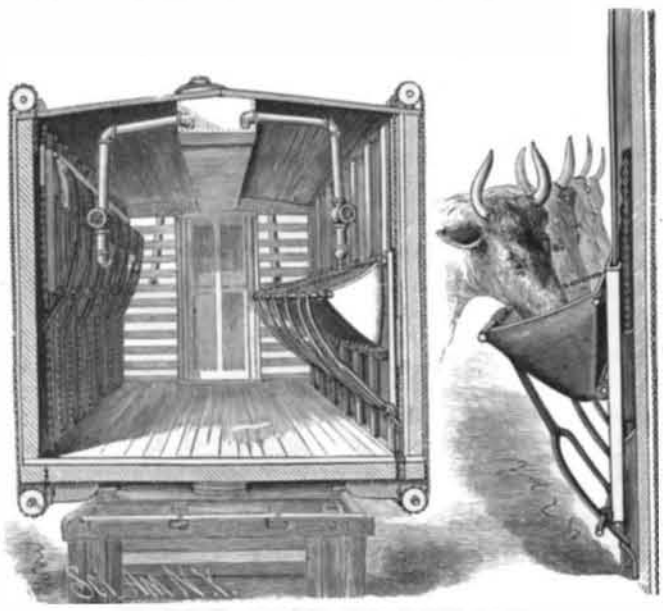
A WATERING DEVICE FOR STOCK CAR.

The accompanying illustration indicates so plainly the principal features of an improved means of furnishing railway cars with watering troughs as to hardly call for any detailed description. The troughs are made of rubber cloth or other waterproof flexible material, and have slides, rods, and bars arranged to fold the trough while being raised and open it while being lowered. The trough-operating slides have straps or chains connecting them with wheels and shafts, so the slides can be readily operated to raise and lower the troughs. The water tanks are placed in the upper part of the cars, from which pipes, as shown, lead down to



WATERING DEVICE FOR STOCK CAR.

such positions as to discharge water into the ends of the troughs when they are lowered and opened, the tanks themselves being supplied with water in the same manner as the locomotives are watered, through spout projections in the roof of the car.

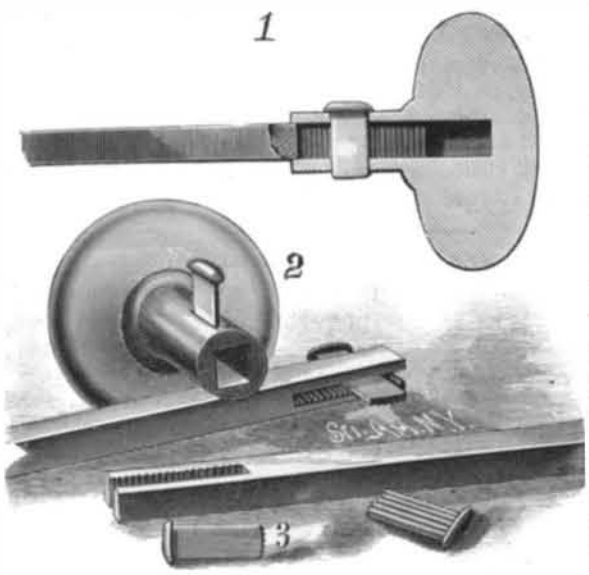
This invention has been patented by Messrs. John P. Christopher and Murray McCallum, of Michigamme, Mich.

An Intermittent Oil Well.

Phillips Bros.' well near Butler, Pa., is one of the most phenomenal wells ever seen in the whole oil regions, and all interest is now centered there, to the exclusion of the lately discovered Glade district, which is rapidly waning. Phillips' well was drilled on Aug. 30, and has been producing since over 1,300 barrels daily, reaching on the 7th 100 barrels an hour. It flows with the regularity of clockwork, the oil gushing out at intervals of nine minutes and a half, the flows lasting about four minutes. Large numbers of people visit the well.

AN IMPROVED DOOR KNOB.

The engraving represents a door knob recently patented by Mr. Edwin A. Johnson, of Allegheny City, Pa., which may be securely attached to the spindle and easily and quickly adjusted according to the thickness of the door. One end of the spindle is formed with a longitudinal slot, the inner side of one of the prongs of which is provided



JOHNSON'S IMPROVED DOOR KNOB.

with vertical serrations. The knob has the usual neck for receiving the end of the spindle, and also a vertical slot in the neck through which a flat key is passed between the prongs; the key has serrations upon one surface which exactly correspond with those on the prong, so that they will bind, and thus hold the parts firmly together and prevent rattling. Both ends of the key receive the strain of the knob, and the bottom projection facilitates removal when necessary. The end of the spindle can be passed into the neck a greater or less distance, as may be required, according to the thickness of the door; and in any position the knob can be locked in place by passing the key through the neck and between the prongs.

Tempering Steel by Compression.

M. Clemandot's method consists in heating the metal so that it becomes sufficiently ductile, and then submitting it during cooling to a strong pressure. He noticed that this treatment affected the structure of the metal in such a way that it acquired properties analogous to those brought out by tempering. The metal thus obtained differs considerably from steel simply cooled, by its finer grain, its greater hardness, and its greater resistance to rupture, particularly with grades of pretty high carbon steel. In these respects it approaches in quality steel tempered in water, without being identical with it. It has two different effects, almost simultaneously—an energetic and continuous compression, and a rapid cooling of the steel. The cooling is caused by the contact with the platform of the hydraulic press, and takes place much more rapidly than when the same piece is allowed to cool without being compressed. The remarkable results obtained by M. Clemandot are explained by the combined action of cooling and compression. The first, in its results, resembles the compression effected by hammering or rolling; the second, the effect of tempering by immersion. It has been urged that the piece of steel must be inclosed by a mould into which it fits exactly. It is, however, only necessary that the compression act upon two opposite faces. A square bar, whether straight or curved to horseshoe shape, need only be laid down flat and compressed between the two platforms of an hydraulic press. In order to obtain the best results, the cherry-hot piece of steel should be as rapidly as possible subjected to the pressure settled upon beforehand, ranging from 10 to 30 kilogrammes per square millimeter.

While the tempering process by immersion brings about an increase in the volume of the steel and a corresponding decrease in its density, the action of high mechanical pressure during the entire process of cooling tends to bring the metal back to its original volume or its normal density, thus preventing the creation of a state of intermolecular tension noted in tempered steel. Actual experiment has confirmed these theoretical deductions, so far as the resistance of the compressed steel to stress is concerned.

A Delicate Instrument used by the Government for Testing Thickness.

The Post Office Department at Washington recently cancelled a contract with an envelope manufacturing firm for not furnishing the precise article in matter of weight contracted for, and, according to one of our contemporaries, a curious little machine in the office of the Chief of the Stamp Bureau was the cause of the cancellation of the contract. It is a queer looking contrivance, a cross between a set of butcher's scales and ordinary grocer's scales, or rather a combination of the two. There is a large dial, like the face of a clock, with a little hand that flies around the face pointing to the figures at the side, which are arranged like the figures on the clock face, with little dots between. "You see three dots," said the gentleman in charge, inquiringly. "Well, the space between those indicates one sixteen-thousandth of an inch. Getting it down pretty fine, isn't it? You see this movable piece of iron here, which comes down with a smooth surface upon this other solid surface? Well, the raising or lowering of that moves the pointer which runs around the dial. To test the thickness of a sheet of paper, we simply place it between this movable piece and the solid surface below, and when the movable piece of iron comes down upon the paper the hand registers the true thickness of the paper. Delicate instrument? Well, I should think so. Just give me a hair from your head, will you?"

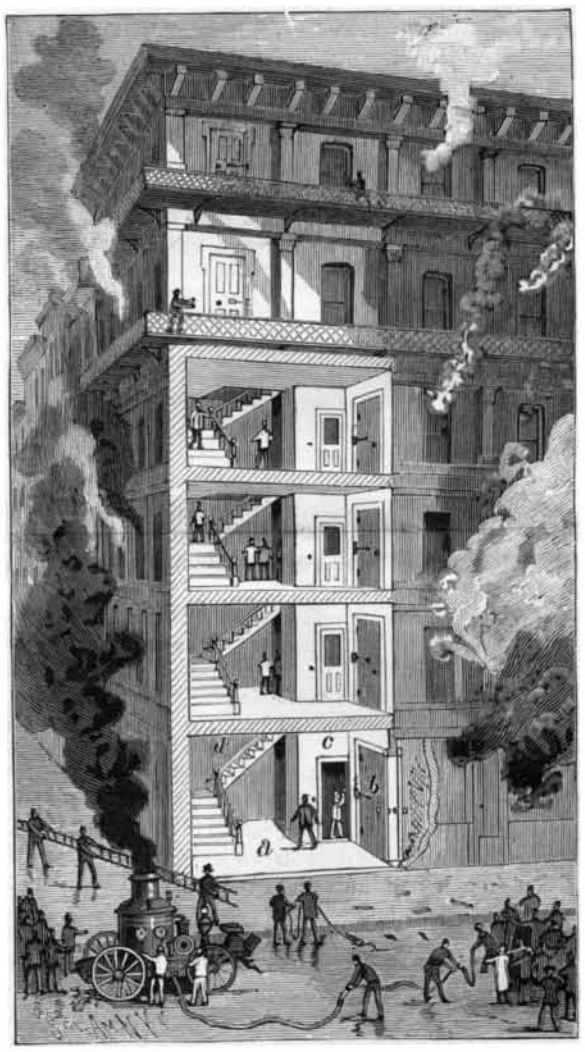
Then he took a hair and slipped it deftly between the movable pieces. The hand on the dial followed the motions of the screw until it stopped at the figures 20. "Just twenty sixteen-thousandths of an inch in diameter," he said. "Now let me try a hair from your mustache? They are generally much larger, especially if you have been in the habit of shaving." He took up a pair of scissors, and clipped off a hair from the mustache and placed it in position. The hand stopped at 50. "Fifty sixteen-thousandths of an inch thick," he said. "That shows the effect of shaving. I measured a hair from the hand of a gentleman a few minutes ago which was forty sixteen-thousandths thick, but those in his mustache were precisely the same thickness, the reason being that he had never shaved. Yes, that is the machine that proved that the firm making our envelopes was not fulfilling its contract," he said, as he fell back admiringly

Weather Forecasts.

It seems to be overlooked by meteorologists, says a writer in the *Journal of Science*, that when a season has taken a decided character, whether as wet or dry, the ordinary indications of change seem to lose their meaning. In 1879 all signs of fair weather, drawn from the appearance of the clouds, the actions of birds and insects, etc., were quite misleading. And in the present season I have more than once seen the commonly accepted signs of rain go for nothing. The sky may become gradually overcast, with dark ragged masses of underscud; there may be a "hollow and a blustering wind," swallows may fly low, slugs come out in numbers, bubbles of gas rise from ditches, etc., but the weather remains dry, or at the most there is a slight shower.

AN IMPROVED FIRE ESCAPE.

The engraving shows a fire escape recently patented by Mr. W. F. Cullen, of Logansport, Ind. In any approved part of the building—frequently in one corner—and connecting with the main hall, is constructed a fireproof compartment on each floor, thus forming a series of compartments one above another extending from the ground floor to the top of the building. The walls, floors, and ceilings of these chambers are built of fireproof material, and are provided with fireproof and self-closing doors communicating with the interior of the building and also with similar doors opening upon verandas which may be built only at the upper stories, or at all of the stories, to enable people to reach the fire escape by the exterior passages when cut off from the more direct interior course by fire within the building. Double doors, made of boiler iron, are used, and are provided with springs for closing them self-actingly, one door swinging inward and the other outward. Within the compartments are constructed fireproof stairs leading from one story to another, and when an elevator is used, as shown in the engraving, in which the escape chamber is shown at *a*, the fireproof doors at *b*, the elevator at *c*, and the iron stairways at *d*, the shaft is built of fireproof material, and being thus protected, it will not act as a flue to accelerate and spread the fire, as elevator shafts generally do. This device affords, practically, the advantages of a completely fireproof building—so far as protection from fire is concerned—without the cost of making the whole structure



CULLEN'S IMPROVED FIRE ESCAPE.

incombustible, and it may be readily built into buildings already erected.

The compartments are of sufficient size to contain at once as many people as are likely to occupy a floor at any one time, so that all can at once escape into chamber, and the door may be quickly closed behind them to exclude heat, smoke, and fire. Once within the compartment they may descend at leisure, even though the fire be burning fiercely close by. Also, by reason of the safety and permanence of the chambers, firemen are enabled to pass up to the different stories to rescue those overcome with the heat and to battle with the fire.

Buttered Flour.

A Connecticut company, says the Hartford *Times*, makes flour all ready for baking biscuit or strawberry shortcake; it only requires to be mixed with milk or cold water, and the batter is ready for the oven. The process of its manufacture is interesting. A quantity of wheat flour is sifted and dumped into a large tub. Butter cut into large cubes is added to the flour. Then the white-coated operator weighs out certain mysterious quantities of baking soda and fine table salt, which go to swell the contents of the tub. Then the mixture is placed in a large polished cask, which revolves slowly in one direction, while a sort of dasher inside moves in the opposite direction. The cask revolves about 30 minutes, at the end of which time it is opened. It is found that the ingredients have been thoroughly mixed; every particle of moisture contained in the butter has been evaporated, and that the mixture is as fragrant as new mown hay. It is then placed in bags and boxed for shipment.

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