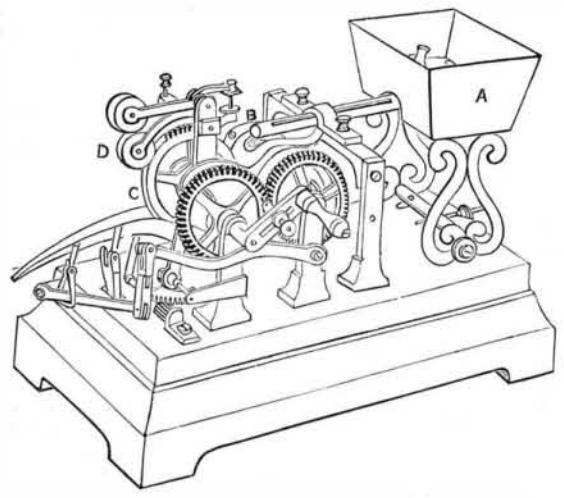
FRENCH PILL PRINTING MACHINE.

The engraving shows a pill printing machine invented by M. Vial, of Paris. The pills, first coated, are placed in the hopper, A, and are conducted thence, one by one, along a small groove to B, where they drop through a cylinder to another groove. At a certain point in their passage they are brought in contact with a wheel, C, which is being turned by the operator. On the outer rim of the wheel the type is fixed, it is inked from little rubber cylinders, D, as it revolves, and the pill meets the wheel just as the type approaches. It receives the impression in beautifully clear characters, and is henceforth unmistakable as to its properties, no matter in what company it may ultimately find itself.



PILL PRINTING MACHINE.

A Model Foreman.

The following, from the *Manufacturer and Builder*, contains not only good advice to the class of persons to whom it is addressed, and to which they will do well to heed, but to the manufacturer it suggests some of the qualifications a foreman should possess to insure harmony and good feeling among the workmen:

He will not discharge a good workman for a slight offense, and retain the poorest men. A good foreman (instead of giving his order to a man verbally and imperfectly) will always carry a sketch block or pad in his pocket, and where drawings are not used, will give his orders on paper, together with a rough pencil sketch if required. He should then require the workmen to file away those orders, thus putting him in the possession of the necessary evidence to defend himself in case there should be any fault with the work when completed.

A foreman should realize that his workmen are entitled to his respect, and he should conduct himself in such a manner that when he moves about among his men they will feel in duty bound to show him all the courtesy which pertains to his position. His personal habits should be such as may with profit be imitated by every man in the shop. If a workman gets into trouble over a piece of work, a kind and sympathetic foreman will always help such a person out of his difficulty.

It is wise for a foreman to employ only the best language toward his men, for the use of profanity not only creates an enmity between the foreman and the workman, but also destroys the ambition and interest which the latter should always manifest in his work.

A foreman should be systematic, and wherever a standard or a certain routine can be applied to any branch of the work it should be done. Tools, instead of being left scattered over the floor, should each have a particular place. Thus, both the foreman and workman are saved the aggravating annoyance of searching for these tools.

When a piece of work is given to a mechanic he should always be allowed to finish it, for one of the most disagreeable things, and also one of the most humiliating to the workman, is to commence a piece of work and then have the foreman to take it to some one else to finish.

Finally, a model foreman should endeavor to make himself so useful to his employers that they cannot well do without him, taking the same interest in managing the shop and studying economy with as much care as if his own capital were invested in the business. The manufacturing world are looking for artisans of this kind, and any person who has followed the opposite plan will, by adopting the principles herewith outlined, be agreeably surprised in a short time that he can make progress with so much greater satisfaction to himself than ever before.

A Novel Horseshoe.

A Berlin manufacturer is making a horseshoe of iron and hemp that is receiving considerable favor among the Germans. The shoe is of malleable iron carrying a deep wide groove, into which tarred hemp rope is firmly wedged. The rope is so thick that it protrudes beyond the rim of iron. The shoe is very light, and is said to be serviceable.

A Large Ingot of Steel.

There was cast recently at the Norway Iron Works, South Boston, an ingot of steel 10 feet 4 inches long, 24 inches square at one end, and 26 inches square at the other. It weighed 19,000 pounds, exceeding by some 9,000 pounds the largest casting of the sort previously made. The mould, which was of cast iron and weighed 13,700 pounds, was constructed by the Bridgewater Iron Company. The ingot is to form a part of a pumping engine now being made by the Bridgewater Company for the Calumet and Hecla Mining Company.

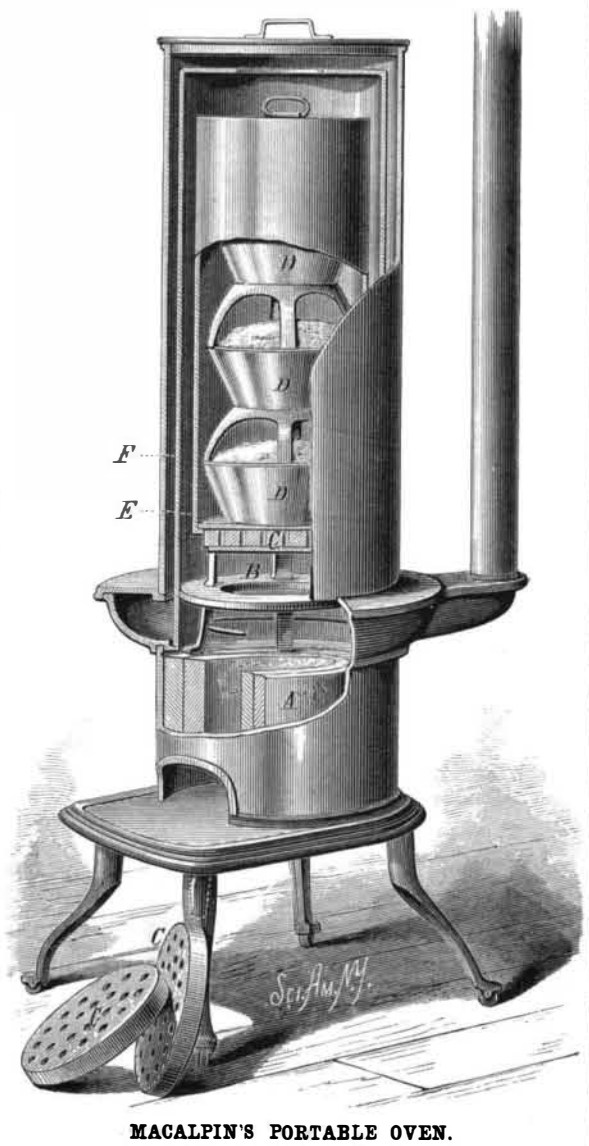
NEW PORTABLE OVEN.

It is generally admitted that for some culinary operations the ordinary cook-stove and range are neither effective nor economical, and it has been determined by actual experiment that in the matter of baking, ordinary stoves are wasteful of both fuel and time.

The new portable oven shown in the engraving is designed to be used in connection with an ordinary portable furnace, and is not only capable of baking with a small amount of fuel, but it also prevents the dissemination of odors from the articles being cooked. The inventor contracts the fire pot of an ordinary portable furnace by inserting an extra lining, A, of fire brick; this serves the double purpose of materially reducing the fire space and of preventing the radiation of heat into the room—a very desirable feature in warm weather.

The top plate of the furnace has the usual opening for the reception of cooking vessels. To this opening is fitted a cylindrical casing, closed at the top by a removable cap, and to a flange surrounding the upper edge of the fire pot is fitted a cylinder concentric with the outer cylinder, forming between the two a flue, F. The inner cylinder has a central opening at the top, so that the products of combustion may pass upward in the inner cylinder, and downward in the flue, F, to the chimney flue.

An annular plate, B, and a plate, C, of refractory material are supported by legs which rest on the fire brick, A. The pans, D, which contain the dough, are supported one above another on the plate, C, the several pans are separated by light frames, and they are all inclosed by a cylindrical casing which rests upon the plate. C. By this arrangement the full effects of the fresh products of combustion is utilized in heating the inner casing and its contents, there being very little loss of heat by radiation, owing to the fact that the products of combustion, which pass upward around the inner casing, descending the flue, F, form an effectual air-jacket which prevents the chilling of the oven.



MACALPIN'S PORTABLE OVEN.

The design of the inventor is to concentrate and make use of all of the heat from the fire, so that none of it shall pass up the chimney and be wasted, and at the same time to have such control of it as to permit more or less of it to escape into the room as may be desired, and to carry off all offensive odors and smoke which commonly escape into the room when cooking is done in the usual way. Either coal or gas may be used as fuel. The oven is made in different sizes, large ones being made for hotels and bakeries.

The oven is raised from the furnace by cords or chains passing over pulleys in the ceiling, with counterbalance weights at the end.

These ovens may be adapted to broiling, frying, or cake making. We are informed by the inventor that a loaf of bread weighing two pounds two ounces has been baked in one of these ovens in thirty-two minutes, and that eight and a half pounds of bread can be baked in the same length of time.

This invention was recently patented by Mr. Daniel MacAlpin, 2041 Ridge avenue, Philadelphia, Pa., who should be addressed for further information.

HENS' WIRE NESTS.

It is a well known fact that straw or hay nests or basket nets for setting hens cannot be kept free of vermin. The

IMPROVED HEN'S NEST.

annexed, illustration, which we take from the *Leipziger Illustrirte Zeitung*, shows a very practical and simple nest. It is made of wire netting, and is filled with hay or straw, which can be removed and replaced with fresh material very conveniently. As the air can circulate through the nest quite freely vermin are not apt to infest the nest. It is also stated that it is well to pour petroluum on the bars or rods of a chicken coop so that the petroleum will spread on the feet of the fowls, so that when they scratch themselves they will bring the petroleum in contact with the body, dispersing the vermin.

Railway Ties and Telegraph Poles.

But few people comparatively have any idea of the amount of timber used in the construction of a single railroad. We hear that our forests are rapidly disappearing, and we know that material for building and fuel causes the sacrifice of many leafy monarchs of the forest; yet only the initiated knows that it yearly takes 200,000 acres of forests to supply cross-ties for the railroads of the United States. We interviewed a gentleman who has been in the business for thirteen years, and concluding that his observations and experience would be of interest, we give the substance of his talk: It takes 15,000,000 ties to supply the demand on our railroads, for which, on an average, the contractors get 35 cents apiece, making in the aggregate $5,250,000. In building a new road the contractors figure on 2,700 ties to the mile, while it takes 300 ties to the mile to keep a constructed road in repair. Contractors, of course, buy pieces of timber land as near to the proposed line of road as possible, paying for the timber an average of $20 per acre, or giving the proprietor of the land 10 cents for every tie got out. The average of a good piece of timber land is 200 trees to the acre and 12 ties to the tree.

The size of a cross-tie differs on different roads, but the usual size demanded is 8 feet 6 inches long and 8 inches face. White or burr oak is considered the best timber for the purpose, although cherry, maple, ash, and even locust have been used. The last named were first used on the Little Miami Railroad, and after a time thrown aside as unfit for the purpose. Railroad men much prefer ties hewn out with an ax to those sawed in a mill, and many contend that the first named will considerably outlast the sawed ties. This theory is probably a fallacy, as sawed ties have been placed alongside of hewn ties, and remained sound twice as long. This business gives employment to an army of choppers, who are paid 10 cents apiece for each tie. A continued practice makes the choppers expert in the use of the ax, and a single man has been known to get out 35 ties in a day; yet the average is only 10, while an expert will probably get out 20. During the war, when ties sold at from 50 to 65 cents, choppers were paid 12½ cents apiece. Although the contractor gets 35 cents apiece from the railroads for each tie, still there is a loss of from 5 to 7 per cent on dockage and stealage. An inspector is sent by the company to inspect the ties. This is generally a clerk from some of the offices, who frequently knows but little as regards the strength or durability of timber, and, as a consequence, some of the best ties are docked and only bring 20 cents apiece. The stealage is where the section men put in new ties which have not been inspected and received, and fail to report the use of the same to the roadmaster.

Most all cross-tie men also contract for bridge timbers and trestling, as well as telegraph poles. For the latter chestnut and cedar are mostly used. They bring about $1.75 apiece, and are cut mostly in the tamarac swamps of Michigan and the forests of Southern Kentucky and Tennessee. Large sums of money have been made by lucky contractors above

described, and each only adds to increased demands. Ohio has over 4,000,000 acres wood land, yet the ever-increasing demand for railroad purposes alone, if supplied entirely from our forests, would leave us without a single stick to mark the existence of our once dense forests.—*Cincinnati Commercial.*

Adulterations of Carpet Yarns.

The use of cow hair, buffalo hair, camel's hair, and Russia cattle hair for the adulteration of wool is becoming a recognized business. It is claimed that these hairs are excellent substitutes for wool, and not only cheaper, but fully as durable.

We have records of its use at different eras in the world's industrial record, but as frequently as it has been employed so frequently has it been relegated again to the qualification of mattress and sofa stuffings. For some years, however, it has been employed by many carpet manufacturers to be worked into the yarns.

It is gathered in large quantities, and brought to this market for use in carpets at the rate of fully twenty million pounds per year. How much is made up in other fabrics we are unable to state. The hair is invariably taken from the hide at the tanner's, by means of a process termed "sweating," and is not clipped, as is the popular supposition. The hides are soaked in vats for from three to five days. They are then stretched on beams or stands, with arched surfaces, thus, ⌒, and then rubbed with a *sciver*, or scraper. The hair is easily susceptible to this proceeding, and peels off. It is next washed and baled. The hair is brought mostly from the West, though considerable "cattle hair" (called Russian cattle hair) comes from Europe. About four million pounds are imported to New York and Philadelphia annually, and used in the manufacture of blankets, cloakings, and carpets.

Buffalo hair is also used, though there is not so much coming into the market now as formerly, owing to the law having prohibited the slaughter of the animal for fear of the utter extermination of its breed. Two million pounds will cover the amount worked into carpets per annum. And again we find camel's hair used. We conversed with one dealer recently who assured us that he had sold over four hundred thousand pounds of the stuff during the past four months. This, like all such matter, is incorporated with other material—wool, shoddy, etc.—before spun into yarn.

Of the various hairs incorporated with wool textures, cow hair is the most common. When received in its rough state from the West, in bales, it is, *first*, washed; *second*, put through a picker, which eradicates all impurities; *third*, it is spread on an "apron," in quantities according to the intentions of the manufacturer, and the proportions of wool and shoddy are likewise selected and mixed with the hair; *fourth*, from the apron, the hair, shoddy, and wool are worked off (by a tender—usually a young girl—who mixes the selections) on to a carding machine, which mixes the properties evenly. It is then spun. The same process is applicable to all other kinds of hair.

The red cow hair is sold for about two and one-half to three and one-half cents per pound, and refuse light colorings; the *white* brings from eight to twelve cents per pound.

The Russia cattle hair costs more, the prices for which are: Russia cattle hair (red), four cents; Russia cattle hair (white), twelve cents. This hair, which was sent here at one time in no inconsiderable quantities, is now imported more cautiously. Much of the material was formerly lost in the refuse of the waste troughs and imperfected preparatory machines. Now, however, considerable economy is exercised in saving the wash and utilizing it. The prices brought to day, in the New York markets, for these "mixings" for *woolen* yarns, are as follows:

Cow hair (red), 2½ to 3½ cts.; cow hair (white), 8 to 12 cts.; buffalo hair, 8 to 12 cts.; camel's hair (Russian), 16 to 20 cts.; camel's hair (China), 22 to 28 cts.; camel's hair (noils), 40 cts.; Russia cattle hair (red), 4 cts.; Russia cattle hair (white), 12 cts.—*Carpet Trade Review.*

Tincture of Insect Powder.

A concentrated tincture of insect powder is highly recommended as an insecticide by Finzelberg, who prepares it by digesting one part of Persian insect powder in ten parts absolute alcohol, and claims that in order to prove efficacious it should be scattered by means of an ordinary perfumery atomizer. When thus used in closed rooms all flies soon drop dead; while scattering it over linen, etc., acts as a protection agains fleas, etc.

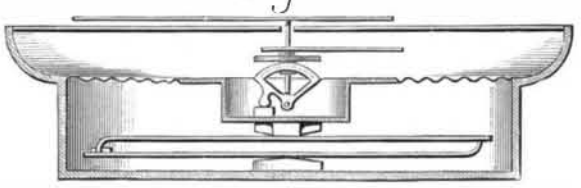
Azotine.

The *Annales Industrielles* notes a new discovery by M. Heddebault, which consists in the separation of wool from cotton in rags and waste products in which these two textiles are mixed, by treating them with steam at 150° C. under a pressure of five atmospheres. Under the influence of this temperature the wool is decomposed, fuses, and flows off into a lower receptacle, while the cotton, flax, and in fact all vegetable fiber, are unattacked. It is then only necessary to pound and wash the latter to obtain products containing no longer any traces of wool, and which are admirably adapted for bleaching and manufacturing into paper. The solution of wool, evaporated to dryness, has been named by the inventor *azotine*. Owing to the increase in value of mixed cotton and woolen rags thus treated, especially for paper making, the cost of the operation is virtually covered, and the new product—*azotine*—costs really nothing. This material, which is completely soluble in water, and which contains all its nitrogen in a soluble form, is to be used, mixed with dried blood, as a fertilizer. The invention is said to be an important one, both for the paper making industry and for agriculture.

THE FIRST INVENTOR OF THE STEAM GAUGE.

Mr. Sydney Smith, of Nottingham, England, who claims to be the "original inventor and first patentee of the steam pressure gauge," not long since sent a letter to the *Engineer* setting forth his claim, and giving a copy of a corroborative

Fig. 2



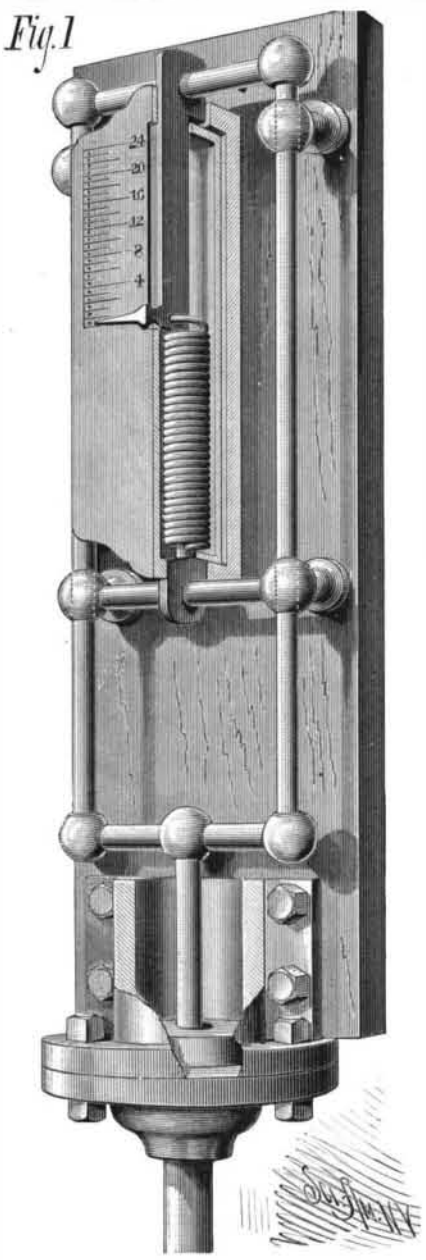
MOREAU'S STEAM GAUGE.

letter from George Stephenson. The following is the letter, together with a note appended by the editor of the *Engineer:*

"Tapton House,
"Chesterfield, October 15th, 1847.

"A most important invention has been submitted to me for my approval, patented by a Mr. Smith, of Nottingham, and intended to indicate the strength of steam in steam engine boilers. It is particularly adapted for steamboats, and can be placed in the cabin, on deck, or any other part of the vessel, where it may be seen by every passenger on board. It may also be fixed in the office of every manufactory where a steam engine is used at a considerable distance from the boiler. I am so much pleased with it that I have put one up at one of my own collieries. It is some distance from the boiler—in another house—and works most beautifully, showing the rise and fall of the steam in the most delicate manner. The indicator is like the face of a clock, with a pointer,

Fig. 1



BRADLEY'S STEAM GAUGE.

making one revolution in measuring from 1 lb. to 100 lb. upon the square inch of the pressure of steam. It is quite from under the control of the engineer, or any other person, so that its indications may be relied upon, and the construction is so simple that it is scarcely possible for it to get out of order. I might give a full explanation of the machine, but I think it best to leave that to the inventor himself. The numerous and appalling accidents which have occurred from the bursting of steamboat boilers have induced me to give you these observations, which I think desirable to be laid before the public. I may state that I have no pecuniary interest in the scheme, but being the first person to whom it has been shown, and the first person to make use of it, I feel it a duty I owe to the inventor, as well as the public, to make it as universally known as possible. The indicator is put up at Tapton Colliery, near Chesterfield, and may be seen any day by any respectable person.

(Signed) "GEORGE STEPHENSON."

"[We have taken some trouble to investigate Mr. Smith's claim to be considered the first inventor of a practical steam gauge, and we have every reason to believe that he is entitled to that honor. In other words, Mr. Sydney Smith, of Nottingham, patented, in 1847, the first steam gauge which was efficient, compact, portable, and suitable for use on boilers carrying a high pressure of steam. We have failed to find any record of an invention fulfilling the same objects of older date than Smith's patent.—ED. *E.*]"

We have been more fortunate than the editor of the *Engineer* in our search for the anticipator of this invention, in finding that two patents were granted in this country for practical steam gauges prior to 1847.

The first was granted to George Bradley, of Paterson, N. J., August 16, 1841. The second to De Fontaine Moreau, of London, England, August 20, 1846.

The construction of Bradley's steam gauge is so clearly shown in Fig. 1 as scarcely to require description. It consists of a cylinder connected with the boiler and containing a piston which is acted on by steam pressure, and connected with a rectangular sliding frame whose upward movement is opposed by a spiral spring. The sliding frame carries a pointer which moves over a fixed scale. Of this steam gauge the inventor, in his patent specification, says:

"The operation of the machine is thus: The steam pressing against the piston forces it outwards or towards the spring, and with it the rectangular frame, the cross-head of which, being connected with the fixed bar, causes the spring to which it is attached to become elongated, and the index which it carries to move opposite to that part of the scale which indicates the pressure against the piston. When the ordinary spring balance is used, if the area of the piston is one inch, the index will point on the scale to the number of pounds per square inch of pressure in the boiler above that of the atmosphere; the scale, however, admits of any mode of graduation.

"This machine is expected to become a necessary appendage to every steam boiler, for the purpose of enabling any one, however ignorant, to tell at any time by sight the pressure of steam in the boiler as well as the most experienced engineer.

"It is believed that there is now no instrument in use for this purpose. The ordinary spring balance which is usually attached to locomotive engines is connected to the lever of a safety valve, and merely indicates the pressure of the steam at the instant it is capable of lifting the valve and at no other time, and even then it requires a nice calculation to ascertain the pressure on the boiler, as it depends on the leverage of the safety bar, so that to an ordinary traveler it affords no information of the pressure of the steam by looking at it however minutely, while by the one now proposed, literally, 'he who runs may read,' and when we reflect on the number of lives that have been lost on board steamboats which such an instrument might have been the means of preventing, its value as a life-preserver will be apparent to all."

In Moreau's steam gauge, shown in the smaller engraving, the steam pressure acts on a diaphragm, whose motion is multiplied by a toothed quadrant and a pinion on the index arbor.

Nevada's Natural Phenomena.

Nevada is a land of curious natural phenomena. Her rivers have no visible outlet to the ocean. She has no lakes of any magnitude. She has vast stretches of alkali deserts, however, that give every indication of having been the beds or bottoms of either seas or lakes. Down in Lincoln county there is a spring of ice-cold water that bubbles up over a rock and disappears on the other side, and no one has been able to find where the water goes. At another point in the same county is a large spring, about twenty feet square, that is apparently only some eighteen or twenty inches in depth, with a sandy bottom. The sand can be plainly seen, but on looking closer it is perceived that this sand is in a perpetual state of unrest. No bottom has ever been found to this spring. It is said that a teamster, on reaching this spring one day, deceived by its apparent shallowness, concluded to soak one of his wagon wheels to cure the looseness of its tire. He therefore took it off and rolled it into the, as he thought, shallow water. He never laid his eyes on that wagon wheel again. Our mountains are full of caves and caverns, many of which have been explored to a great distance. Speaking of caves, a redeo was held last spring over in Huntington valley. During its progress quite a number of cattle were missed and for a time unavailing search was made for them. At last they were traced to the mouth of a natural tunnel or cave in the mountain. The herders entered the cave, and following it for a long distance, at last found the cattle. It appears that they had probably entered the cave, which was very narrow, in search of water. It had finally narrowed so that they could proceed no further. Neither could they turn around to get out. They had been missed some days, and if they had not been found must inevitably have perished in a short time. As it was they were extracted from their predicament with difficulty, by the herders squeezing past and getting in front of them and scaring them into a retrograde movement by flapping their hats into the faces of the stupid bovines.—*Eureka Leader.*