

Springfield grade is 60 feet to the mile, and the Charlton grade 51.47 feet. At the sharpest curve the grade is about 49 feet. Similar experiments were made on a freight train of 27 cars, drawn by the Adirondack, famous for her trials with the Mogul engine last summer, and showed that the tension on the draw-bar going up Springfield grade at a speed of 5.9 miles per hour, was about 16,000 lbs.; and the average strain going up Charlton grade at an average speed of about nine miles per hour, was 14,500 lbs.; the power required in the first instance being 84,840,000 foot pounds. Near the top of the grade the power of the engine was tested by applying the brakes, and it was found that, running at four miles per hour, the engine could exert a tension of 17,000 lbs. Beyond this point the drivers would slip and little progress was made.

Really, the most important experiments in which the association is just now engaged are in testing the quality of iron and steel used for bridges, rails, axles, and car wheels. Recent trials of the tenacity of iron used for various bridges and car axles indicate that much of the iron now in use will only stand about two thirds the strain which it is guaranteed to resist. For instance, some iron now being put into a new bridge at the East, which is supposed to stand a pressure of 60,000 lbs. to the square inch, breaks readily at 40,000 lbs., and a car axle, supposed to be equal to 110,000 lbs., snapped at 70,000 lbs.

When it is borne in mind that the calculations of bridge building engineers are based on the guaranteed strength of the iron, the reason for the fall of iron bridges becomes apparent at once, and instead of wondering at an Ashtabula horror, the wonder rather is that it is not repeated. The Eastern Railroad Association, which is making these experiments, represents all the railroads on the Atlantic coast north of Richmond, Va., and east of Pittsburgh and the Alleghenies, and was organized about ten years ago, having for its object the investigation of the validity of patents and claims to royalties for the use of the same. S. M. Whipple, of South Adams, is the general agent. The scope of the association has naturally broadened, and it has been for the past few years largely engaged in testing the merits of various railway equipments with the idea of getting the best in every department. The dynamograph car is a curiosity in itself, containing, besides the dynamograph, which is an ingenious instrument, registering exactly the amount of power required to pull a train, a chronograph, which records the speed of the train every $7\frac{1}{2}$ seconds; an anemometer, which registers the velocity of the wind, whether natural or caused by the motion of the cars; and a complete set of instruments for testing the hardness, tenacity, ductility, density, and the amount of carbon in rails, axles, etc.

The Use of Glue and its Applications in Carriage Body Making.

The following suggestions are from the pen of Mr. John D. Gribbon, the veteran carriage body maker of this city: Glue is obtained by boiling the skins and hoofs, etc., of animals, also the skins and some other parts of fishes: but that from animals is considered the best, and that obtained from the skins of old animals is considered better for the purpose than that from young ones. The strongest glue of all—Russian isinglass—is made from the air bladders of a species of large fish found in the Russian seas, but its great price excludes it from use by the carriage trade, when other glues can be substituted. From experiment made it has been found that glue made from the sinews and skins of animals is superior to that made from their horny parts; but the latter, again, is found from actual observation in practice to be much superior to glue made from the skins, etc., of fishes, as it is not so subject, as the last named, to be affected by the atmosphere. Animal glue is, for the reason just named, unquestionably preferable to fish glue, although the latter is sometimes sold as first quality glue.

TESTING GLUE.—In the selection of glue, the testing of it, so as to form some estimate of its adhesive qualities, is a matter of first importance. All glue in the cake is subject to be influenced by the moistness or dryness of the atmosphere, becoming soft in damp weather and crisp in dry weather, but different kinds are differently affected, and hence it is better to purchase in dry weather, as that which is *then soft is not of as good quality as that which is crisp*; and it should be borne in mind also, when purchasing, that the *most transparent* is generally the best. It is always advisable, before purchasing, to submit to experiment a sample of the article offered. To do this, take a cake of glue, place it in a pan, and cover it with water; when, after some hours, if it be good glue, it will *swell but not dissolve*, while, if bad, it will *partly if not wholly dissolve in the water*. Another test is this: After being dissolved by means of heat, that glue is best which seems most cohesive, or which is capable of being drawn out into thin filaments or strings, and does not drop from the brush or glue stick as water or oil would, but rather extends itself in threads, as it falls from the brush or stick; and if the glue possesses the requisite properties, this will always be found to be the case.

PREPARING GLUE.—The preparation of glue is very simple. It is first broken up in small particles and put into a vessel, covered with cold water, and left to soak for a number of hours, the length of time required for soaking being generally governed by the strength of the glue, the strongest glue taking the longest time. After being soaked until it all swells and becomes soft and gelatinous (avoid oversoaking) it is then placed upon the fire to cook, being kept stirred until it is thoroughly dissolved and appears stringy,

as we stated above. It is then ready for use; but in factories where a large quantity is employed, it is then poured out in a large flat pan and left to cool; and the workman, when desiring it for use, cuts off the required quantity and heats it. I would remark here that it is a bad habit for workmen to allow the glue pot to remain on the stove after they are done using it, as a very prolonged heat will destroy the adhesive qualities of the glue.

In some of the large carriage factories of the United States, where steam is generally used, a steam jacket is provided to receive the glue when it requires to be warmed, and, in connection with this jacket, a pipe heated by steam is generally added, on which panels may be warped bent, which proves a very expeditious and convenient process for both the purposes named, and preferable in every way to the use of a stove.

As a novelty in the way of preparing glue, the pulverized article, which has recently been introduced to the trade, merits mention here. In passing along one of our thoroughfares my attention was attracted, not long ago, by a sign on which the words *pulverized glue* were prominently displayed, and being curious to see the article and learn its advantages, I went in and asked an explanation from the proprietor. It seems that the pulverized glue is recommended for its convenience, being more quickly prepared for use than that which is in cakes, the latter requiring several hours to soak, whereas the pulverized can be soaked just as thoroughly in a few minutes; and this is a great advantage, particularly in warm weather, when glue put to soak is often liable to spoil. Again, if a workman's cooked glue runs out, he can in a short time prepare more from the pulverized, and this is often a great convenience, as every workman knows, especially when quitting time is near at hand.

We would say further in regard to glue in the pulverized form that it avoids the serious injury by salt air that affects glue in the cake in crossing the ocean, and it is for this reason particularly adapted for exportation.

APPLICATION OF GLUE.—Referring to the letter of your London correspondent, it is worthy of note that, with very few exceptions, no stoves or heaters are used in the English body shops, and, when a panel is to be bent or the glue to be heated, recourse must be made to the smith-shop to accomplish the object, but good gluing cannot be done under these circumstances, and particularly in a climate like the English, that is almost continually moist. In the United States, on the contrary, every carriage maker, even if he is doing business on the smallest scale, will have a stove for heating his body-shop in cold or damp weather, and also for bending his panels, shavings and waste stuff usually constituting the fuel employed. The heat of the body room is generally kept at a temperature of from 55° to 65° Fah., which is a comfortable one for the workmen to labor in, without becoming exhausted from the heat, and such a temperature will render the workman more cheerful, and cause him to accomplish more work than is the case (particularly common in England) of cold winter weather with an unheated shop, when the workman feels as if he touched ice when he takes hold of his tools, which feeling certainly does not expedite his labors, and when he feels glad at the approach of quitting time, that he can warm up at the tap, and take a drink of something warm.

There is no reason why in England bodies could not be glued together as well as here, provided the room were properly warmed and proper precaution taken. Some may raise the objection that glue will not hold so well on the hard ash here employed, but some years ago I saw bodies glued here in Mr. Charles Parker's factory, very hard ash and mahogany being used, and they held together quite as long and as well as any others having whitewood panels. The only difference in the case of using very hard wood is that the surfaces to be glued together should first be roughed with a tooth plane, or other tool, as a file or saw.

The following additional suggestions may be of value in applying the glue:

In all American carriage factories the side, back, and front panels are glued on, no nails being used, excepting one small tack in each corner to keep the panel in place while the straps and hand screws are being put on. In putting on the neck and bottom arch panels, some builders use both nails and glue, while others use glue without any nails, mitering these panels along the edges without nails, and where properly fitted and put on, no trouble is experienced from their giving way.

In the case of panels glued on, there is of course no fear of nails showing, while the latter is frequently the case on English carriages, even when the top quarters and back have been covered with leather, the nails showing through all. French carriage builders, until quite recently, have always nailed on the neck panels of boots, but the nails would always, in spite of the greatest care, show through the paint and varnish, and latterly they have been covering the necks of their boots with enameled leather, to avoid this trouble. It was the knowledge of this weakness in French carriages, in connection with the perception of its absence in American carriages, that, at the time of our Centennial Exhibition, first led some of their celebrated builders to look into the advantages of using glue to hold the panels on without nails.

When panels are glued on—properly on—there is no occasion to cover the quarters with leather. In the matter of roofs, some American builders cover them with patent leather, neatly nailed in a rabbet in the side-top and end rails, while others prefer to cover them with duck and paint in the same manner as the panels. Still others put on the roof

board in one piece (which is easily obtained since the new method has been introduced of cutting panels from around the log, whereby the width is limited only by the diameter of the tree), and closely block the same on the inside, no covering of cloth, leather, or other material being required, as was the case with the old method of putting the roofs on in narrow boards.

We will add two further suggestions in this connection, namely, in applying glue, where the part is end grain, first fill the pores of the wood with thin glue, and let dry; then clean off, and glue at the joint with strong glue. Many a job has been spoiled by reason of neglecting to fill the end grain in this manner. Next, in adding water to glue, it is best to give the glue a boil before using again, so that it may be evenly and thoroughly mixed.—*The Hub*.

NEW BOOKS AND PUBLICATIONS.

SANITARY ENGINEERING. By Baldwin Latham C.E. Published by George H. Frost, Chicago. Price \$3.00.

This is a reproduction of the English work published by Mr. Latham in 1873. It is a series of excellent and valuable papers forming a guide to the construction of works of sewerage and house drainage. It has heretofore been printed as a supplement to the *Chicago Engineering News*, from the stereotype plates of which the present book is made. Illustrations are abundant and good, and the work is sold at one quarter the price of the original English edition.

THE ELEMENTS OF DESCRIPTIVE GEOMETRY. By S. Edward Warren, C.E. John Wiley & Sons, 15 Astor Place, New York city. Price 3.50.

This is a new work prepared and reformed to meet an evident demand for brief text books. The author explains clearly, arranges his topics logically and uses the fewest words possible, all excellent features, and in brief has compressed into comparatively small space as compared with other works on the subject, a very full view of the science. The plates accompanying the text are bound in a separate and handy volume, and thus rendered easier for reference.

BREAD AND CAKE BAKING. By Frederick D. Hauptmann. Price \$1.00. Published by the Author. P. O. Box 94, New Waterford, Ohio.

A collection of recipes, differing from those ordinarily found in cook books in that they are the work of a practical baker of experience and are especially intended for the trade.

PERFUMERY AND KINDRED ARTS. By R. S. Christiani. Price \$5.00. Henry Carey Baird, Publisher. 810 Walnut street, Philadelphia.

The climate of the United States, is so diversified says the author, and in many parts so well adapted to the cultivation of numerous plants, which are useful to the perfumer, that the author hopes by this treatise to awaken attention to the practicability of establishing flower farms and orange groves, as well as to the utilization of many indigenous plants now neglected for perfumery purposes. The work he offers is a complete encyclopedia apparently covering all branches of the subject. Descriptions are given of all the materials used in perfumery, of the laboratory and its requirements, and then follow a very large number of recipes for extracts and bouquets, aromatic and toilet powders, hair oils, pomades, hair dyes, essences, soaps, etc. In an appendix are instructions for making sugars, jellies, candies, cordials, etc. All the recipes have been carefully revised and many are the result of the author's long experience. The work will doubtless prove exceedingly valuable to the perfumer.

HOW TO DRAW A STRAIGHT LINE. By A. B. Kempe, B.A. Macmillan & Co., 22 Bond street: New York. Price 50 cents.

This is a continuation of the set of technical volumes, known as the Nature Series. It is a lecture on linkages, fully treating the subject and copiously illustrated.

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.

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NEW MISCELLANEOUS INVENTIONS.

IMPROVED COMBINED SPRING SHACKLE AND STEP.

Reuben Doty, Wellsville, N. Y.—This invention consists in the peculiar construction of a shackle for coupling the springs of platform wagons, and in the combination of a step with the shackle. Portions of the shackle are secured to the ends of the wagon springs by bolts. These parts are similar, and consist of a round bar, from the ends of which the arms project at right angles and parallel to each other. At the ends of these arms eyes are formed for receiving bolts. The bars of the other parts are arranged at right angles to each other, and between them a bearing piece is placed, which covers half of the surface of each of the bars. From upper part of bearing piece an arm projects, to which a step is secured by means of a rivet or screw. The advantages claimed for this improvement are that the shackle is cheaply and easily constructed and applied. Friction is distributed over a large surface, so that the wear is reduced to a minimum, and the step is always kept in a horizontal position.

IMPROVED GAS DROP-LIGHT.

William B. S. Taylor, Westfield Township, N. J.—The nature of this invention is such an arrangement and application of flexible tubing to such drop-lights or chandeliers as will protect the tubing from injury by unnecessary coiling or rubbing and the heat of the lights when the chandelier or drop-light is in use, and will carry it out of the way when it is not in use. In this improved method of constructing chandeliers and drop-lights the tubing is to be attached to the lower parts both of the suspending and of the stationary parts of the fixture, and is allowed to hang or is steered in a manner agreeable to its nature.

IMPROVED FEED BAG.

Thomas R. Lowerre, Mott Haven (Morrisania Station), N. Y., assignor to himself and Richard U. Wright, of same place.—The object of this invention is to furnish an improved feed bag for horses, which shall be so constructed as to allow the oats to pass down to the horse's mouth as fast as he eats them, and no faster, which will allow the horse to have plenty of air while eating, which shall be evenly balanced, so that the horse can eat comfortably, and which will prevent the oats from being thrown out by the horse. The body of the feed bag is divided by two partitions into three compartments—a central compartment, into which the horse's nose is inserted, and two side compartments, in which the grain is placed. The lower edges of the partitions extend nearly to the bottom of the bag, space being left beneath said edges for the grain to pass slowly into the bottom of the central compartment as fast as the horse eats it.

IMPROVED ATTACHMENT FOR CARPENTERS' SQUARES.

Jeremiah Daniels, Sharon, Wis.—This invention relates to an improved attachment for carpenters' squares, and it consists of a number of parallel bars that are secured to slotted end pieces that are clamped to the square by means of screws and nuts. The object of the invention is to provide a square that will facilitate laying out single and double mortises, tenons, and other operations in carpentry. The square is used by placing its longer arm against or upon the timber to be laid out and marking at the sides of the parallel bars for the sides of the mortises or tenons. The attachment does not interfere with the use of the square in the ordinary way, as the heads and nuts of the bolts are on a line with the inner edge of the square beam and serve to guide it. If the bars do not stand in the required relation to the side of the timber, the slots in the end pieces and the bolts afford a means of adjustment.

IMPROVED LINE FENDER FOR HARNESS.

Thomas J. Lindsay, Winfall, Ind.—The object of this invention is to prevent a horse, in double or single harness, from getting the lines under his tail, and the nature of the invention consists in a fender or shield which is made of wire or leather, and shaped to fit the upper portion of the tail of a horse, said fender or shield being provided with a tail strap, side pieces, and other means for properly fastening it to the harness.

IMPROVED BRACELET.

Julius Hackenberg, New York city, assignor to himself and Charles H. Graef, Edgewater, N. Y.—This bracelet is formed of a number of parallel rings, held together by cross stays, which are grooved exteriorly, so that the rings project above them, whereby, at a short distance off, the stays are not at all or scarcely noticeable, thus giving to the bracelet the appearance of a series of independent rings, while at the same time the rings are firmly united together.

IMPROVED MUSTACHE SPOON.

Roger Williams, Yonkers, N. Y., assignor to himself and Robert J. Anderson, New York city.—This invention relates to an improved spoon to be used by persons with mustaches, the spoon keeping off any part of the soup or other fluid from the mustache, while admitting the easy taking of the liquid, and also the convenient cutting of any larger part therein; and the invention consists of a spoon whose bowl is placed at a suitable angle to the handle, provided with a lateral mustache guard, extending at slight inclination across the front part of the bowl, and arranged with a cutting edge at the rear portion. The position of the bowl to the handle facilitates the taking up of the liquid over the rear part of the bowl and the ready conveying of the same into the mouth by a turn given to the handle, which tilts the bowl and empties the same of the liquid.

IMPROVED BELL PIANO.

William H. Wood, Port Rowan, Ontario, Canada.—The object of this invention is to provide a musical instrument in which bells are employed to produce the musical sounds. It consists in the arrangement, in a casing similar to that of an ordinary piano, of a number of bells of either metal, glass, or pottery, properly tuned, and in an arrangement of hammers operated by means of keys, and in dampers and softeners operated by pedals or stops. The softeners consist of pieces of leather, which are attached to bars that are moved by an arrangement of levers similar to those of an ordinary piano.

IMPROVED SELF-ADJUSTING EYE SHADE.

Thomas A. Platt, Brooklyn, N. Y.—The object of this invention is to furnish an improved eye shade, which shall be so constructed that it will adjust itself to the shape and size of the head, and may be worn without causing pain or annoyance to the wearer. The invention consists in an improved eye shade formed by the combination of the two springs with each other and with the shade. To the ends of the spring are secured, by rivets or other suitable means, the ends of a similar metal spring, to pass over the head of the wearer, and thus keep the shade in place.

NEW HOUSEHOLD INVENTIONS.**IMPROVED FRUIT JAR.**

Hiram Purdy, Burlington, Iowa.—The object of this invention is to furnish fruit jars which shall be so constructed that they may be closed perfectly airtight, and which will allow their covers to be easily removed. The cover, which fits into the mouth of the jar, is tapered, and has a wide shallow groove formed around it to receive the rubber band or packing. The jar is closed by pressing the cover down into place while the contents of the said jar are hot, and have thus expelled the air. To open the jar the upper edge of the band is drawn down to uncover the air hole and allow air to enter the jar. The cover is then drawn to one side, which forces the edge into the groove and allows the other side of the cover to be raised.

IMPROVED BED BOTTOM.

Germain Luciani, Paris, France.—This invention relates to an improved elastic mattress, which is constructed chiefly of wood, and is designed to supply a cheap and useful article, having advantages which have hitherto only been obtainable at high prices. All elastic mattresses hitherto constructed, even those having lengths or laths of wood, have been provided with springs, and this invention is designed to avoid this costly and complicated arrangement, being based essentially upon the principle of utilizing the inherent elasticity of the strips of wood or laths, united by bands or straps fastened rigidly either to the strips of wood or to the rods, and are doubled and sewed with very strong thread, so that the said strips of wood and rods may slide freely, as in sheets or coverings, the capability of which is necessary to give elasticity to the whole apparatus, between which they slide.

IMPROVED RECIPROCATING CHURN.

Grovner Goff and Henry Hardick, Stevensville, N. Y.—The object of this invention is to furnish for dairymen an improved churn motion, by which a uniform stroke is imparted to the dasher of the churn with little effort, the length of the stroke being readily adjusted as required. The pitman connection of the crank shaft with the elbow lever changes the rotary motion of the hand crank wheel into the reciprocating motion of the elbow, for working the dasher, the flywheels, and transmitting gearing, facilitating the working of the churn, so that the same may be run with but little effort, producing a uniform and effective stroke of the dasher, and facilitating and accelerating the churning operation. The device is readily applied to the churn, always in order for work, easily adjusted, and effective in operation.

IMPROVED CHURN.

Nelson W. Cone, Delaware, O.—The object of this invention is to provide a churn that will thoroughly and expeditiously cut and agitate the cream, and that is simple and inexpensive in construction. The cream receptacle consists of a rectangular box, having a suitable cover, and having grooves formed at its ends for receiving bars from which fingers or breakers project toward the center of the churn. The shaft is provided with a number of blades or paddles, which project radially from the shaft, and are of such width as to nearly fill the spaces between the breakers. The breakers and blades should be of about the same width, and the number of each should be proportioned to the size of the churn.

NEW MECHANICAL AND ENGINEERING INVENTIONS.**IMPROVED LIFTING JACK.**

Joseph S. Kirkwood, McKeesport, Pa., assignor to himself and Henry C. Myers, of same place.—The nature of this invention consists in combining, with a ratchet lifting drum, a lifting rack, which is guided by tapered grooves in two standards, in combination with one or more ad-

justing screws, which will allow the rack bar to be disengaged from the said ratchet drum whenever desired, and thus quickly raised or lowered by hand. Should the rack bar be raised, and it is desired to lower it quickly, this can be done by turning back the screws and disengaging the bar from its wheel. The ratchet wheel teeth, as well as the teeth on the rack bar, are pitched like saw teeth, so that they are very strong, and will stand considerable strain without fracturing.

IMPROVED MORTISING MACHINE.

William W. Green, Jr., Chicago, Ill., assignor to himself, E. N. Niegel, and J. M. Shields, of same place.—This invention has reference to a new construction of mortising machine, and consists of a revolving endless chain saw, formed of pivoted sections or links with cutting teeth, to which the proper tension is imparted by a grooved tension bar, the wood being fed and guided to the mortising saw by a movable treading table or bench. Any thickness of wood can thus be exposed to the action of the saw, while, by stretching a chain with wider links on the rollers, a mortise of greater width may be cut. By feeding the stuff along the table the mortise is cut by the chain saw. The machine may be employed for mortising, sawing, and recessing lumber, as it is readily controlled by the movable table and worked in rapid and effective manner. To the sides of the tension bar may be attached, by studs or pins, wedge-shaped sections, which impart to the endless cutting chain a certain angle of inclination at both sides, and admit thereby the cutting of wedge-shaped mortises, when such are required.

IMPROVED RAG ENGINE.

Edward D. G. Jones, Pittsfield, Mass.—This invention has relation to engines which are designed for reducing rags to pulp fit for making paper. The nature of this invention consists, first, in novel devices for lifting or adjusting long spindles or cutting cylinders of rag engines, where the bars both arranged outside of the tub or vat, and supported independently thereof, the back bar being so placed, relatively to the tub, that the cutting cylinder can be driven by a belt applied directly to a pulley on the spindle, the two bars being adjustably simultaneously from the front of the tub; second, in a half-box bearing for the rear end of the cylinder spindle, which is supported upon the rear bar, and adjustable at right angles to the longitudinal axes of the spindle; third, in constructing the breast or back fall of the belt in a plane which is tangent to the arc of the concave beneath the cutting cylinder, whereby a free discharge is effected, and the pulp is not thrown back over the cylinder.

IMPROVED FLYING MACHINE.

James J. Pennington, Henryville, Tenn.—This invention relates to machines for navigating the air, and it consists in a fan of peculiar construction, which takes air in from the front of the air ship and forces it out at the rear. The object of this invention is to provide apparatus by which the air may be navigated with facility and safety. The apparatus is suspended by a balloon or upon a rope tramway, and is propelled by drawing the air into the conduits and driving it out of the discharge nozzle. When the apparatus is suspended by a balloon it is raised or lowered by auxiliary fans, and when it is desired to turn the apparatus in a horizontal plane a gate is turned so as to direct the air to one side or the other, as may be required. To steer the air ship vertically and to assist in propulsion a fan is employed having feathering blades, which are turned on their axis, as the fan is rotated, by a central cam. This cam, being movable, permits of reversing the action of the fan.

IMPROVED PUMP.

George W. Robaugh, Ottumwa, Iowa.—The object of this invention is to provide a piston for pumps that may be readily packed without removing it from the pump, also to provide an efficient valve and valve seat. The piston is provided with a flange, against which packing is pressed by the follower. The follower is sectional, being made of two parts. A nut holds these parts in place on the rod and against the packing. When the packing is to be removed the nut is loosened, and one part is removed from the rod by raising it upward and moving it sidewise until it is free from the piston rod. The other part is removed in a similar manner. The valve casing or cage consists of a casting having upon each end a flange for connecting it with the other portion of the pump. This casting is of two diameters, the lower portion being the smaller, and having formed in it the valve seat. In the upper and larger portion there is a rabbet for receiving the grating or cover, which is held in place by the pump barrel. Below the grating there is an annular valve that is fitted to the valve seat, and to a seat formed on its upper surface another valve is fitted. The lift of the annular valve is limited by the grating, and the lift of the other valve is limited by the cage. The lift is thus divided between the two valves, and greater capacity is secured than is possible with a single valve unless the lift is unduly increased.

IMPROVED DEVICE FOR PROPELLING VESSELS.

William F. Morrison, Plattsmouth, Neb.—The object of this invention is to provide an improved device for propelling and steering vessels without agitating the water, the same to be used in canal, river, lake, and ocean navigation. The invention relates particularly to the combination and arrangement of parts for steering a vessel. The desired effect is produced by the expulsion of water from suitably arranged tubes. The water may be discharged through either upper or lower pipe, and the reaction or force against the closed end of the pipe caused by the discharge of the water along through the pipe produced the forward or backward motion of the vessel. The water surrounding the vessel is but little agitated, as the operation of supplying the water to the tank and the discharging of the same for propelling and steering purposes produces only a small effect on the same, the water being discharged at a very slow motion, while the internal reaction at the right angles of various discharge pipes, together with the recoiling force of the confined water on the closed end of the pipes, gives a very effective propelling and steering capacity.

IMPROVED FIRE ESCAPE.

Henry W. Chapman, Blue Rapids, Kan.—The object of this invention is to provide an improved fire escape which may be instantly made ready for use, and by which persons may easily and safely descend from the upper portions of burning buildings. The apparatus when not in use may be folded upon the floor of the room, and may be covered by some article of furniture. When it is required for use a triangular frame is set up in the window, and the person desiring to descend sits upon the seat and lowers himself by the rope or is let down by persons from below. If flame and smoke should issue from the lower portions of the building, the lower end of the rope may be carried away from the building, and the person, in this manner, may be conveyed to a distance from the building.

IMPROVED SEWING MACHINE.

William G. Cummins, Cookeville, Tenn.—This invention relates to improvements in lock-stitch shuttle sewing machines for general family use, which can be stopped or started instantly at the will of the operator without stopping the treadle. The bobbin may also be wound while the needle and feed motion is stopped, and be run by treadle or hand in convenient manner, the object being not only to extend the adaptation, but to simplify the construction, especially of those parts subject to wear and repair, and thus produce a low priced, reliable, and readily repairable sewing machine of wide range. The invention consists essentially of an improved connection of the bobbin winder with the driving shaft and clutch pulley, and by an elbow lever with the presser bar, so as to interrupt the operation of the sewing machine without stopping the treadle. The bobbin winder is retained in raised or lowered position by an elevator and clasp spring, as required.

IMPROVED DITCHING MACHINE.

John H. Rauch, Ida, Mich.—The frame of this improved ditching machine is composed of two parallel lines rigidly secured together at a suitable

distance apart by means of bolts and bracing tubes. The frame is mounted on two transporting wheels, one of which is applied on an axle and constructed with a flanged rim, for the purpose of preventing it from slipping on the ground. By means of a draft equalizer the team can walk on the outside of the ditch being dug and draw the machine, and by means of the tongue attachment a team can draw the machine direct. At the front end of the elevator frame is a gage drum, which is provided with sod cutters, and in the rear of this drum, and a little below it, is a shovel plow rigidly fixed to the elevator frame. The earth excavated by this plow is carried up by means of an endless apron attached to a chain and deposited upon another endless apron, which is arranged at right angles to the elevator chain. A drum rolls on the ground in front of the plow and gages the depth the plow should run. The excavated earth is carried up by the elevator apron and deposited upon an apron attached to the chain, which latter will carry the earth off laterally and deposit it in a wagon or upon the ground at a proper distance from the ditch.

IMPROVED CLUTCH FOR STOPPING AND STARTING MACHINERY.

Moses C. Johnson, Hartford, Conn., assignor to Willard Parker, New York city.—Upon a shaft a pulley is placed, the rim of which is bored out to receive a split ring, over which it freely revolves when the ring is unexpanded. A sleeve is placed upon the shaft, and to it a wedge is secured, which consists of a bar of iron or steel that is made flat and tapered at one side and left round upon the other side. When this wedge is forced between the follower and ring, the follower is forced outward, straightening the toggle and throwing the ends of the ring apart, so that the ring fills the rim. It is obvious that when the ring is thus expanded the disk will carry the pulley or the pulley will carry the disk, as may be required.

IMPROVED SHEET METAL ROLLER-SEAMING MACHINE.

Pardon A. Whitney, Southington, Conn.—This invention relates to the construction of the shaft journals and journal boxes. The shafts are of a uniform diameter from the burrs to the gears, so that they may slide through their journal boxes. The lower shaft is journaled in a fixed bearing at the front of the machine, and is turned at the other end, forming shoulders. Upon this portion, and between the shoulders, a cylindrical box is placed, which is split longitudinally and is placed in the frame, where it is clamped by a screw. When the screw is loosened the box, together with the shaft, may be moved longitudinally within certain limits. The front box of the upper shaft is solid, and is fitted to a rectangular opening at the front of the frame. A spiral spring bears this box up, and the screw passes through the cap and bears upon the top of the box. The upper shaft is turned down at its rear end and fitted to a box placed in the back of the frame, and is held in place by a pin that passes through the sides of the frame and forms a pivot, upon which the box swings.

IMPROVED WIRE FENCE TIGHTENER.

Chambers C. La Rue, Blairstown, Iowa.—This invention has relation to devices for tightening wire fences, and the nature of the invention consists in the combination of an angular lever with clamping jaws or pinchers and a connecting rope. The pinchers consist of two levers constructed with gripping jaws, one of which jaws is flanged, so that the other jaw, which is flat, can firmly bite and hold the fence wire. To prevent the wire from being flattened or kinked, the straight jaws of the pinchers are grooved, and in these grooves the wire will lie closely and be gripped by the flanged jaws.

IMPROVED STRIPING MACHINE.

Christopher Van Slyck and Henry S. De Forest, Schenectady, N. Y.—The object of this invention is to furnish an improved machine for forming ring stripes around broom handles, which shall be simple in construction, convenient in use, being easily adjusted to form the wide or the narrow stripes, and reliable in operation, forming the ring stripes with perfect accuracy. The handle to be striped is placed in notches in the sides of the upper ends of arms, the lower ends of which are rigidly attached to the end parts of the shaft, which rocks in bearings in the blocks, and to which is attached an arm which projects downward through a slot in the bed plate. The lower end of the arm is rounded off, and to it is attached a strap, to be connected with a treadle or other device, to enable it to be operated by foot or hand power, to bring the handle in contact with the cylinders by which its point is applied, by the revolution of which the handle is revolved.

IMPROVED LIFE-SAVING APPARATUS.

Walter S. Green, Long Branch, N. J.—This invention relates to apparatus for rescuing persons from wrecks of vessels and other inaccessible places, and it consists of a cart on which are mounted two reels, one for carrying a hawser and the other for carrying a line. The cart is also equipped with a mortar and other appliances. The mortar and balls are used for carrying the smaller line to the vessel. The smaller line is used for hauling the hawser to the vessel, the sand anchors are buried in the sand, and to them the shore end of the hawser is attached. Shear poles are arranged for holding the hawser up out of the water, and the boatswain's chair runs upon the hawser from the vessel to the shore, being hauled by the small line.

IMPROVED FIRE ESCAPE.

Annabella G. Knox, New York city.—This invention relates to an improved fire escape, which may be stored away in compact shape, is instantly ready for use, allows the convenient lowering of children, packages, etc., from upper stories, and forms, finally, a convenient communication with the ground from any height. The invention consists of a rope of suitable strength, having bolstered stops secured at suitable distance to the rope, which is secured to the floor or other support of the upper story, and provided with similarly bolstered loops or handles at the part passing over the window sill. The lower end may be closed to form a loop to be placed around the body of children or around packages and other articles. The fire escape may be stored away in a suitable box in the rooms, halls, or other suitable place, is instantly ready for use, packed into small space, and cheaply manufactured.

IMPROVED FIRE ESCAPE.

George N. Shishmanian, Galveston, Tex.—This invention consists of an air cushion, having a concave upper surface, in the center of which there is an opening of sufficient size to admit a person's body. The cushion is supported above a suitable car by standards that rest upon springs. The object of the invention is to provide apparatus for receiving without injury persons or goods falling from windows of burning buildings. When the apparatus is to be used it is drawn near the building, and beneath the window from which escape is to be made. The person desiring to reach the ground jumps into the concave surface of the air cushion and escapes through the central aperture to the car below. The momentum of the fall is broken by the cushion, and is arrested by the action of the springs. Goods may be thrown upon the cushion without fear of breaking them. The apparatus can be readily moved from place to place, and is more manageable and reliable than ladders.

IMPROVED PACKING FOR COMBINING TUBES OF INJECTORS FOR STEAM BOILERS.

James B. Harkins, Altoona, Pa.—This invention consists of a combining tube for boiler injectors, provided with a rabbet to receive packing rings and a follower, said rabbet being in communication with the passing stream of water through suitable openings extending to the inner surface of the tube, whereby the packing is expanded by the pressure of the water. When the injector is in use the outward pressure of the water and steam exerted in the inner surface of the rings throws them against the barrel of the injector and prevents water and steam from passing between the rings and barrel. The packing thus made and applied requires no adjustment, as it remains tight until it is worn out.