of a remarkable conjuring trick I saw performed while on a voyage from London to Calcutta. The conjurer was a Parsee, whom you might have taken for a respectable servant out of a place, but who was actually a small land owner who was traveling for pleasure, and had taken up conjuring as an amusement. Spreading a white cloth on the deck of the steamer, he sat down with his back resting against the companion hatch. As soon as he had settled himself, he turned to one of our fellow voyagers and asked for the loan of a rupee, which he requested should be given to one of the ladies present. The lady took it, and at the request of the conjurer looked at it and declared it to be really a rupee. The conjurer then told the lady to hand it back to the gentleman from whom he had borrowed it. The gentleman took it, and then followed the following dialogue:

"Conjurer: 'Are you sure that is a rupee?'

"Fellow Voyager: 'Yes.'

"Conjurer: 'Close your hand upon it and hold it tight. Now think of some country in Europe, but do not tell me your thought.'

"'Now open your hand,' said the juggler. 'See what you have got, and tell me if it is a coin of the country you thought of.'

"It was a f.5 piece, and our friend had thought of France. He was going to hand the coin to the Parsee, but the latter said: 'No; pass it to another sahib.' As I happened to be the nearest, the f.5 piece was handed to me. I looked closely at it, then shutting my hand, thought of America. When I opened it, I found a Mexican dollar. This I handed to the gentleman on my right, who in turn thought of Russia, and on opening his hand found a Russian silver piece in place of the Mexican dollar. The juggler performed several other tricks during the voyage, but they were of a commonplace kind, and in no way comparable to the coin trick, which I have never seen rivaled."

Why Rails in Use Rust Less Quickly than Rails at Rest.

The preservation of rails in use is not the result of vibratory motion, or of an electric action due to the passage of the trains, but to the formation of magnetic oxide, produced by the compression of the rust on the metal. The rails are thus protected against the action of moist air in the same manner as is iron oxidized by fire.—W. Spring, Bull. de la Soc. Chim. de Paris.

**One Hundred Thousand Butterflies.**

None but those who have seen a hundred thousand butterflies, each differing from the other in some particular, can have the faintest conception of the wonderful beauty of many of these most delicate creations of nature. Nothing in art can approach them in delicacy of color, or equal their exquisite coloring.

Almost the finest collection of butterflies in the world is owned and has been made by Berthold Neumoegen, of the New York Stock Exchange. Only two collections in the world can compare with it. One of these belongs to the British Museum, the other to a public institution in Paris.

Mr. Neumoegen has spent twenty years and \$35,000 in making this collection. It has been enriched by the efforts of some member of nearly every exploring expedition that has been organized during the last fifteen years. Specimens have been contributed by Livingstone, Stanley, Schwatka, and members of the Greely relief expedition. Gorgeously hued victims from the Victoria-Nyanza to Lady Franklin's Bay, from Borneo to Labrador, from Cape Colony to Kamtchatka, and, in fact, from every country between "Greenland's icy mountains and Africa's coral strand," are crowded into this army of 100,000 strong.

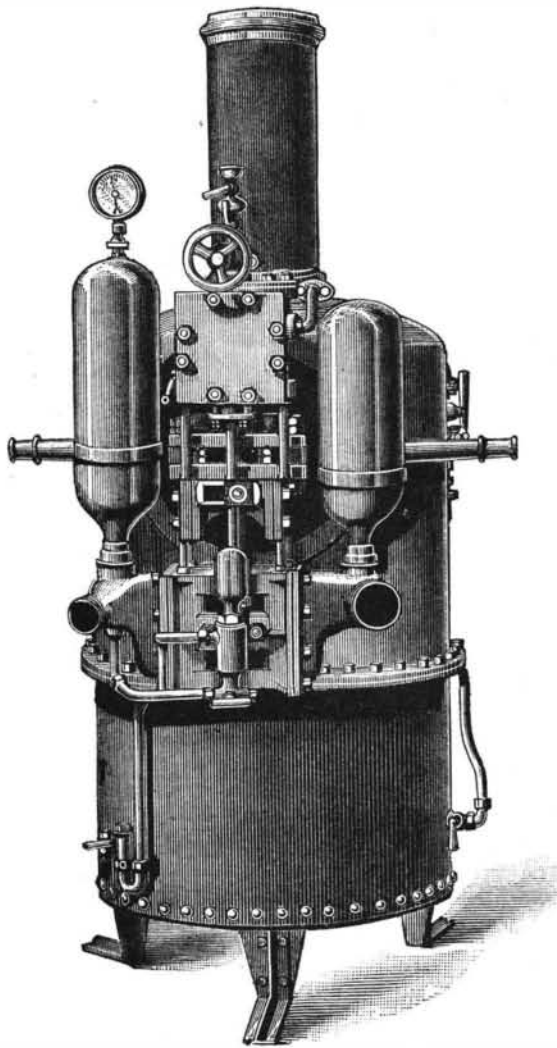
To every specimen is attached a card, giving its name, sex, family, and the name of its discoverer. Several new butterflies have been named after this enthusiastic collector.—*Agassiz Companion.*

**How True It Is.**

You can get all the opinion you want on both sides of a question nowadays. Oatmeal had not long ago been reported to be a healthful food, when some physician arose to deny it and to assert that it produced dyspepsia. Allowance is always to be made in such a question for the variations of human stomachs and constitutions, so that what may be a good food for one person may not be for another. The truth about oatmeal for the generality of persons (and they are the only persons you can speak for) is that, if it is eaten in only a partially cooked condition, it is not healthful; and neither is flour, corn meal, and many other articles of food. Indigestion and acidity of stomach are caused for some people by the eating of sugar or other sweets on oatmeal, and they get the same effect if they eat these sweets on rice or bread. Cream, too, may be too much fat for a sensitive stomach if put on oatmeal. In these cases it is not the oatmeal, but either its insufficient preparation or the addition of an improper food that causes the stomach trouble. If a person will eat a moderate amount of oatmeal, cooked and prepared as his needs may demand, there can be no question that it is healthful, digestible, and highly nutritious.—*Good Housekeeping.*

**A HAND CART STEAM FIRE ENGINE.**

The little machine we illustrate has been brought out by the Sphincter Grip Hose Company, of London, and is described in the *Engineer*. It consists of a little



HAND CART FIRE ENGINE.

steam pump of the drag-link type, mounted on a vertical cross-tube boiler of the standard description. All the parts usually made of gun metal or brass in the best practice are here of gun metal or brass. The entire machine in all its details is exceedingly well got up. This we can assert as the result of personal inspection; nothing has been left undone to make this little machine efficient and trustworthy.

It is conveyed to a fire on an ingenious hand carriage

with high wheels. It is carried between the wheels, as shown, by trunnions. When it has arrived at a fire the carriage is removed, by taking out two pins, which permits the trunnions to slip out of their bearings in the carriage, which is then wheeled away, and the engine then stands on three supports, as shown in the detached view. It is then used like any other fire engine, and will throw a powerful  $\frac{3}{4}$  in. jet. The boiler pressure is 100 lb. on the square inch, and steam can be got up in seven minutes from cold water.

It might be supposed that the engine would be unsteady when put down to stand on three legs, so to speak, in the street; but we are assured that this is not the case, and that no trouble is experienced from this cause. The engine will do much more work than a manual driven by thirty men, and at much less cost. It appears to us to meet a want in a very satisfactory manner.

**Electric Prostration.**

New conditions develop new diseases.

The "railway spine" has taken its place in medical nomenclature, and the "caisson disease" has also been recognized. Now a third has been added to the list, in a condition which has received the name of "electric prostration."

This is a disorder, says the *Medical Era*, of Chicago, that affects those who work under strong electric lights. After an exposure of one or two hours the workers have a painful sensation in the throat, face, and temples, the skin becomes of a coppery-red color, there is irritation of the eyes, with profuse lachrymation, lasting forty-eight hours. After five days there is desquamation of the discolored skin.

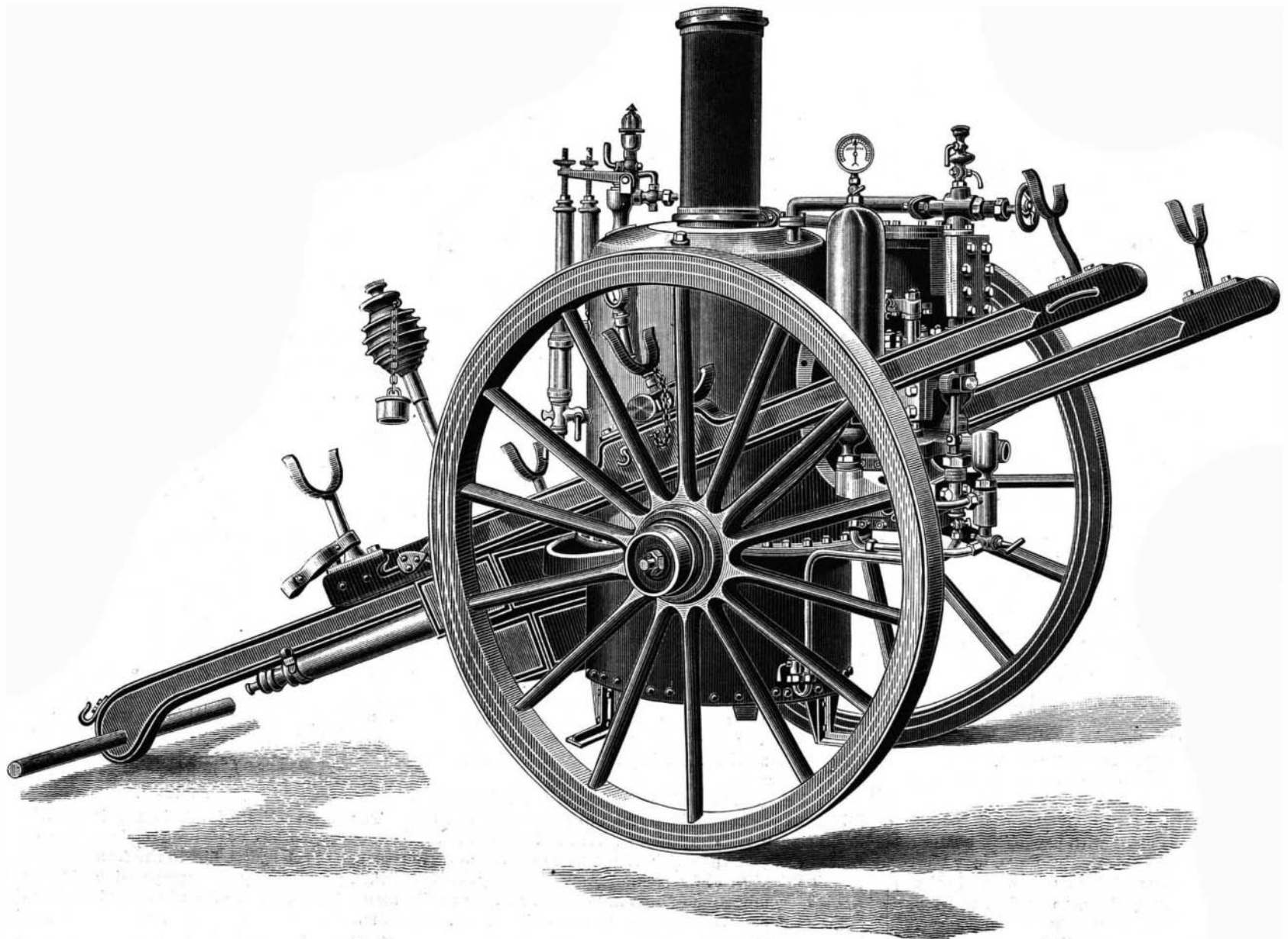
These symptoms do not follow exposure to the ordinary Edison light, but to one of excessive strength, such as is used in electric furnaces for the quick heating of metals. Some mitigation of the symptoms may be procured by the use of dark colored glasses, but not entire immunity. The effects seem to follow exposure, not to the heat, which is not great, but to the intensely brilliant light.

Thus has a new industry created a new disease, for which the profession will be called upon to find a remedy.

**Curiosities of the Phonograph.**

Subscribers to whom are rented machines can have left at their door every morning the waxy tablets known as phonograms, which can be wrapped about a cylinder and used in the phonograph.

On these tablets will be impressed from the clear voice of a good talker a condensation of the best news of the day, which the subscribers can have talked back at them as they sit at their breakfast tables.



HAND CART STEAM FIRE ENGINE.