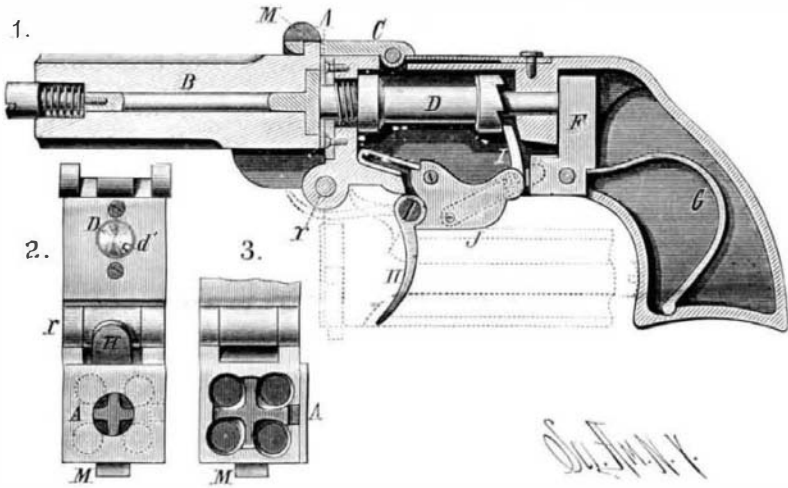


**A Portable Leclanche Pile.**

Mr. C. M. Gavill has recently presented to the Physical Society, in the name of Mr. Guerin, a pile whose liquids have been rendered immovable, and which is as a consequence portable. This result has been obtained by substituting for water a solution of agar-agar, an alga that comes from the extreme East. The

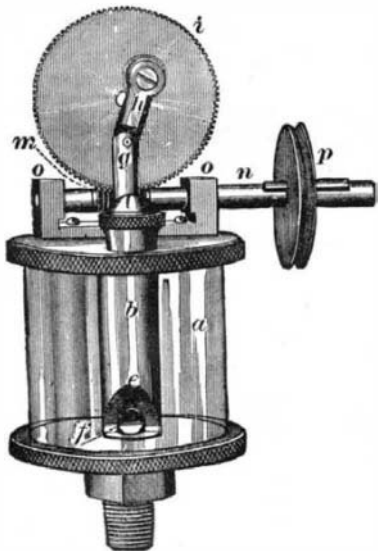


CHUCHU'S REPEATING FIREARM.

liquid upon cooling becomes a solid and elastic jelly. The proportion of agar-agar may vary from one to five per cent, and depends upon the substances that are to be mixed with liquid. The model that Mr. Guerin has studied is the agglomerate Leclanche pile. Its electromotive force is slightly less (0.03 to 0.04 volt) than that of the ordinary styles of the pile. The resistance of one of these elements of medium dimensions is about 0.9 ohm. The same process may be applied to any other pile.—*La Nature*.

**OILER FOR ECCENTRICS, CRANKS, ETC.**

This oiler may be applied to eccentrics, cranks, cross-heads, dynamos, and all other stationary or moving bearings; the one shown in the cut is for a stationary



MERSHON'S IMPROVED OILER.

bearing, and is operated by a band from the pulley to shaft. Its operation may be easily understood from the engraving, which clearly shows the construction. It works automatically, and when the machine stops it is impossible for the oil to run to waste. The feed is positive and regular, and the flow is increased or diminished by the speed of the machine. It can be easily attached, and when once in position and adjusted it requires no attention except to fill, and, having glass sides, the amount of oil in the cup can be seen. The parts are few, and not liable to get out of order.

Further particulars can be had from Mr. S. D. Mershon, 95 Campbell Street, Rahway, N. J., or the Shelton Brass Hardware Company, of Birmingham, Conn.

**REPEATING FIREARM.**

The invention herewith illustrated relates to repeating firearms, and more particularly to pistols having several barrels. The pistol occupies very little space in the pocket, as the barrels may be folded underneath the stock, and by reason of the multiplicity of barrels it presents the same advantages as the revolver at present in use. The four barrels are formed of a single piece of metal having four bores; this piece is provided, near its point of articulation with the stock, with a hinged cover plate, A, which can be turned around upon the rear end of the piece, so as to prevent the cartridges falling out when the pistol is folded, as shown by the dotted lines in Fig. 1. In the center of the barrel piece is an extractor rod, B, provided at its outer end with a spiral spring, which tends to hold the star-shaped opposite end in a recess in the rear end of the barrel piece; the star is properly recessed to receive the rim of the cartridge. By pressing upon the extremity of the rod, the star can at will be removed from the recess. When the pistol is in use, the barrel is held to the stock by a lug, M, engaging with a slot formed in a catch, C, pivoted to the stock. A spring holds the catch horizontally in such a way that in order to break down the pistol it is necessary to lift the free end of the catch, to release it from the lug. In the stock is a movable firing pin, D, having a firing point or striker at its forward end. By pressing upon the trigger, H, a pivoted piece, J, acts upon the hammer, F, so as to draw it back, the firing pin being retracted by its own spiral spring. When this pressure upon the trigger is discontinued, the mainspring, G, which has been bent by the movement of the hammer, unbends, drives the hammer forward, when the firing point strikes a cartridge in one of the barrels. Each time the trigger is pulled it actuates a pawl, I, which revolves the firing pin a quarter of a turn, to bring the firing point opposite the barrel next to that in which the cartridge has been fired. When the pressure upon the trigger is relaxed, a compressed spring forces it back to its original position. Fig. 2 is a front end view of the pistol folded, and Fig. 3 is the same view with the covering plate open.

This invention has been patented by Mr. Athanase Chuchu, whose address is care of H. H. Swift & Co., P. O. box 3399, New York city.

**IMPROVED ENGINE GOVERNOR.**

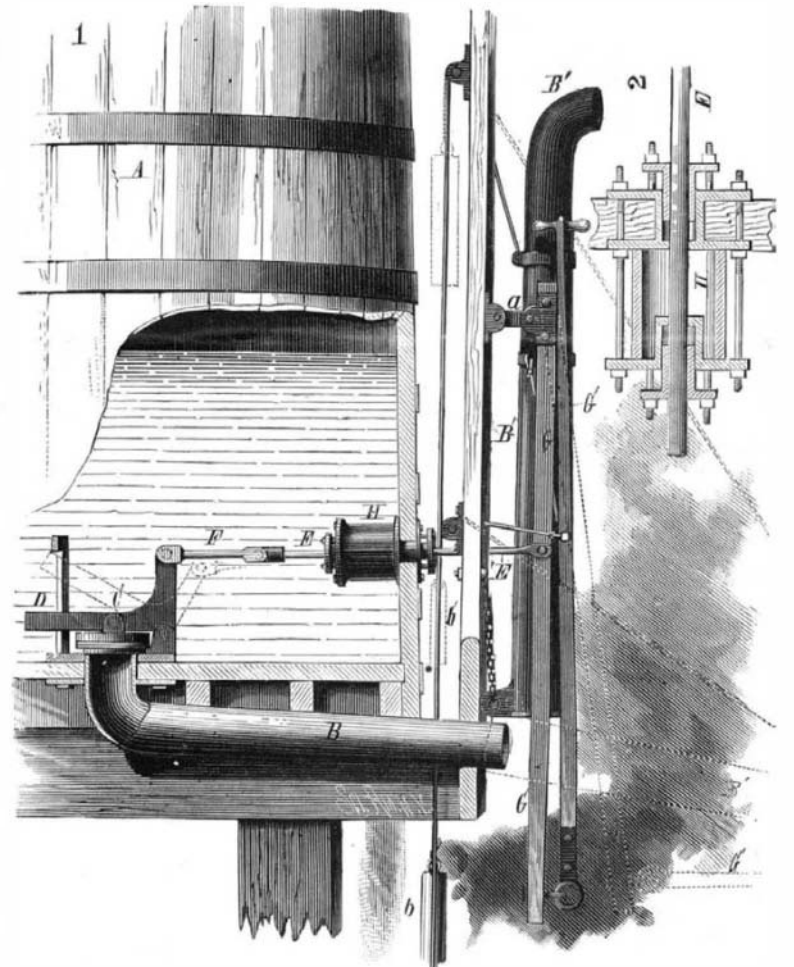
The governor shown in the cut is remarkable for quickness of action on the slightest variation in the speed of the engine. Two saucer-shaped shells, or hollow disks, fitted with curved blades, work face to face in a casing filled with water; one of these turbines is driven by the engine, and the other oscillates and works the throttle valve. In the engraving, the right hand figure shows the casing attached to the part of the steam pipe containing the throttle valve, and the oscillating turbine in its working position; the middle figure shows the revolving turbine removed, along with the casing cover, through which its axle works; to the left hand is shown a face view of the governor. The water in the revolving disk or turbine is thrown out-

ward, forward, and sideways into the oscillating disk. The blades in the latter deflect the currents from an outward and forward direction into an inward and backward direction, and send the water back into the revolving disk. The reversing of the motion of the water by the blades of the oscillating disk gives it a tendency to revolve in the same direction as the other disk; this tendency is resisted by a chain attached to a pulley on the disk until the strain on the chain is sufficient to lift a balance weight, which keeps the throttle valve open. When that strain is exceeded it shuts the throttle, and when it falls short the weight opens it. It is claimed that by this arrangement a comparatively small velocity of the disk is required to get up much greater power than with any centrifugal arrangement; a sudden increase in the velocity produces an almost instantaneous action on the throttle, so that the whole load may be suddenly taken off the engine without any danger of running away. The durability of the apparatus is assured, since almost the only wearing part is the spindle of the revolving disk, upon which there is no strain.

All further particulars concerning this governor, which has been most successfully used in Great Britain, can be obtained from Messrs. Napier Brothers, Windlass Engine Works, Glasgow, Scotland.

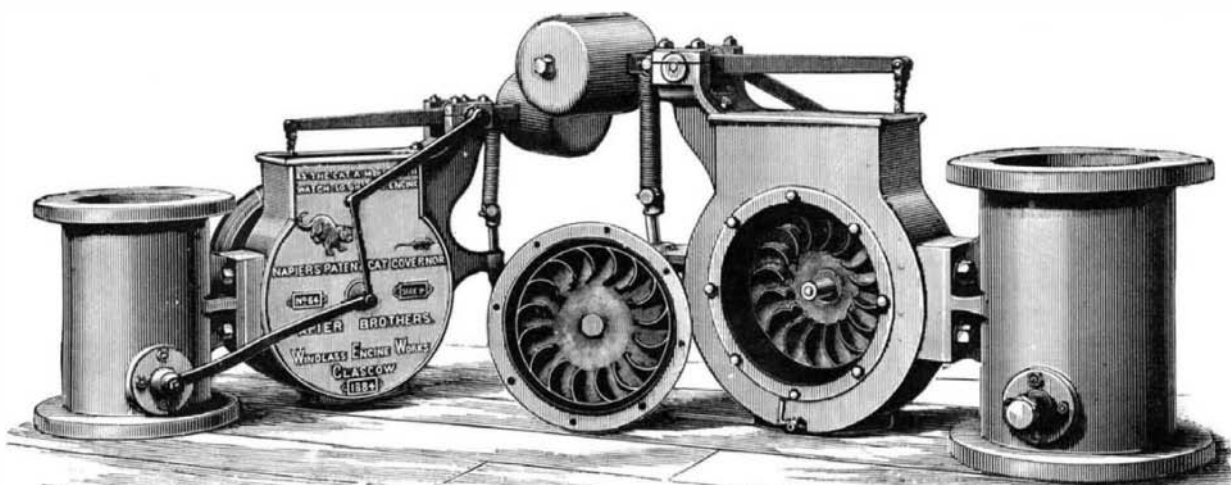
**RAILWAY WATER TANK.**

In the Northwestern States much trouble has been caused during the past few years by the freezing of the railway water tanks—a tank half full of solid ice has been a by no means uncommon occurrence. The engraving represents a water tank, the invention of Mr. Albert Roberts, of Marion, Ia., Supt. Water Supply of the C., M. & St. P. Railway, designed especially to



ROBERTS' RAILWAY WATER TANK.

overcome this difficulty. The arrangement for opening the valve is simple, convenient to work, and not liable to freeze up; all the parts of the tank are out of the way of passing trains. In the bottom of the tank, which is not unlike those in common use, is fitted the outlet pipe, B, adapted to connect with the swinging pipe, B', in the usual way. Over the inner opening of the pipe is a valve or gate, arranged to lift on a lateral pivot by means of the bell crank, D, to the horizontal arm of which the valve is attached. The rod, E, is connected with the vertical arm of the crank by the rod, F, and, passing through the side of the tank, may be moved back and forth by the pivoted lever, G. In order to bring this lever within reach of the operator from the tender, it is provided with a hinged bar, G', adapted to swing up and down with the sway spout. The short connecting rod, a, permits the necessary variation in position as the valve is moved. The lower end of the lever is some distance below the outlet pipe, so that when the spout is lowered to the position indicated by the dotted lines it is about level with the end of the spout, and the handle bar is horizontal, rendering the operation of the lever and its connections easy. The spout and lever may be connected by a chain, as shown. When the spout is elevated, the chain is drawn taut, and the handle bar is thereby held



THE "CAT" ENGINE GOVERNOR.

in a vertical position; but when lowered, the chain is slack, allowing the handle to be drawn outward.

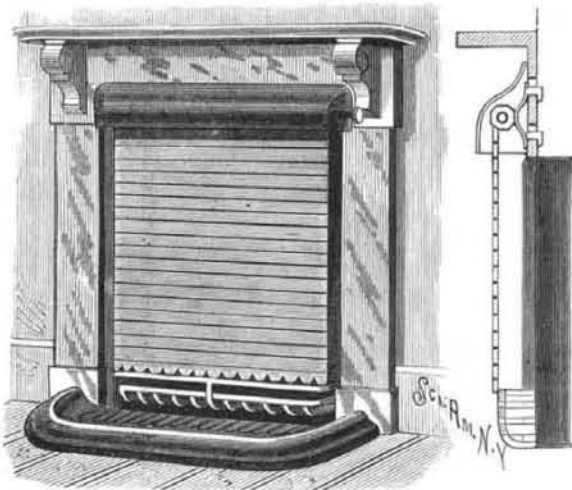
This construction, it will be seen, admits of the valve being forcibly closed as well as opened. To render the movement of the spout and handle bar as easy as possible, and to hold them at any desired angle, the counterweights, *b*, are provided. In some of the ordinary railway tanks, the chain which raises the valve is exposed to the liability of being frozen fast, and the tank rendered useless until the ice is cut away. This invention obviates the difficulty by passing the rod which actuates the valve through a chamber, *H*, provided with suitable stuffing boxes, and attached to the inside of the tank near the bottom. This chamber is made long enough to extend inward beyond the limits of frost, and is filled with common black oil, which serves to lubricate the valve rod, and thereby the better prevent any accumulation of ice on the parts extending beyond the stuffing boxes. The chamber is preferably made of wood, and is quite simple in construction, as will be seen from the drawing. The tank may be so arranged as to receive water directly on the valve, which may be further protected against frost by a sawdust box placed immediately beneath it.

#### Bad Effect of Cement on Iron.

A few days ago, says the *Sanitary News* of Chicago, a large water pipe on the fourth floor of the government building, this city, burst, flooding the floor and badly damaging the ceiling of the third floor. It is thought that it was caused by the cement hardening, together with the jars caused by the workmen while repairing other parts of the work. In relaying the tiles on the floor, it has been found necessary to replace much of the iron gas pipe with galvanized iron pipe, as the iron pipe has almost rusted away, while the galvanized pipe that was put in about nine years ago is almost as good as it was then, showing to advantage the lasting qualities of galvanized iron as compared with iron pipe when embedded in cement. As the cement is so injurious, the pipe is being either incased in boxes or laid in gravel.

#### FIREPLACE ATTACHMENT.

This attachment can be applied to the front of a fireplace, to serve as a blower to regulate the draught, and to answer the purpose of a summer front. Two brackets are held upon the mantel by hooks that enter slots made at each side of the fireplace. To a roller journaled in the brackets is secured the upper end of a screen formed of metal slats connected together by links, or hinged to each other. One end of the roller is prolonged and provided with a handle or knob, by which it may be turned, and between the handle and bracket is a polygonal wheel, which is pressed by a spring, as shown in the sectional view; the pressure of the spring keeps the roller in any position. A sheet metal cover, secured to the mantel, inclosed the brackets and roller. By turning the roller the screen may be raised so as to entirely open the fireplace, or it may be lowered so as to entirely close it, when it will act as a blower or as a summer front. It may also be placed at any desired height, to regulate the draught of the



DICKINSON'S FIREPLACE ATTACHMENT.

chimney and to prevent smoke entering the apartment.

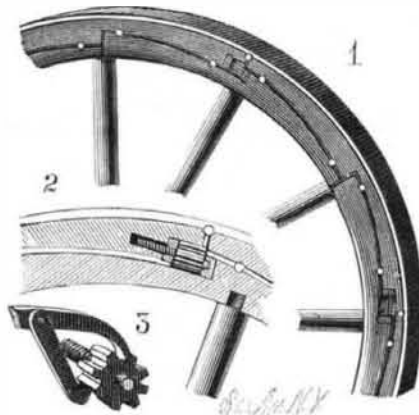
This invention has been patented by Mr. Thomas W. Dickinson, of Sharon, Pa.

#### Legislating against Thistles.

The recent Indiana Legislature enacted that any person knowingly allowing Canada thistles to grow and mature upon his land, or land under his charge, shall be fined not less than five nor more than twenty dollars; and for the second and each subsequent offense, double the amount of the first fine. Supervisors of the highways of the State who allow thistles to grow on any road in their districts are subject to like penalties; as are also road masters of railway lines who allow the pests to grow about stations or along the right of way under their supervision. This is a wise law, and worthy of enactment in other States.

#### TIRE TIGHTENER.

The rim of the wheel is formed of a series of two sets of felly sections, the sections of each set all being of the same shape and size. The outer edge of each outer section is curved on the radius of the wheel, and the inner edge has two concave curves forming a shoulder at the middle, as shown in Fig. 1. The inner edge of each inner section is formed to fit the corresponding edge of the outer section. The rim of the wheel is so made that the inner edges of both sections are in contact, and the sections are arranged so as to break joints. On the shoulder of each inner section is a metal plate, into which one end of a screw spindle passes, the other end passing through a nut in the adjacent end of the outer section and into a hole in the end of the section, as shown in Fig. 2. Between



POWERS' TIRE TIGHTENER.

the nut and plate the spindle is formed with a ribbed head. The tire is held in place by rivets placed between the sections and between the tire and rim of the wheel. By means of the tool, Fig. 3, the spindle may be turned to press the ends of the outer sections more or less from each other, thereby increasing the circumference of the wheel at the outer edges of the rim, and tightening the tire. This invention has been patented by Mr. Emory R. Powers, of Paradise, California.

#### Decay of the Obelisk at Central Park, New York.

Cleopatra's Needle, the Egyptian obelisk at Central Park, is found to be rapidly crumbling away under the influence of our American climate. For 4,000 years the needle suffered comparatively little change in the dry, warm air of Egypt, but though it has been in America only five years, there are already unmistakable signs of its serious decay. Fragments of stone are found scattered at the base of the needle, and flakes an inch or more in length can readily be picked off with the fingers. On the eastern side of the monolith there is a fissure three feet in length and sufficiently wide to admit the insertion of a knife blade for a distance of two or three inches. A finer crevice extends to a much greater depth. The vein containing the fissure can be traced to the south and west sides. Should this large fragment split off, the obelisk would undoubtedly fall.

These indications have led the Park Board to consider means for its artificial preservation. Prof. Doremus strongly recommends the use of paraffine, which is not affected by the atmosphere and has the advantage of being impervious to moisture. The stone would be warmed at its surface, in order that it should absorb the melted paraffine more readily. This treatment would make the stone somewhat darker, but brighter and nearer the color of the original syenite. It is thought that it would prevent further decay. Prof. Egleston, of Columbia College, favors the use of boiled linseed oil, as giving a better protection even than paraffine. The corresponding needle, erected on the Thames embankment, London, has undergone a similar deterioration, and artificial protection was found necessary. In this case a liquid was used composed of a solution of dammar resin in a volatile hydrocarbon, with a small quantity of wax and a still smaller quantity of corrosive sublimate added. Prof. Crookes, the great English chemist, is, however, quoted as preferring paraffine to dammar resin. Prof. Chandler, on the other hand, regards the proposed method of heating the obelisk by means of charcoal furnaces, so that it shall absorb a larger amount of paraffine, as one of unquestionable danger. The expansive action of heat is liable to cause cracks and fissures, which would leave the stone in a more injured condition than before the treatment. It is evident that much caution will be necessary, and that a preliminary trial should be made before the obelisk itself is subjected to any process. It was proposed some time ago to inclose the entire monolith in glass, and though that method would have given rather a clumsy result, it would have been far preferable to the loss, or deterioration of so interesting a relic. The decay of even our native building stones has shown our climate to be particularly trying to all exterior masonry, and has called the attention of architects and engineers to the necessity of some artificial preservative. There are many substances which have been tried

for this purpose, and have been found more or less effective, but opinions differ considerably as to which is the best for general use, and which method of application gives the most satisfactory results.

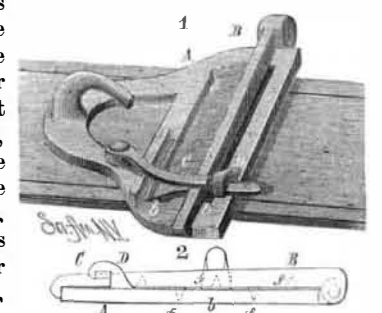
Many of our readers have doubtless given some attention to this subject, and have perhaps been able to collect information in regard to actual experiments which have come under their notice. We should be glad to hear from them, and to have them suggest a practical method for the preservation of the obelisk.

#### The Magnesium Light.

Magnesium, which has more than once been abandoned as a source of light, appears about to be employed again. A Mr. Graetzel has succeeded in producing pure magnesium by electrolysis, and at a price much less than that at which it has hitherto been sold. So there are serious thoughts of using it for lighting purposes. The Bremen aluminum and magnesium manufactory that is working the Graetzel process has just offered two prizes for magnesium lamps with clockwork movement. Five hundred and two hundred marks (\$125 and \$50) will be awarded to the constructor whose lamps shall be adjudged the best and most practical. The Bremen manufactory reserves to itself the right of working the two systems that are rewarded. —*La Nature*.

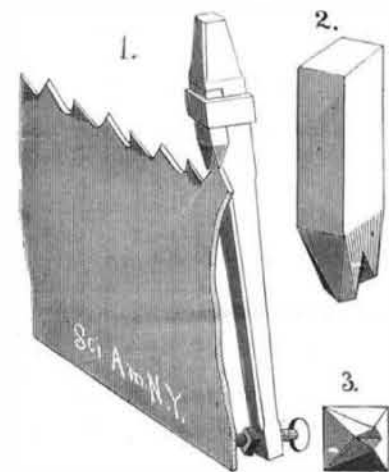
#### HOOKE BUCKLE.

The frame, *A*, of the buckle is formed at one end with a hook, and at the other end is slotted to form cross bars. The central bar is formed with points, *f*, to retain the strap, *C*, which is passed through the slots, as shown in the engraving. A bar or lever, *B*, is hinged at one end to the frame, so that it may be closed over in line with the forward slot, and locked in this position by a lever pivoted to the frame, and adapted to be turned over the end of the bar and held by a hook, *b*, formed on the frame. The hinged bar is formed with teeth, *f*, to hold the strap, to which the buckle may be applied. A lug on the free end of the bar, *B*, enters a notch in the frame, thus preventing lateral movement of the bar. This buckle, the invention of Mr. Victor Berthelot, of Cannon Store, La., may be cheaply made, and can be easily shifted upon the strap.



#### IMPROVED SAW SET.

Fig. 1 shows the saw set applied to the blade of the saw, and Figs. 2 and 3 show the detachable die. The steel stock or bar is formed at one end with a slightly tapered head, below which is a notch in one edge. In the lower end of the die, which is held in the recess in the stock by a wedge band, is a notch inclined from the inner edge downward toward the middle of the lower end, the sides of the notch being beveled. The lower



MARSH'S IMPROVED SAW SET.

end of the recess for receiving the die is inclined outward. The saw to be set is held in a horizontal position in a vise; the saw set is placed on that side of the saw opposite the bevel of the tooth to be set, in such a manner that the point of the tooth passes into the notch in the end of the die, the point of the screw passing through the lower end of the stock resting against the blade. A blow is then delivered on the head of the stock, whereby the point of the tooth is pressed over by the die. By means of the screw, which is provided with a locking nut, the inclination of the stock to the saw can be governed, and the desired set given to the teeth; as the inclination of the stock to the saw increases, the set given to the teeth decreases. The device is convenient to handle, reliable, and not liable to get out of repair.

This invention has been patented by Mr. Gideon Marsh, of Mancelona, Mich.