of milk, which, on exposure to the air, turns sour and curdles: the sugar it contains being converted into lactic acid. At the same time microscopic observation always reveals the presence of minute organisms of the nature of bacteria in the coagulated milk. By collecting a number of samples of milk in separate glass vessels, with suitable precautions to prevent the access of organisms, the milk in a few of the glasses was found, after some weeks, to be entirely free from change, destitute of any acid reaction; and under the microscope, no indications of the presence of bacteria were to be found.

The next step in the investigation was to find evidence to decide whether the particular bacterium found in sour milk was or was not the cause of the lactic fermentation. For this purpose, Professor Lister endeavored to estimate the number of bacteria in a given quantity of sour milk, by placing one fiftieth of a minim of the milk on a slide, and counting the number of bacteria in the field; then by diluting the milk to such an extent that a single drop of the liquid would probably contain, on the average, one bacterium, a liquid was obtained, with which a number of separate quantities of boiled milk were inoculated, by adding a single drop of the liquid. The result was that out of five glasses of milk treated in this way only one was curdled, and on examination the one was found to contain the *bacterium lactis*, while the four others, which did not curdle, had no bacteria in them.

In another series of experiments, five specimens of milk were each inoculated with a drop of the liquid, calculated to contain two bacteria; other five specimens were inoculated with drops calculated to contain one bacterium; another set of five open glasses were inoculated with drops calculated to contain one bacterium; and one with a drop calculated to contain four bacteria. The result was that the last specimen curdled in a few days, and all those calculated to have two bacteria curdled in a few days. Of the five glasses calculated to have one bacterium, three remained liquid. On opening one of these glasses the milk was found to be perfectly sweet; it had a slight flavor of suet, similar to that which Pasteur has described as resulting from the oxidation of the oleaginous constituent of milk.

The result of these experiments proves conclusively that the ferment which caused the curdling of the milk was not in solution but in the state of suspended particles, otherwise every drop of the inoculating liquid should have produced the same result. Again, the fact that some drops were destitute of the ferment proves in like manner that it was not in solution.—*Pharmaceutical Journal.*

The Ancestry of Insects.

In his new work on "Our Common Insects," Mr. A. S. Packard gives an excellent chapter under the above caption. He considers that the natural system is the genealogy of organized forms; and when we can trace the latter we establish the former; and he concludes that there is a strong genetic bond uniting the worms, insects and crustacea in one grand sub kingdom. Many of the most interesting facts pointed out by Mr. Packard are presented in condensed form below.

The lowest form of insect life is the parasitic mite, the highest is the hive bee. Between these two there is an ascending scale of being, a continuity of improving organizations, which affords strong arguments for the theory of evolution. The mite is called the pentastoma, and lives in the manner of the tape worm a parasitic life in the higher animals. It is found in the nostrils of dogs, sheep, and horses. It is a little higher than some worms but lower than others. Young mites when hatched have but three pairs of feet, while their parents have four. If these early stages of mites and myropods are compared with these of the true six-footed insects as the cicada, or dragon fly, it will be seen quite plainly that they all share a common form. By simple modifications of parts here and there, by the addition of wings and other organs in these simple creatures, Nature has rung numberless changes on the elemental form. Starting from the simplest kinds, such as the poduras, spiders, grasshoppers, and May flies, allied creatures which we know were the first to appear in the earlier geologic ages, we rise to the highest, the bees with their complex forms, their diversified economy and wonderful instincts. In this progress upwards the beetles are higher than the bugs and grasshoppers, and the butterflies and moths more highly organized than the flies. In the egg nearly all insects agree most strikingly in their mode of growth. The earlier stages of the germ of a bee, fly or beetle bear a remarkable resemblance to each other, and suggest that a common design or pattern at first pervades all. At a certain period in the life of the embryo, we notice that all agree in having the head large, and bearing from two to four pairs of mouth organs resembling the legs; the thorax is merged with the abdomen and the general form of the embryo is ovate. The first to discuss the subject of the ancestry of insects was Fritz Muller, who suggested that the larva of crabs, zoëa, was the common ancestor. Haeckel and Friedriech Brauer have partially sustained this idea. The latter declared his belief that, though it seemed premature after the discovery of highly organized winged insects in rocks so ancient as the Devonian, to even guess as to the ancestry of insects, yet he would suggest that, instead of being derived from some zoëa, "the ancestors of insects must have been worm-like and aquatic." Mr. Packard rejects the zoëa origin of insects, and says the only refuge is in the worms. But how to account for the transmutation of any worm into a form like the leptus, with its mandibulated mouth and jointed legs, seems at first well nigh impossible. We have the faintest possible indication in the structure of some mites, and of the tardigrades and petastoma, where there is a striking recurrence to a worm-like form, readily noticeable. In the demodex we see a tendency of the mite to assume, under peculiar circumstances, an elongated, worm-like form. The mouth-parts are aborted, while the eight legs are not jointed and form simple tubercles. In the tardigrades, a long step lower, we have unjointed fleshy legs armed with from two to four claws, but the mouth-parts are essentially mite in character. A decided worm feature is the fact that they are hermaphrodites, each individual having ovaries and spermaries, as is the case with many worms. When we come to the singular creatures of which pentastoma and linguatula are the type, we have the most striking approximation to the worms in external form. They lose the rudimentary jointed limbs, which some have well marked in the embryo, and from being oval, rudely mite-like in form, they elongate, and only the claws remain to indicate the original presence of true jointed legs.

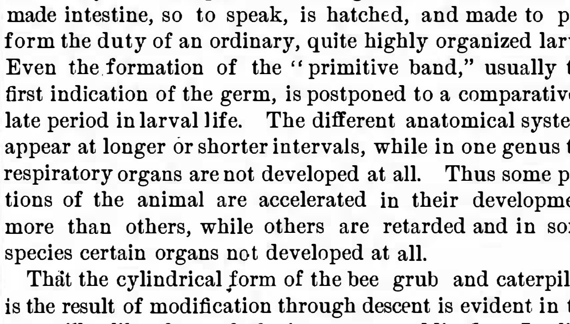
Professor Ganin, a Russian naturalist, made some remarkable discoveries in regard to the early stages of the platygaster, a parasite on a gall fly. He established facts which bear strongly on the theory of evolution by "acceleration and retardation." In the history of many early larval stages we see a remarkable acceleration in the growth of the embryo. A simple sac of unorganized cells, with a half-made intestine, so to speak, is hatched, and made to perform the duty of an ordinary, quite highly organized larva. Even the formation of the "primitive band," usually the first indication of the germ, is postponed to a comparatively late period in larval life. The different anatomical systems appear at longer or shorter intervals, while in one genus the respiratory organs are not developed at all. Thus some portions of the animal are accelerated in their development more than others, while others are retarded and in some species certain organs not developed at all.

That the cylindrical form of the bee grub and caterpillar is the result of modification through descent is evident in the caterpillar-like form of the immature caddis fly. In like manner the caterpillar form is probably the result of the leaf-eating life of a primitive larva, and the soft-bodied maggot of the weevil is evidently the result of its living habitually in cavities in nuts and fruits. So the organs of special sense in insects are in most cases simply altered hairs, which are themselves modified epithelial cells.

NEW ARRANGEMENT OF THE AIR RESERVOIRS IN PUMPS.

The object of the air reservoir in pumps and hydraulic machines is to equalize the movement of the water and to deaden shocks. Its action will be more efficacious in proportion as (1) the head of water is low; (2) the movement slow; (3) the section of pipe and valves large; (4) it is itself large, and (5) as the mass of water is small. Given the pressure and dimensions of the pump in order that the reservoir may operate to best advantage, it is further necessary that it contain as much air as possible, that the water pipes be completely isolated, and that it be disposed as near as possible to the point where shocks and other disorders are most likely to occur. We illustrate herewith a new arrangement of air reservoir which we extract from *Dingler's Journal.*

Fig. 1. Fig. 2.



P is the section of the pump, V the valve box, *w* the reservoir of aspirated air, and *w'* that of compressed air. The dotted lines indicate the highest levels, full lines the minimum normal level. The entry pipes, *e e'*, are placed exactly above the maximum level, and escape pipes, *a a'*, are situated as low down as possible.

By this arrangement it is claimed that sudden shocks are impossible. Even if the valve, S, be opened suddenly, so as to allow of the escape of considerable water at once, the perturbation affects immediately only the small column of water comprised between the air reservoir and the escape orifice. The water in the tube remains as before, as it is only after the air pressure in the reservoir, K, is diminished that the flow progressively becomes more rapid.

The Melting Point.

The theory that iron in a cupola is melted all up through the stock is wrong, for every cupola has a certain point at which the iron is melted, and there is not a pound of iron melted in any cupola until it comes down to the melting point. The melting point in a cupola is generally from six to eighteen inches above the tuyeres, but it may be raised or lowered a little by increasing or diminishing the amount of fuel in the bed; but if we get the bed too high it throws the melting point too high, and the result will be slow melting. If we get the bed too low, it will allow the iron to get below the melting point, and the result will be dull iron; and in order to do good melting in any cupola, it is very essential that the melter should know the melting point of his particular cupola. The melting point of a cupola is at the point at which the most intense heat is created by the action of the blast upon the fuel. This intense heat at the melting point will cut the lining more than at any other place in the cupola, and the lining will generally be found to be cut out more just above the tuyeres than at any other point, which indicates the melting point of the cupola. If the tuyeres are put in so as to distribute the blast evenly through the stock, and the changes of iron and fuel are put in evenly, and every charge leveled up properly, the heat will be even all through the cupola, and the lining will be cut out in a regular belt at the melting point all around the cupola. On the other hand, if the tuyeres are not put in so as to distribute the blast evenly through the stock, or the charges of iron and fuel are not put in even and level, or if the fire is all on one side of the cupola, the heat will not be even through the cupola, and the lining will not be cut out in a regular belt at the melting point, but will be cut full of holes, which shows that the cupola is not melting all around, but is only melting in spots. By this irregular charging and melting in spots, the cupola may be reduced to half its melting capacity, which accounts for a cupola melting fast on one day and slow on another day. As before intimated, the melting point in a cupola is the point at which the most intense heat is created by the action of the blast upon the fuel. When the blast enters the cupola it is cold, and as it passes through the heated fuel it becomes hot, and as it becomes hot it creates heat by combination with the fuel, and makes an intense heat. If we have a very strong blast it will travel fast and will pass through the fuel rapidly, and it will have to pass through more fuel before it becomes heated sufficiently to make an intense heat by combination with the fuel. On the other hand, if we have a mild blast, the blast will pass through the heated fuel slowly, and is more heated, so that it does not have to pass through so much fuel before it becomes sufficiently heated to make an intense heat by combination with the fuel; so that when we have a strong blast the melting point of a cupola is higher than when we have a mild or weak blast; and the bed has to be put in higher in a cupola with a high melting point than in a cupola with a low melting point, which accounts for one cupola requiring more fuel in the bed than another cupola does. When the cupola is in blast, the bed or fuel in the bottom of the cupola is constantly burning up, and the unmelted iron will get down below the melting point. To prevent this, the melter has recourse to charges of fuel between the charges of iron, and as the charges of iron are melted and drawn out at the tap hole, the charges of fuel come down and replenish the bed and again raise the melting point; the next charge of iron comes down and is melted and drawn out; the bed is reduced and is again replenished by the next charge of fuel, and so on through the whole heat. If we supply too much or too little fuel between the charges of iron, the melting point will be raised too high or reduced too low, or in other words, if we have a melting point of ten or twelve inches in height in our cupola, and we supply twenty or twenty-five inches of fuel, this extra fuel must all be burned up before the iron can come down to the melting point; and we will not have a continuous melting, but will have a delay between each charge of iron. If, on the other hand, we have only five or six inches of fuel between the charges of iron, when we should have ten or twelve inches, this small amount will not more than half replenish the bed, and the unmelted iron will get down too low and will not make hot iron, and the iron may not be melted at all; and in order to do either fast or economical melting, we must not use either too much or too little fuel, and we must have the fuel distributed so as to suit the particular cupola in which it is used; for, as before explained, there are scarcely two cupolas that will melt exactly alike on account of the melting point being higher or lower, which is caused by a stronger or weaker blast, or by more or less draft; and in order to do good melting, the melter should not charge his cupola just the same as some other cupola of the same size is charged because that cupola does good melting charged in that way; but he should vary the height of the bed and the amount of fuel between the charges of iron, and the amount of iron on the bed and on each charge of fuel, until he finds the exact proportions that will do the best melting in that particular cupola.

Melters, in changing from one cupola to another, will generally have trouble in making hot iron, and they will often make a complete failure of melting in a strange cupola. This is simply because they undertake to charge that cupola the same as some other cupola that they have been melting in, and they never pay any attention to the draft, blast, or the melting point of the cupola, which is the cause of their failure in melting in a strange cupola. When a melter takes charge of a strange cupola, his first object should be to study the draft of the cupola, the nature of the blast, and to ascertain the melting point of the cupola. He can generally tell where the melting point is by noticing where the lining is cut out the most, and he can tell whether the cupola is melting evenly, or is only melting in spots, by noticing whether the lining is cut out in a regular belt all around the cupola, or is only cut out in holes, as before explained. He can tell whether the bed is too high or too low by noticing how the cupola melts. He can tell whether he is using too much fuel between the charges of iron, or if he is putting in the charges of iron too heavy, by noticing whether the cupola melts regularly or not, and by noticing if it

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makes regular iron; for if the iron is very hot in one part of the heat and dull in another part, it is a sure indication that the fuel is not properly distributed through the iron, and it should be remedied by increasing or diminishing the weight of the charges of fuel or iron.

In melting with coke, the melter cannot put in his iron in as large charges as he can with coal, because the coke is more bulky than coal, and he has more bulk in the same weight, and if he puts the same weight of coke between the charges of iron as he does of coal, the bulk of the coke will raise the iron above the melting point, and the iron cannot be melted until part of the coke is burnt up so as to allow the iron to come down to the melting point, and the result is that he does not have a continuous melting, but he has a delay between each charge of iron, and the iron will probably be dull in the latter part of each charge; but the melter can do equally as regular melting, and can do faster melting with coke than he can with coal, by putting in the coke and iron in smaller charges, and more of them, which proves conclusively that good melting can be done with almost any fuel and in any cupola, if the melter understands his business; but he may not be able to do as economical melting in a poor cupola as he can in a good one.—*From Founding of Iron, by Edward Kirk.*

[For the Scientific American.]

HOW TO ADJUST ENGINE GUIDE BARS.

A correspondent says; "I am about putting new guide bars to my 16 horse power stationary engine, and desire instructions how to adjust them true with the bore of the cylinder, that the wrist pin will stand in the same line with the driving shaft." He adds: "The bars are bolted to the cylinder cover at one end and to pedestals at the other." Drill holes in the ends, leaving about $\frac{1}{32}$ inch to ream out after the bars are set and in their place. Screw the bottom bars temporarily in their places beneath the crosshead. The gland should be screwed up well into the stuffing box; the piston rod, crosshead, and guide bars cleaned and the rod oiled to cause it to move freely. Then take a spirit level and try if the driving or main shaft of the engine stands horizontal; if not it is as well to true it up with pieces of the requisite thickness inserted under the journal box which requires lifting to make the shaft stand level. If the bottom half of the box has flanges upon it so that the packing piece or liner cannot slip out, it will be retained by being simply laid in position, otherwise it may be required to be pinned or riveted to the bottom of the box. If, however, it is decided not to adjust the main shaft, the spirit level may be placed upon it and a slight mark made to denote where the center of the bubble stands. At the same time, note which end of the spirit level stands toward the engine crank. This being done, pass to the guide bars and move the piston in and out to ensure that it moves freely. If the cylinder cover is off, it will pay to take out the piston rings to facilitate setting the guides.

The next procedure is to place the piston in about the middle of the cylinder and bolt up one of the bottom bars until it just touches the face of the crosshead guide and stands at the same time true with the bore of the cylinder, as tested by the spirit level. The bore of the cylinder being level the bar must be set level, but if the bore stands out of level the bar must be set to correspond. The guide bar being thus adjusted to lightly touch the guide on the crosshead, the other bottom guide bar is adjusted in the same manner. The spirit level must be placed across the two bottom bars and the latter adjusted until the bubble stands in the same position as it did when placed upon the horizontal part of the engine shaft. This is necessary to ensure that the axial line of the wrist pin (which is of course supposed to stand true with the bottom faces of the crosshead guides) shall be adjusted to stand parallel with the axial line of the engine shaft, which is an important consideration because otherwise the connecting rod would be twisted when its brasses were keyed up. The next operation is to move the crosshead once or twice up and down, and if it binds unduly at either end the spirit level should be placed across the bars at that end and the bar or bars lowered, to maintain the same spirit level adjustment. When the crosshead will move from end to end of the bars, having contact with both their entire length, the bars may receive a very light coat of red marking. Shove the crosshead up and down them two or three times, and the marks upon the bars will denote if the bearing between the crosshead guides and the surface of the bars is even from end to end. During this adjustment the fit of the flanges of the crosshead against the edges of the bars requires watching, the marks being a sufficient guide. When properly fitted, get out the liners (as the small pieces, which are placed between the ends of the bars and the supports, are termed). To get the thickness of these liners, take wedges made of iron, wood or lead, and insert the thin end between the end faces of the bars and their seating upon the supports, forcing the wedges in with sufficient force to leave a mark upon them. By chalking the faces of the wedges they will exhibit the marks more plainly. The wedges should be inserted at each end and on both sides of the bar, the liners being got out a little thicker to allow for fitting.

In filing up the liner use either a surface plate or a straight edge, and file the liner faces hollow rather than rounding, for if filed rounding the guide bar may cant to one side in the bolting up, while if hollow the bar will be sure to bolt up solid. When the four liners are ready, put them in position between the bars and their seatings. Bolt the bars firmly in place, wipe them clean, and test them lengthways with the spirit level to ascertain if they are parallel with the bore of the cylinder. Place the level across the bars to test parallelism with the engine shaft. Note where further adjustment is necessary. Put marking upon the bars and move the crosshead up and down to ascertain how much the respective liners require reducing. After filing all the liners it is better before putting them in for the next adjustment to give them a light coat of marking, to show where they bear. At each trial of the bars the spirit level and the straight edge should be applied. The crosshead should be moved up and down the bars to ascertain by the bearing marks upon the surfaces how the crosshead guides fit. The fitting marks are a finer test than the spirit level, hence the last part of the fitting should be performed with strict reference to the bearing marks, both upon the bars and the crosshead as well as upon the liners; the crosshead flanges being adjusted and fitted at the same time as the face fitting.

The adjustment is correct when the gland is equally free and has an equal amount of play in the stuffing box at whatever part of the stroke the piston rod may be. In bolting up the bottom bars during the last part of the adjusting process, it is necessary to screw up the bolts to the same degree of tightness, for a little extra tightening in some of the bolts may cause the bars to spring out of true, if the ends of the bars or the seating for the liners is not practically true. To set the top bars place the crosshead in the middle of its stroke and lay the bars upon the crosshead guides. Then, with the wedges applied as before, ascertain the required thickness of the liners, one at a time, leaving them as previously a trifle thick, testing them on both the flat and the edge faces by marking placed on the surfaces, and moving the crosshead up and down, dispensing with the use of the spirit level and straight edge, and working entirely by the bearing marks. J. R.

To renew manuscripts, take a hair pencil and wash the part that has been effaced with a solution of prussiate of potash in water, and the writing will again appear, if the paper has not been destroyed.

NEW BOOKS AND PUBLICATIONS.

"FRET SAWING FOR PLEASURE AND PROFIT." H. T. Williams, Publisher. New York: Illustrated. Price 50 cents.

This is a complete handbook of fret sawing, valuable alike to the amateur and skilled artists for the hints and suggestions contained therein. It describes the various kinds of woods with their uses, and treats of each mechanical and artistic detail in the most minute manner. It is printed on fine paper and profusely illustrated throughout.

MONEY AND LEGAL TENDER IN THE UNITED STATES. By H. R. Linderman, Director of the Mint. G. P. Putnam's Sons. New York.

This volume contains in a brief and convenient form a complete history of the money used in the United States, of the various acts of Congress in regard to it, of the establishment of the mint, of the variations of the money standard, and the change from the double standard of gold and silver to the gold standard. Foreign coins, the paper currency, national currency, and the re-monetization of silver are all considered. As Mr. Linderman says, "until recently, the subject of bringing this currency from a credit to a specie basis has not received the attention which its great importance demands." The work will be found very timely and useful to the public in the examination of these financial questions.

Recent American and Foreign Patents.

Notice to Patentees.

Inventors who are desirous of disposing of their patents would find it greatly to their advantage to have them illustrated in the SCIENTIFIC AMERICAN. We are prepared to get up first-class WOOD ENGRAVINGS of inventions of merit, and publish them in the SCIENTIFIC AMERICAN on very reasonable terms.

We shall be pleased to make estimates as to cost of engravings on receipt of photographs, sketches, or copies of patents. After publication, the cuts become the property of the person ordering them, and will be found of value for circulars and for publication in other papers.

NEW AGRICULTURAL INVENTIONS.

IMPROVED FENCE.

Franklin Fulkerson, Frankfort, Ind.—This is a new and ingenious fence, so constructed as to prevent cattle from putting their heads between said boards and riders and throwing off said riders. The general design is strong and substantial.

IMPROVED COTTON PLANTER.

Daniel W. Reed, Allenton, Ala.—The object of this invention is to provide for use in planting cotton a simple but highly efficient machine, in which the whole quantity of seed in the hopper will be agitated, and a portion thereof also rubbed between opposing surfaces for the purpose of separating its interlacing fibres and enabling it to discharge, in the desired manner, at the bottom of the hopper into the open furrow. The invention consists in employing vertically and reversely reciprocating seed-rubbers and dischargers, the same being arranged on opposite sides of the hopper and working in suitable guides. The invention also consists in providing the sides of the hopper with adjustable pieces or sections for regulating the quantity of seed discharged within a given time.

IMPROVED PLANT AND TREE PROTECTOR.

Julius O. Antisdale, Lake Harbor, Mich.—Ordinarily tubes of sheet metal, paper, and other opaque substances are used for protecting plants against the ravages of worms. The present inventor suggests an excellent improvement in the shape of a glass cylinder composed of two half sections, which are forced a few inches into the soil, so as to surround the plant. The earth is pressed closely about the cylinder to keep the two sections together without the use of a band.

IMPROVED FRUIT DRYER.

William S. Plummer, Portland, Oregon.—This invention consists in a case provided in its lower part with a lining set at a little distance from its walls, the large door, the small door, the cleats or sides to receive the fruit frames or trays, the doors, and the cover and cap to allow the moisture-laden air to escape, to adapt it for use in drying fruit. It dries the fruit rapidly and evenly, and is so constructed that it may be readily taken down, set up, and moved from place to place.

IMPROVED DROPPING ATTACHMENT FOR CORN PLANTERS.

Jacob W. Oberholtzer and Charles E. Wilcox, Hiawatha, Kan.—This is an attachment to corn planters that will mark the rows and drop the corn simultaneously. The apparatus is used by making a mark across the ends of the field and starting the dropping in the mark at each end of the field. Uniformity in the rows is thus secured. The construction is quite ingenious and novel.

IMPROVED DITCHING AND TILE-LAYING MACHINE.

Robert E. Nevin, Enon Valley, Pa.—This is an improved machine for tile ditches, laying the tiles, and filling the ditches. It may also be used for digging open ditches and making other excavations. A number of excellent improvements are embodied.

IMPROVED SEEDER AND PLANTER.

Uriah Baldwin, Isaac T. Shumard, and William K. Shumard, Stewartson, Ill.—This is an improved machine so constructed that it may be readily adjusted to plant the seed in drills or rows. A number of useful improvements are embodied, all of simple and ingenious construction.

IMPROVED VENTILATING GLASS SHADE AND COVER FOR PLANTS.

Semon J. Pardessus, New York city.—This is an ordinary glass shade having an opening in the top closed by a hinged plate in which are openings which can be open or shut at will. Its object is to protect plants while growing, and to aid in the development of buds and flowers.

IMPROVED ROAD SCRAPER.

James H. Edmondson, Valparaiso, Ind.—This road scraper is of the sulky type, and is so constructed that it may be easily operated by the driver from his seat to load and unload it. When loaded it may be swung beneath the axle and carried to any desired distance. It is an excellent machine for use upon roads in parks and country places.

NEW MISCELLANEOUS INVENTIONS.

IMPROVED FIREPLACE GRATE.

Robert L. Mitchell, Huntsville, Ala.—This invention relates to certain improvements in open fireplace grates, and it consists in the particular construction of double back and sides, and in the combination with the inner back and sides of a detachable back plate for the fire pot which operates as a key to lock and hold the other parts in proper position.

IMPROVED STOPPING MECHANISM FOR LOOMS.

John Megson, South Adams, Mass.—The object here is to stop the motion of a loom in the event of the weft or filling running out or breaking, if such motion of the loom is permitted by the fork being operated by the end of the thread which has been left by the shuttle. Such weft or thread permits the motion of the loom to continue in two ways, namely, by getting entangled on the fork and also by lying in the box in such a position as to cause the fork to move. In both cases the loom will run as if there was filling in the shuttle, and if more than one kind of filling is being used an imperfect pattern will be produced, or it will be necessary to adjust the pattern chain. The new attachment breaks the thread off, and when it lies in the box it slackens it, taking away its resistance to the fork.

IMPROVED MACHINE FOR GUMMING LABELS.

Lazarus Morgenthau, New York city.—This consists essentially of an endless feed belt that conducts the labels to be gummed to an endless supply belt, to which the adhesive substance is fed from a suitable receptacle below by distributing rollers. A circular brush exposes all parts of the label to the action of the supply belt. A second revolving brush clears the labels from the pressure brush, and conducts them to an inclined clearing plate, and from the same to the place of use. These machines are excellently suited for applying paste to wall paper, stamps, labels, etc. One is in operation at the fair of the American Institute, and its working well substantiates the inventor's claims.

NEW MECHANICAL AND ENGINEERING INVENTIONS.

IMPROVED CAR COUPLING.

William Harrison, Linneus, Mo.—This invention relates to an improvement in the class of safety car couplings, that is to say, couplings which are so constructed that the device for locking the link may be raised or lowered without requiring the operator to enter between the cars. The invention consists chiefly in providing a sliding case for each drawhead and constructing it with inclined shoulders and notches, whereby it is adapted to raise, and lock in the elevated position, the device that engages the link.

IMPROVED MACHINE FOR MAKING BARRELS.

William K. Hoback, Bentonville, Ark.—The staves are set at each end in a ring, or annular guide, and an iron band is lowered to surround and enclose the hoops about the middle of their length. The said band is adjustable and serves to clamp or compress the hoops tightly together. An annular anvil or heavy iron ring is lowered inside the barrel or hogshead to a point nearly opposite the outer adjustable band, and it serves to hold the staves in position, while a central hoop is being nailed on, and the points of the nails that secure the hoop are turned and clinched on the annular anvil.

IMPROVED RE-SAWING MACHINE.

John Lamb, Ottawa, Ontario, Canada.—This is a new resawing machine for splitting slabs, boards, or plank. It embodies an ingenious arrangement of adjustable feed works. The lumber is carried against a circular saw by rotation of rollers which follow the inequalities of board without imposing any undue strain on the feed.

NEW HOUSEHOLD INVENTIONS.

IMPROVED EXTENSION BED LOUNGE.

William E. Buser, Chillicothe, O.—This manufacturer has devised an improvement in the class of bed lounges having a sliding top. The object in view is to render the head of the false bottom self-supporting when the lounge is extended; to attach the false bottom to the true bottom, and support it by such means and in such manner as will enable it (when raised) to extend over the foot of the body of the lounge; to provide improved stops for preventing the top being detached from the body of the lounge when slided off the same to allow the false bottom to be raised.

IMPROVED WASHING MACHINE.

Aaron M. Cornelius, Oregon City, Oregon.—This machine has a corrugated roll that revolves over a bed consisting of two or more smaller corrugated rolls. There is a new arrangement of spring followers for carrying the smaller rolls up against the larger rolls, an improved arrangement of supports, and a device for fastening the machine in the tub. The principal advantages claimed are durability, the various parts adjusting themselves to wear, and superior strength.

IMPROVED CANDLESTICK.

Jesse Failing, Umatilla, Oregon.—This consists of an ordinary candlestick, but split centrally at its cylindrical part, so as to form two halves, that clasp the handle. The split stick is held together by a spring placed immediately below the rim, and retained there by suitable rests. The spring-acted top rim of the stick holds the candle firmly in place until it burns down to the stick, when, by the gradual heating up of the rim the pressure is relaxed, and thereby the interior spring forces the candle up gradually until entirely consumed.

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