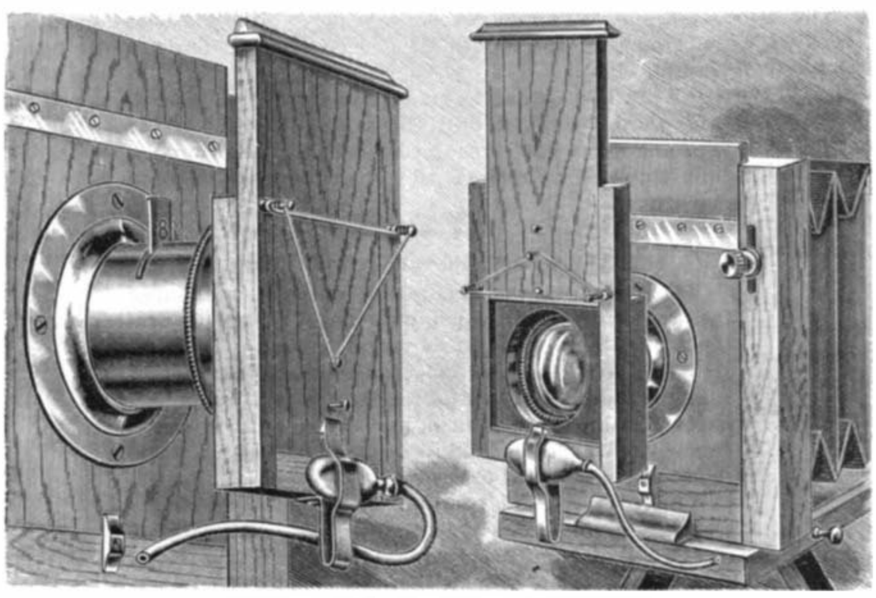
nuts and the tapering ends of the plugs are firmly clamped in place by tightening the nuts.

Further information relative to this invention may be obtained of Mr. J. G. Patton, No. 285 River Street, Troy, N. Y.

A SIMPLE CAMERA SHUTTER.

It would be difficult to say who invented the simple shutter shown in the annexed engraving. It has been made and used by amateur photographers, and seems to answer the purpose very well indeed. Although it is crude when compared with some of the perfected shutters, the results secured by it are not inferior to those of better instruments.

The block forming the support for the working parts is bored to receive the outer end of the camera tube. To this are attached two grooved uprights and a cleat extending across the block at its lower edge. To the grooves of the uprights is fitted the shutter, which consists of a piece of thin board blackened on its inner surface, and provided on its outer surface with three escutcheon pins, all arranged on the median line of the shutter. The lower pin, which is without a head, is engaged by a spring catch. The second pin projects the farthest, while the third projects only a short distance. In each grooved side strip is inserted a pin, which projects some distance from the surface of the strip. An ordinary rubber band is stretched around these pins, and the outer strand is wound several times around each pin, to separate it from the inner strand. The spring catch, which is attached to the bottom of the block, is bent outwardly to permit of placing under it a small pneumatic bulb similar to those used on pen fillers. With the bulb is connected a flexible rubber tube, having on its free end a larger bulb, by means of which the smaller bulb is inflated when the shutter is to be released.



HOME-MADE CAMERA SHUTTER.

The shutter is held normally in a closed position by the spring catch, which engages the lower pin. In another form of the shutter an ordinary hook is used in lieu of the spring and pneumatic bulb.

To prepare the shutter for operation, the outer strand of the rubber band is placed around the upper and shorter pin, as shown in the left hand figure. When the exposure is to be made, the shutter is operated by compressing the large bulb, which inflates the smaller bulb, thus pressing outwardly the spring catch and disconnecting it from the pin. The elasticity of the rubber band forces the shutter upward until the pin passes above the inner strand of the rubber band. The momentum of the shutter carries it upward, and bringing the longer pin into engagement with the inner strand of the rubber band, stretches the band, as shown in the right hand figure, thus arresting the movement of the shutter and storing power for closing it. The elasticity of the inner strand of the rubber band is sufficient to cause the shutter to drop quickly and regain its original position.

Draining the Zuyder Zee.

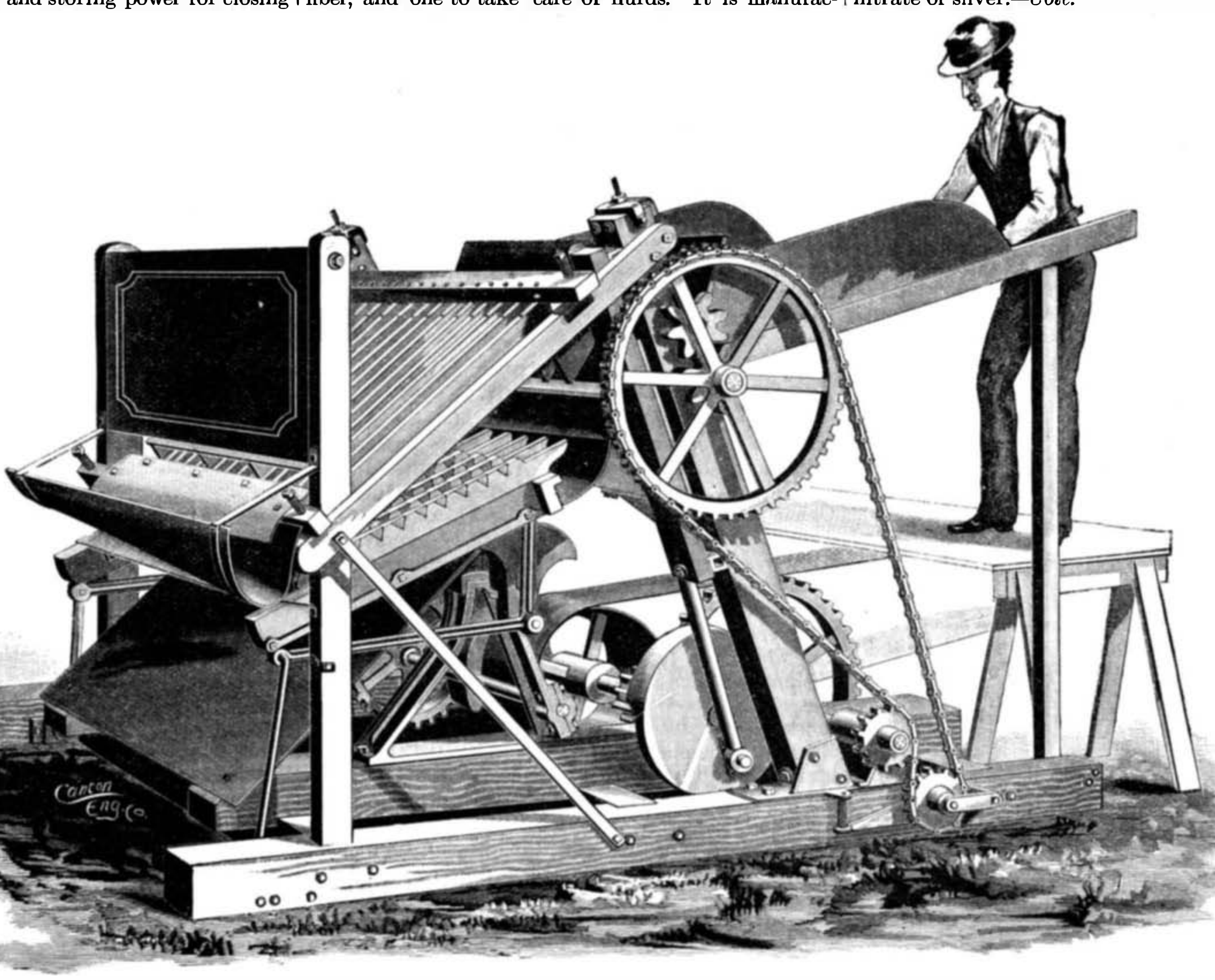
The government of Holland has for a long time past had under consideration a project for draining the vast lagoon known as the Zuyder Zee. This sheet of water is almost useless for purposes of navigation, and large vessels can only find their way to Amsterdam by means of the North Sea Canal. As agricultural land, however, it would be exceedingly valuable, since it is estimated that more than two-thirds of it is very fertile. The Zuyder Zee was formerly a lake, but in the twelfth and thirteenth centuries it was united to the North Sea by inundation. A commission was appointed some time ago to examine into the question of draining this territory, which has a superficial area of 760 square miles. A report on this subject has now been issued. It proposes to close the Zuyder Zee by means of a dam that shall be constructed from the mainland, on either side of the island of Wieringen. The water thus cut off from the sea would be divided into four parts, in each of which the work of draining would be carried out successively. The cost of constructing the dam is estimated at £3,675,000, and the draining would involve an expenditure of £13,000,000.

THE SHELY FIBER BREAKER.

The machine shown in the illustration is designed to break six to eight thousand pounds of hemp or similar fiber per day, with a ten h. p. engine and about nine hands--an engineer, a water hauler, a buncher, one feeder and assistant, three to receive and remove fiber, and one to take care of hurds. It is manufactured by Messrs. C. Aultman & Co., of Canton, O., and is reported to have been successfully used in breaking hemp in Kentucky, and to have given great satisfaction in an experimental test upon jute furnished for the purpose by the Commissioner of Agriculture, the machine being likewise adapted for work upon ramie, flax, and all similar fibers. There are at present three of these machines for use in breaking hemp in central Kentucky, one in Bourbon and one in Clark County, one on the farm of the inventor, Mr. J. D. Shely, near Lexington, and one also at Trenton, O.

From the top and back of the machine the fiber is fed through two feed rollers which adjust themselves automatically to any sized bunch, passing thence through the break, which is composed of a sash and four stationary feed bars. The sash passes between these stationary bars, breaking the hemp on both the up and down strokes, the bars being so arranged that they break alternately first on one side and then on the other, making each revolution equivalent to four strokes. Passing into the cleaner, the fiber is separated from the hurds—its coarse or hard part. The cleaner is composed of two bars, one stationary and the other vibratory, being longitudinally placed slats, the upper stationary one of which is smooth, while the lower vibratory one is grooved or notched. The vibratory bar or riddle runs by a compound elliptical motion, forcing the fiber between the slats of the stationary riddle and thence out of the machine. In breaking rough hemp stationary dividers are preferably placed between the break and the cleaner to split the hemp and better prepare it for the cleaner.

GLYCERINE, $C_3H_5 3HO$, is the hydrate of the trivalent radical glyceryl. It is a sweet, sirupy liquid, obtained by the decomposition of fats and oils, principally as a by-product in the manufacture of candles and soaps. The fatty acids are used to make candles and soaps, when combined with soda or potash. Pure glycerine is colorless and odorless, freely miscible with water and alcohol in all proportions; but with oils it only emulsifies, and does not perfectly blend. It is a solvent of many alkaloids and their salts, as well as resins. The purest is prepared by distillation; although not volatile without decomposition, yet it passes over undecomposed in the vapor of water, and may be concentrated by careful evaporation. This mode of preparing it was patented by Price's Candle Company, but now much distilled glycerine is imported from Germany. Glycerines of inferior quality have a disagreeable smell, and are sometimes colored. Good glycerine should not be colored after being subjected for two hours to the action of an added solution of the nitrate of silver.—*Cole.*



AN IMPROVED HEMP AND FIBER BREAKING MACHINE.

New Industries Resulting from the Building up of the Navy.

In a stirring speech recently made in the Senate by Senator Gorman, of Maryland, in favor of liberal appropriations for the navy, he said:

Under the provisions of those various acts, Mr. President, we have created plants which are a marvel to the whole world. It does not apply alone to the navy. We are equipping and have ready now the finest war vessels, of their type, that float upon the ocean. We have done more than that. We have created plants that are constructing vessels for commercial purposes. These shipbuilders claim, and I believe it to be true, that they are now prepared to construct the finest steel vessels on private account within 10 per cent of the cost of like ships constructed on the Clyde. We have in the State which I have the honor in part to represent three or four shipyards constructing vessels for the government and for commercial use. The largest plant in Maryland, and probably one of the best equipped in the country, is at Steelton, Baltimore Harbor, the president of which informed me a few days since that while they were prepared to construct the largest war ships, they had not and probably would not make an offer to construct a war ship, for the reason that his company had reached the point where they would have all that they could do on private account.

The concurrent testimony is to the effect that but for the appropriations heretofore made on account of the navy, none of these great plants would have been equipped with machinery to build war ships or the great ships for commercial use that are now afloat and being constructed.

Abnormal Breathing.*

Neither man nor animal breathes through the mouth normally. The only natural way for respiration and inspiration is through the nose. When we breathe through the nose, the cold, dry, impure outward air is sufficiently warmed, supplied with watery vapor and freed from dust. When we breathe through the nose, smelling at the same time through our organ of smell, which assists respiration, we become aware of the presence of an injurious or of a generally abnormal mixture drawn in by the breath, and can then either correct so unfavorable an atmosphere or escape from it. Furthermore, only in the nose are found those fine arrangements which can prevent the entrance of injurious substances into the deeper respiratory organs (larynx and lungs), and thus stop the further advance of the hostile body (painful smoke, irritating dampness, thick dust, etc.), besides defying that which has already slyly effected an entrance. This is done by the so-called nasal reflex breathing, to which class belongs sneezing. If we breathe through the mouth, the air is neither sufficiently warmed nor satisfactorily moistened, and laden with all its bad mixtures of dust of mineral, animal and vegetable origin, added to injurious gases, reaches the larynx, the air tubes and the lungs. Snoring is only the least among the evil consequences of breathing through the mouth. The swollen, sore, constantly chapped lips, bad condition of the front teeth and decay of the back ones, a defective development of the sense of smell, frequent inflammation of the throat, attacks of fever, diphtheria and catarrh, and soreness of the larynx and lungs are consequences of breathing through the mouth which have been frequently observed. In children one often sees an habitual and peculiar weak or even stupid expression of countenance. It has also been found, through the experiments of different trustworthy observers, that there is a causal connection between stammering and breathing through the mouth. On the other hand, however, certain forms of nightmare and asthma are causes of breathing through the mouth. That infants are sometimes brought almost to death's door when prevented by a cold from breathing through the nose, is a fact well known to physicians.

When a child or a grown person begins to breathe with the mouth open, there must exist some sufficient cause for the occurrence in the uppermost air passages. No one would voluntarily exchange the only healthy, comfortable manner of breathing through the nose for the burdensome and unhealthy breathing through the mouth. Let any one attempt to breathe through the mouth for five minutes, instead of, as one is accustomed, through the nose, and he will soon be convinced that it is almost impossible. Almost of itself, that is, without muscular force, through the mere pressure of the air, the mouth closes and the original manner of breathing is resumed.

Whoever snores can, as a rule, not breathe through the nose. That it would be useless in such cases to desire to close the mouth mechanically is entirely comprehensible. Every mother, who frequently gives to her child the useless command "Close your mouth," is aware of this. Here it is better to seek, without delay, the advice of an experienced specialist, in order to determine the cause of this mouth breathing. In the case of children, in particular, an unnecessary delay might prove fatal.

Now there are certainly cases in which the cause of this habit may be determined and the habit still remain. But these are the exceptions; as a rule normal breathing results as soon as the air enters the correct passages; if the snoring and breathing through the mouth returns as an evil habit, then and only then can mechanical means be used with advantage to stop this opening of the mouth.

The simplest and oldest of these is to place a band from the chin to the top of the head. This often suffices. As the mouth remains closed by pressure of the air, some of the mechanical appliances to produce this effect might be used. Sometimes it is even sufficient to place a piece of celluloid plate between the teeth, but one would not likely decide to place a foreign substance in the mouth of a sleeper, particularly a restless child.

All of these apparatus must be put on every evening, and worn overnight, until the normal position of the lips and lower jaw is regained. But the most important thing is to remove the obstructions to normal breathing.

* Translated for *Public Opinion* from the German of Dr. E. Bloch, in *Schorer's Familienblatt* (Berlin).

SHEELEY'S CANNING OR PRESERVING JAR.

The accompanying illustration represents a canning or preserving jar, provided with novel means to prevent its turning while the cover is being applied to or removed from it. The most satisfactory fruit jar in use, the Mason, is taken for the foundation. Its prominent features are retained, but a change of shape is made, by which it is held securely in the socket while the cover is fastened or removed.

The cover, which is screwed on, as in the old Mason jar, has on its upper edge fluted or scalloped surfaces, and a fluted wrench accompanies the socket. In the upper end of an arm at one side of the socket in

SHEELEY'S CANNING OR PRESERVING JAR.

which the jar is held is a friction roller, a cord passed around the roller and attached to the handle of a wrench fitting the scalloped cover, affording ready means for quickly removing the cover. This is so contrived that no one need be at a loss to know which way to pull in order to unscrew the cover, neither is there the awkwardness of the common way of unscrewing. Further, the work of both fastening and removing the cover can be done not only by *one person*, but with *one hand* of one person. This all housekeepers will find a great relief. The improvement has been patented by R. C. Sheeley, of Walter's Park, Berks County, Pa.

Legal Electricity.

Electricity seems destined to afford lawyers of all lands an opportunity of showing their professional skill at splitting hairs. In America several legal questions have cropped up. Is electricity dutiable? Can it be stolen? In France it was a moot point until a short time ago whether an electricity supply company was a Societe Civile or a Societe Commerciale, a matter of no little importance to investors, who in the latter case would only be liable for the amount of their shares. A Societe Commerciale, it appears, is one which has for its principal object "the accomplishment of acts of commerce," such as buying raw material and reselling it at a profit, manufactured, or in its natural state. The Edison Company, of Saint Etienne, summoned before the Tribunal of Commerce of that town by one of its customers, declined to submit to the jurisdiction of the court on the ground that the supply of electricity from a central station did not constitute a commercial act, "the company only sold a product which it gathered from nature, and which was a *res nullius*." The Tribunal of Commerce, nevertheless, declared itself competent to try the case, and on appeal its decision was upheld; so that in France, at any rate, electricity when supplied from a central station must be deemed a manufactured article. Across the Atlantic, where the manufacturing interest is dealt with very tenderly by the tax gatherer, a similar decision would add appreciably to the profits of central stations.—*London Electrician.*

The Potato.

As some perhaps look upon the potato, it appears to be a very admirable source of food for man, but it is hardly biological to attribute to the plant such exalted altruistic motives of disinterested generosity as it might imply if we should intimate that this is the end and aim of its existence. There is a class of mankind who appear to deem it proper, like Pope, to hold all nature to account for itself as useful to man, and such would doubtless say that the potato was created to be a food product. To the biologist's ways of thinking, this end of the potato's life is merely incidental—from its standpoint a very unhappy incident; the real end and aim of the potato's life is to propagate its kind, the storage of starch being a part of the plan.

The life of the tuber of the potato is part of the larger life of the entire plant. The history of the tuber is as follows: It starts from a bud on a preceding "seed potato," of which and of whose predecessors it may be thought to form a part, but really it is (like cuttings or slips from any plant) the beginning of what we may call a new plant. The early growth of the cells in the embryonic part of the bud requires food, to furnish which is the reason for the starch supply. But after a time the growing bud tissue differentiates into stem and leaves and rootlets, and then it can begin to depend, as all green plants do, upon the sunlight and the water and gases of the air and soil, and with their help construct its own substance. The starch of the potato tuber thus acquires a biological meaning. Its production and storage are perfectly analogous to the provision made in seeds. In the case of the peanut, we have also an underground structure stored abundantly with food for the undeveloped embryonic tissue, which is also part of the nut. The substance in many seeds is largely albuminous, as shown so abundantly in the pea and bean, also in the peanut, which is a close ally of the pea and bean.

Since the potato tuber and the pea or bean are thus comparable in two respects, both being the starting point of new individual plants and both containing cells which secrete and amass large quantities of food to nourish the embryo plant until its vegetative organs are developed, a hasty conclusion might be made by some that the potato is a sort of seed. This conclusion would be found by the study of the anatomy of the entire plant to be true only in a very particular sense, and not as meant in ordinary terms. The seed is the product of a ripened flower, while the tuber is not. There is a very great difference in the powers of potato seed and of the tuber bud; the latter propagates its kind absolutely and without variation, while propagation from seeds is very likely to result in the appearance of varieties unlike the parent plant. We have in this case an example of the law that nature works very variously toward the same end, using the stem bud in one case as the special organ of propagation and the seed in another, equipping either suitably for its purpose.

Finally, if we compare the potato with an animal, we find that the aggregate of its actions are anabolic, that is, they are constructive, so that as their result elements, or simple inorganic compounds, are laid hold upon and caused to combine to form higher and more complex organic compounds used in the plant's structure. In this it is unlike an animal, the aggregate of whose activities is katabolic, for it takes in highly complex chemicals (furnished from the plant's work) and gives out simpler ones. Associated with the difference is the further fact that the functions of motility and sensation, which are so characteristic of animals and are possible by reason of the constant katabolic character of its metabolisms, are unspecialized in the plant if not entirely absent, while the metabolic function is highly specialized and results in the production of anabolic products in the vast amount we see in the tuber.

We see then that the same forces are at work in the vegetable as in the animal body. The active agents of the tuber are protoplasmic cells, which work along lines determined by inheritance, and manifest certain of the protoplasmic powers in so high a degree as to nearly exclude the others, but retaining the two most universal powers of protoplasm—metabolism and reproduction.—*H. L. Osborn, Microscopical Journal.*

Possibility of a Gaseous State of Certain Metals at Temperatures below their Melting Point.

We notice the following experiment: Leaflets of silver, platinum, and gold were heated to 150° with concentrated hydrochloric acid in sealed tubes. The metals were dissolved and the chlorides formed were reduced by the hydrogen evolved from the metals and the hydrochloric acid. They were deposited on the sides of the tubes in microscopic crystals. It may be assumed that in this experiment even the platinum existed for some time as a liquid before taking a crystalline form.—*Chem. News.*