Frozen Fish.

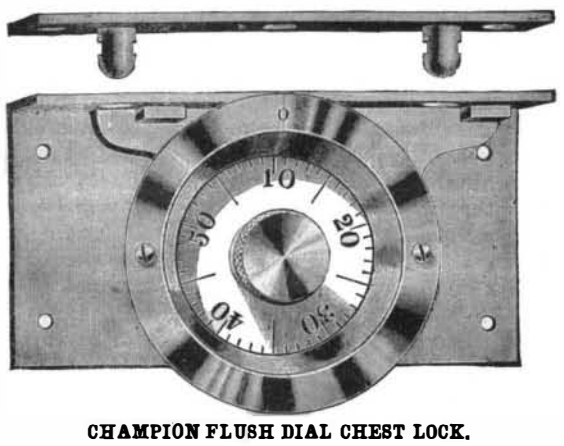
The notice of frozen fish in the SCIENTIFIC AMERICAN of March 20 recalls a similar occurrence under my own observation. Several winters ago I purchased in one of the Hartford, Conn., fish markets three frozen pickerel, and carried them home at night. They were frozen perfectly hard and stiff. I placed them in a large tin pan, and filled it with cold water. In the morning my attention was attracted by a flopping at the pan, and I found one of the fish was splashing about as lively as when he first took the bait.

J. H. L.

STEAM DISINFECTER FOR USE IN HOSPITALS.

The importance of having efficient means at command when an epidemic of contagious disorders breaks out in a populous place has been so abundantly proved in this and other countries that great attention has been drawn to the subject, with the view of securing

DIAL OF THE CHAMPION DOOR LOCK.

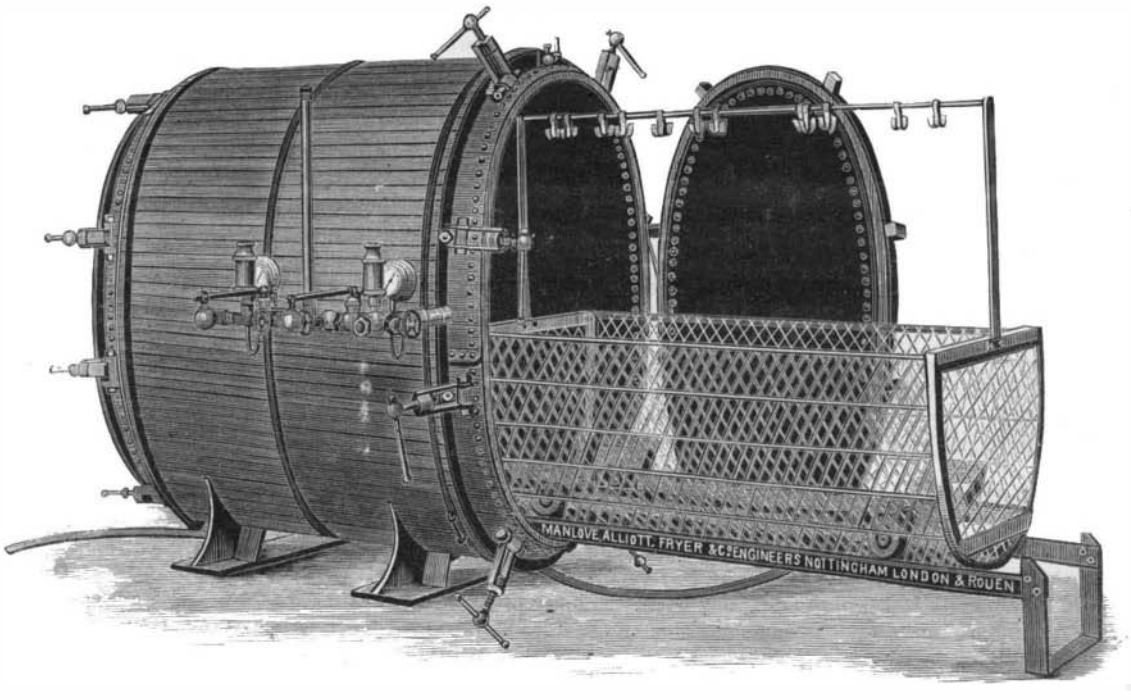


CHAMPION FLUSH DIAL CHEST LOCK.

the best disinfectant. It has been found by high scientific authorities, says the *Universal Engineer*, that heat alone, without the aid of dangerous chemicals, is sufficient to destroy all the germs of disease, all forms of insect life and low organisms, etc.; and the introduction of steam under regulated pressure into a properly constructed apparatus appears the safest and best method for hospital authorities, etc., to adopt.

Washington Lyon's patent steam disinfecter, as made by Manlove, Alliott, Fryer & Co., of Nottingham, appears to offer a thoroughly practical and efficient means of dealing with bedding, carpets, clothes, etc., without any injury to the fabric and no material damage to colors, as letters and papers can be disinfected without risk of damage. As will be seen from the engraving, the apparatus consists of a large and strong iron chamber, with double walls of boiler plate, provided at each end with a steam-tight door. The chamber is made elliptical in section, to enable large spring mattresses, couches, or bulky articles to be inserted without requiring to be doubled up. Steam from a boiler is admitted into the hollow casing to heat the walls of the chamber. While this is going on, the articles to be disinfected are placed in the traveling cage and rolled into the chamber, the door secured by screw clamps round the edge, and the steam by another pipe admitted to the interior of the chamber at 20 lb. pressure.

The temperature and pressure are regulated by valves and gauges outside, the degrees of temperature corresponding to the several pressures marked on the dial. By employing a higher pressure of steam on the outer casing than in the interior chamber the steam in the latter can be superheated, and consequently dried, preventing the condensation of moisture in the articles while being disinfected. The most approved method of fixing is to place the apparatus midway between two chambers; goods received in one chamber after disinfection are taken out into another chamber, to wholly prevent any contact between the infected and disinfected articles. For rural districts a portable apparatus, with boiler attached, can be made, but a fixed machine in a central position of a district is the best way. The apparatus has been definitely adopted by the Government, by the Metropolitan Asylums Board, many corporations, and the Government of China have ordered one to be sent to Hong Kong, so that it has successfully passed the experimental stage, and is an acknowledged method of disinfection.



STEAM DISINFECTER FOR USE IN HOSPITALS

THE "CHAMPION" KEYLESS LOCKS.

Our usual expression for security is that we have placed valuables "under lock and key," but as the lock may be picked and the key lost, this does not always describe the best fastenings. In some of the improved "Champion" locks there is neither key nor key hole. Doors provided with them may be opened from either side, the "Open Sesame" being a knowledge of the combination of figures by which the knob may be made to turn and the door open.

Several forms of these keyless locks are manufactured, the shapes varying according to the purpose for which they are to be used. We illustrate the two forms which will be of more particular interest to builders. The first, known as the "Champion" flush dial chest lock, will be found of much value in protecting a fine set of tools or other shop valuables from theft or the inconvenient curiosity of visitors or borrowing by associates.

As its name implies, the lock is let in flush with the woodwork, that it may not be exposed to injury. It is made entirely of brass, with the dials nickel plated. To open a chest so fastened, it is necessary to know the three numbers which make up the combination. As the possible combinations are almost infinite, there is no chance of the secret being discovered. The numbers may be changed at pleasure, so that, should the combination become known to any undesirable person, it is a simple matter to change it. In construction, the lock is strong and reliable, and being so much more simple, it can be opened in much less time than an ordinary safe.

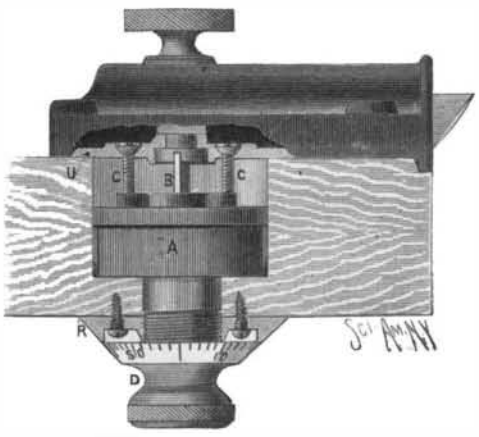
Perhaps it may be feared that the combination might be forgotten, but it must be remembered that a key is not only liable to be left behind, but as well to be lost or duplicated. The combination necessary for the unlocking of a keyless lock may be recorded in any number of places, and in such a way that detection would be impossible. The beveled form of the numbered dial is considered preferable for a great many purposes, but these minor details are susceptible of a large variety of designs.

The second lock illustrated, the "Champion" keyless door lock, is, we believe, the first keyless dial lock applied to a wooden passage door. We show it in section, and also the outside and interior parts, which are visible when it has been applied to door. The difficulty heretofore has been to control the fastening from both sides. As now arranged, the door may be opened from either side, and the lock may be put in place with little trouble. The section shows its construction.

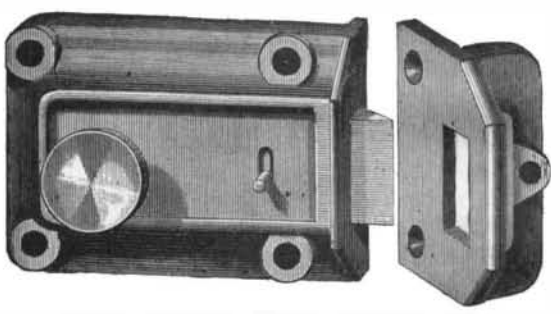
The smaller part of the cylinder, A, is screwed into the ring, R, on the outer face of the door. The spindle is then put in, and the under plate, U, of the bolt case is laid against the inner face of the door. The screws, CC, secure this plate to the cylinder, A. The lock is adjustable to any door. The mechanism by which the dial piece, D, operates the bolt is connected with the bar, B. Before the case is put on, the combination is to be set, in a manner described in the directions accompanying each lock.

By means of the latch shown on the inner side of the case, the bolt may be "thrown off", as in ordinary night latches. But a single revolution is required preliminary to unlocking, and the combination is made directly by turning at once to each of the three numbers. The simplicity and strength of the lock adapt it for use in the best houses. The dial, shown full size in our illustration, may be either nickel plated or bronze.

The Champion locks are, for the most part, the invention of Milton Jackson, now Manager and Treasurer of the Miller Lock Co., of Philadelphia, who are the sole manufacturers, and to whom all further inquiries should be addressed.



CROSS SECTION OF CHAMPION KEYLESS DOOR LOCK.



INSIDE LATCH OF CHAMPION DOOR LOCK.

The Fattening Effect of Chewing Gum.

A Southern paper (*Macon* (Ga.) *Messenger*) says: "Twenty years ago the rule was that Southern women were thin and delicate; it is not the rule now. Southern women are not physically equaled in all North America. Any physician who is as well informed as he ought to be will tell you that this is true. This change is due to the habit of chewing gum. You may smile, you may even laugh, if you please, but I am telling you a plain fact. As to Southern men, they are as thin and gaunt as they ever were, and so they will remain until they cease to chew tobacco and begin to chew gum."

Liquid Carbonic Acid.

A patent recently taken out proposes to produce the carbon dioxide gas for liquefaction by having a solution of sodium bisulphate in a leaden container, and running into it some carbonate or bicarbonate, dissolved or suspended in water, the evolved carbon dioxide being drawn off over a drying mixture into a gasometer, from which it is drawn for liquefaction by compression. Liquid carbonic acid, equal to 500 liters of gas at ordinary pressure, can be supplied for one shilling. In using this for various purposes, it is proposed to pass the gas that escapes after using over moist sodium carbonate, which is thus converted into bicarbonate, which can be again used as a source of supply of the carbon dioxide. There is a bore hole near the village of Burgbrohl, on the Rhine, which yields a constant supply of very pure carbon dioxide. This village is near to the Lake of Larch and the interesting volcanic district surrounding it, where there are a very large number of mineral springs and exhalations of carbon dioxide. This bore hole was sunk some two years ago, and has given a constant supply of gas amounting to about 2,160 cubic meters per twenty-four hours. Apparatus has been erected for liquefaction of the dioxide, and this is now regularly carried on close to the bore hole. The water which rises with the gas is very cool, and is employed to cool the compressing apparatus. About 500 liters of gas are compressed per minute into about one liter of liquid. This is sent away in wrought iron vessels containing about eight liters.

The Currents of the Atlantic Ocean.

We read, and we see it everywhere repeated, that the climate of Norway, which is mild as compared with that of the American coast in the same latitude, is due to the influence of the Gulf Stream. This is the common opinion shared in by a large number of competent persons in France and elsewhere. The public, in its turn, goes still further, and attributes the mildness of the temperature on certain portions of the French coast to the same cause, that is to say, the warm currents of the sea.

It is nowadays generally agreed that the Gulf Stream is soon lost on the surface of the Atlantic, and an endeavor has been made to refer the heating action, which it thus could no longer possess, to another current that forms a sort of continuation of it, and which, after all, is nothing more than a slow movement of the surface waters of the ocean from the east toward the west. Hence the question of heating through a slowly moving mass of water becomes very problematical, and there is now an opinion forming which would attribute the calorific influences formerly ascribed to the Gulf Stream to an atmospheric circulation, and not to an oceanic one.

The circulation of the ocean nevertheless presents considerable interest, and the reason that the question has not been more fully studied is because such researches require large pecuniary sacrifices, on account of the vast field to be covered.

A contribution to our knowledge of this subject, however, has recently been made by Professor G. Pouchet, who, through the liberality of the city of Paris, and the co-operation of Prince Albert of Monaco, was last year enabled to undertake some experiments. Prince Albert's sail yacht, the Hirondelle, which had been placed at Professor Pouchet's disposal, was fitting out at Lorient, and it became necessary to make haste, and, in a manner, improvise the apparatus to be used. The following three forms of floats were decided upon: 1. Ten copper spheres, one foot in diameter, formed of two hemispheres screwed upon a rubber joint. 2. Twenty kegs similar to those used for beer, and of a capacity of 3½ gallons. 3. A hundred and fifty ordinary bottles, closed by a selected cork, and capped with rubber. Each float contained a request, printed in French, Russian, Norwegian, Danish, English, German, Dutch, Spanish, Portuguese, and Mangrabin, that the finder of it would send the inclosed paper to the authorities of his country, in order that it might be sent to the French government, with details as to the place and date, and the circumstances under which the float was picked up.

The Hirondelle, having on board the material for the experiment, set sail about the first of July, 1885. It was agreed that the floats should be put into the sea to the northwest of Corvo, the last of the Azores. On the 27th of July, at a quarter past six in the morning, the vessel being about 110 miles northwest of Corvo, the putting of the bottles into the ocean was begun, and was kept up, mile by mile, till forty minutes past three, when a beginning was made with the kegs, and afterward with the spheres. These two latter styles of floats were spaced two miles apart, and the last of them was thrown over on the 28th. Then the second series of bottles followed. The floats were distributed over a line which ran about 14° north by east, and was 170 miles in length.

The place that had been selected in advance for the operation, and where Prince Albert accomplished the latter so happily, is situated almost exactly upon a line which joins the Strait of Florida (through which the Gulf Stream enters the Atlantic) and the entrance of the British Channel.

It was Prince Albert's opinion that if any of the floats reached the coast of Europe, it would be between 40° and 50° of north latitude; but up to the present no such thing has occurred. Three of the floats were picked up, after a travel toward the east, in which they at the same time strangely inclined toward the south. Two bottles and one keg were found at the Azores—one of the bottles 10 miles off the port of Saint Iria, San Miguel Island, one a mile east of Porto Formoso of the same island, and the keg at the port of Porto, Santa Maria Island.

The two bottles had taken 53 days to travel a distance of 420 miles. The keg, which stranded on Santa Maria, seemed to show that the floats were continuing their course toward the south. It is allowable to suppose that the floats, after turning the Azores, continued to travel in the direction of the Cape Verd Islands, in order to cross the Atlantic and directly reach the Antilles, or to revolve indefinitely in the immense and pacific whirlpool called the Sargasso Sea. However this may be, the positive although partial results obtained seem to establish the fact that from the latitude in which the floats were thrown overboard, not a drop of the Atlantic's surface water reaches the coast of France. This is a point that now appears to be demonstrated. If we admit that there exists a current or simply a shifting of the warmer water from the west toward the east on a level with the coast of France, it is, then, to the north of the 42d parallel that we must look for the origin of the heating of this water. Every one now appears to argue that the Gulf current no longer makes its influence felt beyond the 40th degree of latitude. In reality, outside of its sphere of action, which is now well known and has been perfectly measured, it seems that the motion of the superficial water of the Atlantic between the Azores, the Cape Verd Islands, and the Antilles is in great measure a function of the movements of the atmosphere. On comparing the travel of the floats with Brault's wind charts for July, August, and September, it was found that their direction sensibly agreed with that of the current that carried the floats along.—*Condensed from Le Genie Civil.*

Insomnia in the Aged and its Treatment.

In opening a discussion on this subject, Dr. C. L. Dana said that he had found the information contained in the text-books upon insomnia in the aged was very slight in amount. Insomnia was not frequent in the aged, but when it was present it was sometimes very intractable. Pathologists thought it was due to anæmia and mulnutrition. The thickened arterial walls and the high arterial tension from the contracted kidneys, and similar states, which were found in the aged, would indicate that the blood supply to the brain was deficient. The insomnia produced by anæmia was characterized by drowsiness during the daytime, the patient falling into little naps, while at night he was unable to obtain any rest. This was true of the young as well as the old. If in any case we found no actual disease, it was customary to try iron and rich diet. In the speaker's experience, however, iron did not relieve the anæmia of the aged so as to produce sleep. Alcohol with the food was another remedy, and many recommended hot gruel or hot milk with alcohol before going to bed. While alcohol would relieve some cases, there were others in which the insomnia was increased.

The bromides and chloral, even when given in enormous doses, often failed to give relief. Opium was another remedy. Dr. H. C. Wood had recommended that we make our aged people opium eaters and alcohol drinkers. The speaker had not found that opium always agreed with the aged, and in his experience, where opium had produced sleep, it was sometimes followed by such physical and mental depression as precluded its further use.

He had been disappointed in bromide and chloral, and considered the results of opium sometimes disastrous. He recommended good food, warm drinks at night, and small doses of codeia with cannabis indica. Valerian and lavender, hyoscyamine, and lupulin sometimes were also useful drugs.—*Bulletin of Clinical Society, N. Y. P. G. M. S.*

Motive Power for War Ships.

On this subject Chief Engineer N. B. Clark gives some good suggestions in the *Army and Navy Journal.*

The swift passenger steamer requires engines which will develop power with the utmost economy at the high speed at which they are constantly run, without regard to economy of fuel at low speed. As the war ship consumes by far the greater part of her fuel supply (probably 95 per cent) at low speed, economy of fuel at that speed is a very important factor in the design of her engines.

As it would require about eight times the power to drive a vessel 18 or 20 knots that it would to drive her 9 or 10, it will be seen that engines designed for economy at high speed would not develop power with economy at low speed, as there would be great loss from friction and radiation incident to a large engine developing a small power.

At the present time, the steam machinery of war ships is patterned after that of the merchant service, inasmuch as it is so excessively heavy that, if sufficient horsepower is applied to attain high speed, the ship is so loaded down with steam machinery that but little weight-carrying capacity is left for anything else.

The average weight of the steam machinery of the British Navy is 360 lb. per I. H. P., with 289 lb. for the Iris and Mercury, and 180 lb. per I. H. P. for the torpedo ram Polyphemus, and only 57·7 lb. per I. H. P. in the existing first-class torpedo boats, while the steam machinery of the Chicago is 419 lb., and that of the Boston and Atlanta is 448 lb. per I. H. P.

The difference between 57·7 lb. in the torpedo boats and 448 lb. in the Boston and Atlanta seems to be a high price to pay for economy in the consumption of a small percentage of the fuel, to be obtained by its use, on rare occasions, for short periods of time, particularly when we consider that this ponderous machinery itself has to be carried at the high speed, and that additional power must be applied to overcome the resistance incident to its weight.

The remedy for this state of affairs is the application to war ships of the light-running, rapid-moving engines, constructed entirely of steel and bronze, similar to those applied to the torpedo boats, whereby great strength and power are obtained on a light weight, and by a division of the power among separate engines, so as to disconnect a part when running at low speed.

Such engines, if increased in weight to 115·4 lb. per I. H. P., or 100 per cent, would have ample endurance for the emergency power of a war ship, would develop power at low speed, with the utmost attainable economy, and would by their light weight permit of the application of sufficient power to attain a high emergency speed.

For the sake of illustration, we will take the hull of the British dispatch steamer Mercury, of 3,735 tons displacement, which has made a speed of 18·87 knots, with 7,500 I. H. P., having steam machinery weighing 968 tons. If the far lighter machinery, weighing 115·4 lb. per I. H. P., was applied to the Mercury, the same power would weigh but 386·4 tons, thereby gaining 581·6 tons, which, if applied to water line defense and V gun-shields, would produce a swift vessel, with great sea endurance, invulnerable to shot and shell.

Referring to the British torpedo boat Childers, we find she has compound engines 8½ ft. high, with cylinders 14 in. and 24½ in. in diameter, and 15 in. stroke of piston. If these engines were amplified to 1,875 I. H. P. their cylinders would measure 19½ in. and 34 in. diameter, with 21 in. stroke of piston, and would be 11·9 ft. high.

If two such engines were applied to each screw shaft of the Mercury, she would have machinery capable of developing a high emergency power, and of running with great economy at a low speed, thereby augmenting her sea endurance, as but one set of compound engines would be used in each shaft—the others being disconnected—thereby avoiding the great loss from friction and radiation incident to a large engine developing a small power.

Light-running, swift-moving engines, analogous to those of the torpedo boats in many features, are now being generally applied in industrial establishments, displacing the heavy, centrally located engine formerly used—the smaller engines being applied directly to the machine to be run, instead of running shafting to the machine, thereby avoiding the loss from friction and radiation due to running a large engine to produce a small power, when there is no more required.

The great power developed by the torpedo boat type of engines is due to their high piston speed, which is over 1,000 ft. *per minute;* but as the steam enters the cylinder at a speed of 1,600 ft. *per second,* it will be seen a still higher speed, and consequently greater power, might be developed, if it was not for the racking effect produced by the great momentum of the reciprocating parts.

The momentum of the reciprocating parts is measured by their weight multiplied by the square of their velocity, consequently a decrease of weight would admit of a higher piston speed and greater transmission of power by the same engine.

An aluminum bronze can be made having the same strength as the best steel, with only one-third its weight; and if the reciprocating parts of the engines described, consisting of the pistons, piston rods, connecting rods, and crank pin brasses, were made of this metal, the piston speed, and consequently the power transmitted, might be increased almost 75 per cent, without any increase of momentum.

The weight of reciprocating parts of an engine of the type and proportions of that of the Childers, if amplified to 1,875 I. H. P., and augmented in weight 50 per cent, which would be sufficient for those special parts, would, if made of steel, be 1,507·5 lb. If made of aluminum bronze of equal strength to the steel, the weight would be only 502·5 lb.

If the engines were run at the same piston speed that is now attained with steel, and the 75 per cent increase of power, made available by the use of the lighter metal, was held in reserve for a great emergency, they would possess remarkable powers of endurance.

A Grand Donation to the National Museum.

Dr. C. V. Riley, Entomologist of the Department of Agriculture and Honorary Curator of Insects in the National Museum, has presented to the National Museum his extensive private collection of North American insects, representing the fruits of his labors in collecting and study for over twenty-five years. His collection contains over 20,000 species, represented by over 115,000 pinned specimens, and much additional material preserved in alcohol or other methods. It is estimated by those familiar with the collection to have a money value of at least $25,000. In addition to the actual cost of material, it is hard to estimate the amount of time and labor that such a collection represents. In acknowledging the donation, Professor Baird expresses the warmest appreciation for this most generous gift, and his assurance that both now and in the future it will afford a valuable means of study for the entomologists of this country. This collection is especially rich in Coleoptera and Lepidoptera, and the latter contains many rare larvæ, blown and in alcohol. As it stands, says the *American Naturalist*, by this gift the entomological collections of the National Museum become next in importance to those at Cambridge.