

with the lampblack. The cakes are formed in wooden molds and dried between paper and ashes. Camphor, or a peculiar mixture of scents which comes from China, and a small quantity of carthamine (the red coloring substance of safflower) are added to the best kinds for improving the color as well as for scenting the ink. There is a great difference both in price as well as in quality of the various kinds of ink, the finest article being rather costly. The most renowned manufactory is in Nara, the old capital of Japan, in the province of Yamato.

(For the Scientific American.)

#### THE OCEANIC CIRCULATION CONTROVERSY.

The question as to whether the circulation of the ocean is due to winds or to gravitation is one that is now widely and warmly discussed. Most of this contention seems to collect around two men as nuclei: one is Mr. James Croll, who holds to the wind theory, and the other Dr. W. B. Carpenter, who attributes circulation to the opposite effects of tropical heat and arctic cold. The effect of winds upon the surface of water is far from inconsiderable. We can see this from the results observed on our eastern coast. "It is well known," says Professor Newcomb, "that the tides are there materially modified by the winds, so that the time of high water may be delayed or accelerated by an entire hour or more, and the height changed by one or more feet in consequence of a heavy wind. The effects of a wind thus determined must be the same as that of a difference of level equal to that which the wind is found to produce, and this again must be sufficient to produce a very strong surface current. Moreover, a continuous surface current must, in time, extend itself to a great depth, through friction." On a long sloping beach, the wind is often known to blow the water seaward to such an extent that ships at anchor near the shore in high tide, instead of being able to set sail in a succeeding high tide, have been left on a dry beach. In the passage of the Israelites through the Red Sea, we are told that "the Lord caused the sea to go back by a strong east wind all that night, and made the sea dry land." Observations in connection with the survey of the Suez Canal route have revealed the fact that at the probable place of crossing was a sand bar, but a little beneath the surface, which is now visible above the surface. The strong east wind was sufficient to force back the water from this sand bar and make a dry passage way. So this statement of Scripture is in strict accord with the discoveries of science.

On the other hand, adherents to the gravitation theory hold that, as water is heated by the sun at the equator, and cooled by want of it at the poles, the cold and hence heavier water of the north must sink and crowd under the warmer and lighter water at the equator, thus causing circulation. The movement-forming currents in the air are explained on the theory that the heavy air descends, crowding up the air made lighter by the expansive power of heat. The result of this is seen in the northeast and southwest winds from the poles to the equator, and the probable upper currents in the opposite direction. This is the accepted explanation of atmospheric circulation; and since the water—though less mobile—is nearly a perfect fluid, the same cause would reasonably be expected to produce a similar effect in the ocean. While these two theories, when simply stated, seem almost equally plausible, the friends of each find many objections to an acceptance of the other.

Much has been said about the Challenger's "crucial test" of these opposing theories. This has been advanced by Mr. Croll in opposition to the gravitation theory. Mr. Croll rightly remarks that, for gravitation to act, the surface at the equator must be elevated above that at the poles and all intermediate points. By referring to Dr. Carpenter's oceanic section which is most favorable to the latter's theory—which section is remarkable for the thinness of the warm strata at the equator compared with the greater thickness of the heated water in the North Atlantic—he concluded that the ocean, to be in equilibrium, must stand at a higher level in the North Atlantic than at the equator. To verify this conclusion, Mr. Croll examined the temperature soundings of the Challenger expedition taken near the equator, in 23° and 38° of north latitude; and he computed the variation in the height of these three columns of water due to the temperature indicated, by the use of Muncke's table, showing the expansion of sea water for different degrees of temperature. He afterwards corrected his computations by comparing them with results obtained from the use of Hubbard's table, and found that the column of water at 23° north latitude must stand 2 feet and 3 inches, and at 38°, 3 feet and 3 inches, higher than at the equator, in order to produce equilibrium. This shows that the north latitude waters must stand higher than the equatorial, and that in fact the surface does slope up from the equator to nearly the latitude of England. Hence, if the circulation from the equator to the pole is due to gravitation, the water must literally run up hill. And Mr. Croll says we might as soon expect the waters of the Gulf of Mexico to flow back into the Mississippi and Missouri rivers by force of gravitation.

From the data Mr. Croll has given from the records of the Challenger, it is somewhat difficult to see how he reaches his conclusions. For, taking the temperature soundings as he has given them, and finding the mean of temperature for the three latitudes above mentioned, we find the mean temperature of the water columns for the soundings to be a little over 51° at the equator, nearly 45½° in latitude 23° north, and about 46° in latitude 38° north. According to this, to produce equilibrium, the column would necessarily be highest at the equator, because expanded by greatest amount of heat, next highest at latitude 38°, and lowest at 23°. Hence there would be a depression in the surface, and then

an elevation as we go from the equator to the pole; but as the equatorial surface is higher than the elevation north of it, the force of gravitation could doubtless cause a northerly flow to the surface water. This result, however, does not suit Mr. Croll's purpose, and is evidently not the one which he obtained, though, as far as we can see, legitimately and naturally reached by use of his own data. But if we take in each of the three columns (representing the three latitudes) the mean temperature of only those soundings which correspond in depth in all columns, we obtain results just suited to Mr. Croll's purpose, which represent conditions essentially alike those which he presents as necessarily existing from Dr. Carpenter's section and the Challenger's soundings, namely, 42° at equator, 45° at latitude 23°, and 46° at 38°, or a gradual elevation of surface from the equator to the North Atlantic. This is presumably the method of calculation by which he reached his conclusion.

Mr. Croll further notices that Dr. Carpenter's section south of the equator furnishes an argument for the wind rather than for the heat theory. This section reveals the fact that the amount of warm water north of the equator is much greater than south of it, while, according to the heat theory, the reverse should be the case, because of less obstruction to circulation south than north of the equator. Dr. Carpenter anticipates this objection by explaining that the warm water is in excess north of the equator because "the upper stratum of the North Atlantic is nearly as much cooled by its limited polar outflow as that of the South Atlantic is by the vast movement of antarctic water which is constantly taking place toward the equator." "But," answers Mr. Croll, "this 'vast movement of antarctic waters' necessarily implies a vast counter movement of warm surface water. So that if there is more polar water in the South Atlantic to produce the cooling effect, there should likewise be more warm water to be cooled." Mr. Croll declares this fact is easily explained on the wind theory, by noting the fact that the southeast trade is stronger than the northeast, and hence, by overpowering the northeast trade and blowing across the equator, would sweep the preponderance of warm water into the Gulf of Mexico, where it has time to be heated, and then to the north, where it accumulates.

Mr. Croll is apparently a little inconsistent in the following: "There is an additional reason to the one already stated why the surface temperature of the South Atlantic should be so much below that of the North. It is perfectly true that whatever amount of water is transferred from the southern hemisphere to the northern must be compensated by an equal amount from the northern to the southern hemisphere; nevertheless, the warm water which is carried off the South Atlantic by the winds is not directly compensated by water from the North, but by the cold antarctic current, whose existence is so well known to mariners from the immense masses of ice which it brings from the Southern Ocean." So it is not directly compensated from the north at all, but from the south. And, from all he says, we might expect a constant accumulation around the north pole at the expense of the south. If it is not directly compensated from the north, how is it indirectly? While Mr. Croll leaves us in the dark respecting this important question, we find an explanation in Professor Wyville Thomson's Challenger "Report to the Hydrographer of the Admiralty." He says: "The more the question is investigated, the less evidence there seems to me to be of any general ocean circulation depending upon differences of specific gravity. It seems certain that both in the Atlantic and Pacific the bottom water is constantly moving northwards; and I am now very much inclined to refer this movement to an excess of precipitation over the water hemisphere, a portion of the vapor formed in the northern hemisphere being carried southwards and precipitated in the vast southern area of low barometric pressure." Want of space forbids remark on this explanation.

Mr. Croll again notices, from Captain Nares's report of Challenger Expedition, that, from 50° to 65° of south latitude, water to the depth of 600 fathoms—excepting a thin stratum at the surface heated by the sun's rays—was several degrees colder than the water below it; and declares this entirely inconsistent with the gravitation theory, according to which the colder should sink beneath and displace the warmer. Carpenter answers this quite satisfactorily by saying the cold water, according to Captain Nares's distinct statement, comes from the melting of field ice, and would have less salinity, hence less specific gravity, than the salt though warmer water beneath. The truth of this, however, depends upon mathematical computations from well ascertained data, and not upon theory.

To Mr. Croll's first crucial test argument, Dr. Carpenter at first replied that the doctrine to which Mr. Croll applied his test was a creation of his (Croll's) own, since his whole argument was based on the assumption that the ocean was in a state of static equilibrium, whereas Carpenter claims that it never can be in equilibrium so long as part of it is cold and the other part warm. And he illustrates it by a boiler and water pipes for heating, and claims that equilibrium exists till heat is applied, and then can exist no longer, and circulation necessarily commences. In one of his communications later in the series, Dr. Carpenter replies, as if it were an afterthought, that Mr. Croll "has entirely omitted the consideration of the inferior salinity of the equatorial column." This, he says, would make a difference in the opposite direction sufficient to neutralize the three feet and over of excess in the elevation of the North Atlantic column of water. To Dr. Carpenter's former point, Mr. Croll replies that considering the ocean in equilibrium was an advantage in his opponent's favor: the former granting that it never attains such a condition, and that, on the latter's

supposition, a disturbance of equilibrium would necessitate that the North Atlantic elevation above the equatorial surface be greater than Mr. Croll has computed, and hence so much less liability for the water to move to the north by its weight. "It is singular," says Mr. Croll, "that Dr. Carpenter should not have observed that his objection strengthens my argument instead of weakening it. For if it be true that the equatorial column, though in a state of constant upward motion, never attains to the height required to balance the polar column, then it must follow, as a necessary consequence, that the rise from the equator to latitude 38° in the North Atlantic must be greater than I have estimated it to be; and therefore, so much the more impossible is it that there can be any surface flow from the equator to the pole due to gravity." There seems to be a little want of candor or some misunderstanding in this reply; for it supposes the lack of equilibrium to result in a movement of surface water from the north toward the equator; and neither partly believes this the true direction. Mr. Croll's strong point seems to be that water will not run up hill by the force of gravity. But if the North Atlantic is over three feet higher than the equator, why does it not run down hill by force of gravity? Or, since it is in equilibrium as it stands, is it not as likely to run one way as the other?

Respecting Dr. Carpenter's latter objection, Mr. Croll expresses doubts as to the inferior salinity of the equatorial column to any great depth, though granting it to be a fact as far as the surface is concerned, and claims this as additional evidence in favor of his theory; but in what way, he fails to make clear, especially when he afterwards admits that he has made allowance for differences in salinity, to the advantage of the other theory.

There has been considerable sparring between the opposing parties concerning the viscosity of water in its effects upon this question; but while one concludes that it has nothing whatever to do with the question at issue, the other says that it is so slight that it may well be entirely ignored. Hence the *pro* and *con* on this point need not be noticed.

After the long and determined controversy, which is here but briefly epitomized, it seems a little strange that each has virtually admitted the correctness of his antagonist's position. Mr. Croll remarks: "Everyone will admit that, were there no other agencies at work but equatorial heat and polar cold, a difference of temperature would soon arise which would induce and sustain a system of circulation, but this condition of things is prevented by the equatorial waters being swept away by the winds as rapidly as they are heated." To this, we would simply remark: There appears no good reason why "this condition of things" should be "prevented" by the winds, and might not exist in its degree at the same time. On the other hand, Dr. Carpenter asserts: "I have never denied the existence of a horizontal wind circulation." And in another place: "It is scarcely fair in Mr. Croll to continue speaking of the wind theory and the gravitation theory of ocean circulation as if they were antagonistic, instead of being not only compatible but mutually complementary—the wind circulation being horizontal, and the thermal vertical." In view of these concessions, it may not be unreasonable to conclude that ocean circulation is due to both causes working together, and that we have not yet sufficient data for finally deciding which produces the greater effect, though, perhaps, the probabilities are in favor of the wind.

S. H. T.

#### The American Chemical Society.

This is a new organization, lately formed in New York city. The objects of the society are the encouragement and advancement of chemistry in all its branches.

The society consists of members, associates, and honorary members.

Only chemists are eligible as members or honorary members. The following are the managers:

*President*.—John W. Draper.

*Vice-Presidents*.—J. Lawrence Smith, Frederick A. Genth, E. Hilgard, J. W. Mallet, Charles F. Chandler, Henry Mor-ton.

*Corresponding Secretary*.—George F. Barker.

*Recording Secretary*.—Isidor Walz.

*Treasurer*.—W. M. Habirshaw.

*Librarian*.—P. Casamajor.

*Curators*.—Edward Sherer, W. H. Nichols, Frederick Hoffmann.

*Committee on Papers and Publications*.—Albert R. Leeds, Hermann Endemann, Elwyn Waller.

*Committee on Nominations*.—E. P. Eastwick, M. Alsberg, S. St. John, Charles Frobel, Charles M. Stillwell.

#### Capsizing of a Yacht.

The magnificent yacht Mohawk, probably the largest pleasure sailing vessel in the world, was recently capsized in New York Harbor, by a sudden squall. The vessel was getting under way under all plain sail, when a heavy gust struck her, throwing her almost on her beam ends. As she righted, another squall threw her back, and her heavy wet canvas pulled her over so that in a short time she filled and sank. Mr. William T. Garner, Vice Commodore of the New York Yacht Club and owner of the vessel, his wife, and three others were drowned. The Mohawk was 150 feet long and of 30 feet beam. Her construction was of the strongest description, and her interior fittings were palatial.

Mr. Garner was one of the largest print cloth manufacturers in the country, owning five large cotton mills at Cohoes, besides many others in various parts of New York State. He employed from 7,000 to 8,000 workmen, and in his cloth-printing factories ran 42 machines, this being dou-

ble the number used by any other manufacturer in the United States. He was a man of great wealth, a prominent citizen, and one whose loss will be widely and deeply regretted.

#### Potato Bug Sailors.

The sea coasts in the vicinity of this city and the shores of Long Island Sound are, at the present time, undergoing invasion by countless myriads of potato bugs. Where the insects come from is a mystery. They seem to cling to the floating sea weed and are left therewith on shore by the tide. At Coney Island and other points directly on the ocean the bugs are most numerous, showing that they have been brought hither by sea currents, and by similar means have been swept into Long Island Sound. It seems hardly possible that the insects will now fail to reach the other side of the Atlantic, as they may find transportation on vessels or be carried over in the drifting weed of the Gulf Stream.

#### Progress of the French Exposition of 1878.

Ninety-four Parisian architects have recently submitted plans for the buildings in which the great French World's Fair of 1878 will be held. For six of these, a prize of \$600 each has been awarded, and for an additional six, next in order of merit, the designers have received premiums of \$200 each. The project definitely adopted includes a principal palace which will be built on the Champs de Mars, and in the center of which will be the fine art gallery. The latter will be surrounded by the industrial department. France reserves to herself half the space; the remainder will be distributed among foreign nations. The buildings will cover an aggregate of sixty-eight acres, and the total expense of construction is estimated at \$7,000,000.

#### The Spirophorus.

The above is the name of a new device proposed by Mr. Woillez for restoring partially suffocated people. The patient is enclosed in a metal cylinder, so that only his head protrudes; connected with the cylinder is a large bellows holding five or six gallons of air. When this is operated, the air is alternately drawn out and forced into the cylinder, thus causing artificial respiration in the patient. The movements of the chest of the latter can be seen through a pane of glass in the cylinder.

#### Killing Entomological Specimens.

The Bulletin of the Amiens Linnæan Society describes the following simple device for killing butterflies and other insects, without injuring them, as is often the case when they are held in the hand. A glass tube of sufficient diameter to accommodate the insect is provided, with corks at each end. As soon as a butterfly is captured, one cork being removed, it is gently inserted in the tube, then a wad of tow is pushed in, saturated with a couple of drops of ether. The insect dies instantly, and may be at once removed and pinned.

#### United States Circuit Court--District of Connecticut. RULE IN REGARD TO FOREIGN PATENTS.—THOMAS A. WESTON vs. WILLIAM H. WHITE *et al.*

An American patent will expire at the same time with the foreign patent granted to the same party or parties, but will not exceed the term of seven years.  
The date of publication of the foreign patent is to be the date from which to determine the life of an American patent.  
The fact that a patent has been issued does not of itself prove the introduction into common use without the necessity of other testimony.  
*J. E. Wetmore, for plaintiff.*  
*John S. Beach and S. W. Kellogg, for defendant.*

#### NEW BOOKS AND PUBLICATIONS.

A NEW TREATISE ON STEAM ENGINEERING. By John W. Nystrom, C. E. Philadelphia, Pa.: J. B. Lippincott & Co.

Mr. Nystrom is a thoroughly educated engineer and a competent teacher of his profession; but in this, as in some of his previous works, he falls, we think, into the manifest error of using too many new terms and characters. The object is the laudable one of simplifying his meaning; but the result to the average mind will, we fear, be the reverse. The best of workmen, accustomed for years to his present implements, cannot produce skillful work with strange tools, the manipulation of which he has got to learn before he undertakes a task. The less new terminology introduced into science the better; for the student in any branch has enough to do to become well grounded in principle, without burdening his mind with vocabularies of new languages. Besides, the introduction of new characters and names renders the book useless for reference, save to those who have studied it from the beginning. In other respects, Mr. Nystrom's work is clearly written, and may be profitably studied by engineers and others.

A TREATISE ON THE MECHANICAL THEORY OF HEAT AND ITS APPLICATION TO THE STEAM ENGINE, ETC. By R. S. McCulloch, C. E. New York city: D. Van Nostrand, 23 Murray and 27 Warren streets.

This is an elaborate purely mathematical treatise on thermo-dynamics. It requires a thorough knowledge of analytical geometry and the fluxional calculus for its comprehension, and consequently is not a book for the ordinary practical engineer. For advanced students, however, in colleges, it will be found valuable, since it may be used as the continuation of a mathematical course, and in this respect may be advantageously substituted for the works on astronomy and others involving high mathematics, commonly employed for the study of practical application of the abstract reasoning.

#### Recent American and Foreign Patents.

##### NEW MECHANICAL AND ENGINEERING INVENTIONS.

###### IMPROVED BALL VALVE.

Cortland Carlton and John B. Jones, Kalamazoo, Mich.—This invention is intended to take place of the commonly used hinged leather valve, which frequently gets obstructed and out of order; and it consists of a ball valve with metallic seat entering the wooden tubing, being driven by a sharp circumferential flange into the end of the tubing.

###### IMPROVED STATION INDICATOR.

J. Robinson Balsley, Connellsville, Pa.—As the train, car, or boat leaves a station, a cord is pulled, which turns rollers and

brings into view the name of the next station, which operation causes the hammer to strike the bell to call the attention of the passengers to the indicator. As the train, car, or boat approaches the said station, another cord is pulled, which brings the lever into position to be again operated, and also again strikes the bell to warn the passengers that they are approaching the station.

###### IMPROVED CAR MOVER.

John W. Raynor, Moberly, Mo.—This is for readily moving cars from the main to the side track, or out of the way; and it consists of a block with curved front jaw that takes hold of the outer concave part of the wheel, a pivot dog and block being on the tread of the wheel, and an adjustable gage piece bearing on the flange of the wheel.

###### IMPROVED SWITCH AND SIGNAL LOCKING DEVICE.

Smith H. Finch, New York city, and Henry Moore, Orange, N. J.—This attachment for switch and signal levers is so constructed that the movement of the detent to release a lever will lock the other levers, or any previously arranged number of them, before the said lever has begun to move. So that the other levers cannot be moved until the first one has been brought back to its place and secured by its detent.

###### IMPROVED CAR BRAKE.

Peter Hughes, New York city.—This consists of a yoke spanning a friction wheel on each axle of the car, and having a little motion forward and backward, so as to be driven against the wheel from either end of the car. Said yokes are connected together between the axles, and attached at each end of the car with a brake lever rising up in front of the platform, so that it can be worked to apply the power.

###### IMPROVED SELF-CLOSING HATCHWAY.

Henry Reese, Baltimore, Md.—As ordinarily constructed, the iron hoisting ropes of elevators prevent the use of hinged doors or hatches.—The object of the first part of the invention is therefore to provide hatches adapted for use in such connection; and to this end, rigid arms are attached to the crossbeam of the frame from which the elevator platform is suspended, and cleats are so attached and arranged in the several floor openings of the hatchway that, when the platform goes up, it shall take each hatch or cover with it, and, when it descends, shall leave each in its proper place supported upon said cleats. The second feature of the invention relates to a sliding gate, guard, or railing for each floor opening, the same being arranged to be raised (by hand) when it is desired to transfer goods to or from the platform upon any of the upper floors, and to be automatically released and thus allowed to resume its place when the platform descends.

###### IMPROVED CANAL LOCK AND DAM.

George W. Parsons, Ceredo, W. Va.—The object of this invention is to enable boats to be passed from one level to another, either in canals or rivers, more quickly and with less labor than by means of the locks heretofore used. To this end, the invention is two-fold: It relates, first, to a lock proper; and secondly, to the bulkhead of the lock or dam. For locking purposes the inventor employs vertically acting gates, operated by the pressure of the water in the canal or river. The water is let on and shut off from the pistons which raise and lower the gates, simply by the adjustment of a valve or wickets. It is hence obvious that the labor and time involved in the operation are reduced almost to a minimum. In respect to the chute, the ridge or column of water which forms at the bottom of every fall is broken up by allowing a portion of the water which would otherwise pass over the fall to pass beneath or around it (in one or more separate streams), and enter, or rejoin, the main body at the bottom of the fall. A body of comparatively smooth water will thus be formed to float the boat safely over the brink of the fall.

###### IMPROVED METHOD OF CASTING CAR WHEELS.

James McAllister, Virginia City, Nev.—This invention is an improvement in the class of car wheels having a soft cast iron hub and a hardened rim or tread. The feature upon which the claim to novelty is based is the form of the meeting portions of the cast iron hub and hardened tread or body of the wheel, whereby they are more firmly united than in other wheels of the class.

###### IMPROVED TREADLE.

Henry Reese, Baltimore, Md.—This invention relates to an improvement in that class of treadles in which independent foot rests or secondary treadles are employed, upon opposite sides of the fulcrum, for obviating the tiresome strain upon the ankle joint. The invention consists, first, in a raised support with an arc-shaped face upon which the instep of the footstep rests, and upon which arc-shaped face the sole of the shoe becomes the independent treadle, turning upon the curved face as a pivot. It also consists in a pivoted independent treadle, having pendent weights which hold the secondary treadle or foot rest always in a horizontal position.

###### IMPROVED ROLL FOR RE-WORKING RAILROAD RAILS.

James McCaffrey, Pittsburgh, Pa.—The object of this invention is to economize worn-out steel or iron railroad rails by reducing them to flat bars, in which form they may be conveniently utilized for various purposes. To this end, the invention relates to rolls provided with a series of graduated grooves, through which the rails are passed in succession, being thus gradually reduced to uniform widths.

##### NEW CHEMICAL AND MISCELLANEOUS INVENTIONS.

###### IMPROVED VALVE FOR BRASS MUSICAL INSTRUMENTS.

William A. Tischendorf, Leavenworth, Kan.—This invention relates to the cylinder valves of wind instruments to open and close the air passages; and it consists of said cylinders, pivoted on center points adapted to be adjusted from time to time to take up the slack, and being adjusted to spring pressure. The object is to prevent the wear of the cylinders against the sides of the case.

###### IMPROVED ARTIFICIAL TEETH.

Thomas Williams, Braytonville, North Adams, Mass.—This is a new mode of securing artificial upper front teeth in place in such a way that they will be held firmly in place, and may be readily put in and taken out. It consists in a plate and teeth having grooves or channels along the sides of the outer teeth, and provided with a spring and pad, which rests against the roof of the mouth.

###### IMPROVED TWINE CUTTER.

William Haddenhorst, Hoboken, N. J.—This is a device for cutting twine or cord as it is used for tying up packages. When a package is to be tied, a sufficient amount of cord is drawn through the device, the package is tied, and the cord is cut off by drawing it across the edge of a blade in the apparatus, leaving the device suspended from the cord, from which it need not be removed until all the cord upon the reel or ball has been used up.

###### IMPROVED DRUGGISTS' GRADUATED MEASURE.

Edward L. Witte, White Mills, Pa.—This is a druggist's graduate or measuring vessel, having the scale or graduation burned into the glass in black or other color to be clearly and readily distinguishable.

##### IMPROVED LUBRICATING COMPOUND.

Horace W. Billington, Jersey City, N. J.—This is a lubricating compound consisting of saponified grease or soap, London oil, and paraffin oil. It will keep its state through all grades of weather, the saponified matter will not melt except when broken or disturbed. It will not congeal or harden on cold iron when in use, nor will it gum or thicken. It is applicable to all kinds of axles.

##### IMPROVED GLASS BOTTLE MOLD.

Jacob Pease and Abraham Tester, Brooklyn, N. Y.—This consists of the bottom of a glass bottle mold so arranged that the opening of the sides of the mold lets the bottom fall to relieve the bottle from pressure between the bottom and the breast, which in the common molds cracks and breaks the bottles to some extent. The contrivance is such that, when the mold is closed, the bottom is raised up to the proper position for shaping the bottle.

##### NEW AGRICULTURAL INVENTIONS.

###### IMPROVED SHEARING CHAIR.

James A. Boals, Dinsmore, Pa.—This invention consists of a horizontally revolving seat and a vertically swinging rack, together with adjusting devices for the same, fixed on a platform and arranged in such manner that the sheep may be so placed on the seat and rack as to be more conveniently supported and handled for shearing.

###### IMPROVED HARVESTER.

Richard Emerson, Sycamore, Ill., assignor to himself and Horatio H. Mason, of same place.—This is an improvement in the class of harvesters having a binder's table and tilting platform, and a traveling rake arranged to carry the cut grain up to the binder's table. The construction and arrangement of the parts are simple and embody many new devices, which require drawings for their proper explanation.

###### DITCH-DIGGING AND TILE-LAYING MACHINE.

David T. Lucas, Stockwell, Ind.—This invention relates to a novel construction of ditch-digging and tile-laying machine, designed to effect in one operation the opening of the earth and laying of sections of pipe or tile adjacent to each other, so as to form a continuous under drain. The invention consists mainly in the construction of the placing devices, having a long beam supported in front by a sled adjustably attached to said beam, so as to vary the elevation of the beam and depth of placing devices. The placing device is provided with a chute dam, which the tiles pass consecutively in contact with each other, and occupy a position in the opened channel below, one after the other, in alignment, a supplemental trough being used with the chute to facilitate the inserting of the tiles, and the chute made adjustable to different sized tiles by a spring.

##### NEW HOUSEHOLD INVENTIONS.

###### IMPROVED MATTRESS.

John J. Donahoe, New Orleans, La.—The object of this invention is chiefly to effect an economy in the construction of mattresses, particularly in respect to the material of which the covering is composed, and the mode of making up the same. The invention consists in displacing with the cord or binding at one end of the mattress and continuing the ticking around said end so that the portion which covers the top and bottom of the mattress is of one and the same piece. The portion covering the sides is also in one piece, and likewise the binding cord.

###### IMPROVED WASHING MACHINE.

Thomas Muir, Andes, N. Y.—This invention consists of a couple of conical rollers arranged side by side, and reversed as to their tapers, on a fluted roller, and pressed down upon it by a lever and weight or other suitable means, the said rollers being arranged horizontally across the middle portion of a tub, so that the clothes can be drawn up from and be delivered back into the tub in working the machine. By the conical form a rubbing action is effected, and by the use of two reversed conical rollers the clothes are made to pass straight through the rolls.

###### IMPROVED COFFEE POT.

Willis H. Sherwood, Waco, Tex.—This consists of a receiver for the decoction, fitted in the pot from the top. In the top of the receiver is a dripping cup to hold the coffee or tea, and through which and the receiver a tube extends from the water pot. Up the tube the hot water is forced by the steam, and discharged into the dripper to drip the coffee into the receiver, from which it is drawn for use without passing into the water pot. The receiver is provided with a gage to show the quantity in it, and the water pot has a safety valve to let off the steam when the pressure is too high, the said valve being fitted in the cap of the filling tube.

###### IMPROVED STOVE PIPE ELBOW.

Alfred Greenleaf, Brooklyn, E. D., N. Y.—This is so constructed that the pipes may be cleaned out, when required, without being taken down, and conveniently examined to see if they need cleaning, and ventilated so that they will not rust if allowed to stay up in summer. It consists in the combination of the collar and the cover with the opening formed in the one part of the elbow, directly opposite the cavity of the other part. The edge of the cover has notches formed in it to receive the screws by which it is secured in place, and which are screwed into the collar, so that by loosening the said screws the cover may be removed.

###### BATH TUB ATTACHMENT FOR STEAM, HOT AIR, OR VAPOR.

William C. Kidney and Alfred H. Kidney, New York city.—This invention consists in the combination, with an ordinary bath tub, of a casing provided with movable doors or sections, and ventilating doors or openings. By using this attachment, a steam, vapor, or hot air bath may be taken by its owner at his own house and in his own bath tub.

##### NEW WOODWORKING AND HOUSE AND CARRIAGE BUILDING INVENTIONS.

###### IMPROVED WAGON BODY.

Benjamin Rankin, Jeffersonville, O.—This wagon body is so constructed that it will be held firmly in place, and together, may be readily attached and detached when desired, may be snugly packed for storage, and will allow the rear end boards to be detached without loosening the other parts.

###### IMPROVED TABLE.

Conrad Schmid, New York city.—This is an improved table for parlors, hotels, and other uses, that may be employed for playing and other purposes, its top being capable of being changed from one side to the other by a simple mechanism. The invention consists in providing the circumferential frame of a table with a swinging end locking leaf and a joint covering molding.

###### IMPROVED TABLE HINGE.

Frederick H. Cutler, Buffalo, N. Y.—This hinge for table leaves is so constructed as not only to allow the leaf and top to be flush when extended, but mainly to allow the leaf, when down, to hang immediately under the top, and flush with the edge thereof. This allows compactness of form and in packing for shipment, and does away with the usual edge and groove of the leaf and top.