ENGINEERING INVENTION.

A boiler feeding attachment has been patented by Mr. Morris P. Janney, of Easton, Pa. Combined with the pump and a feed pipe connected with it having a cock or valve at one side of its connection with the pump, is an accumulator connected with the throttle of the pump and with the feed pipe, whereby, when the feed pipe valve is closed, the force of water in the feed pipe causes the accumulator, through its connections, to operate the pump throttle.

MISCELLANEOUS INVENTIONS.

A wagon has been patented by Mr. George S. Conwell, of Booneville, Tenn. This invention covers an improvement in wagon bodies whereby the wagon can be readily fitted with side standards for hauling wood and the like, or may be formed into a box wagon by the addition of suitable side boards.

A pocket book fastening has been patented by Mr. Robert L. Boyd, of New York City. A catch plate is attached to the flap, having a hook-shaped jaw adapted to engage a corresponding jaw on a base plate attached to the body of the pocket book, the base plate having a movable button arranged to be pushed over the engaging jaws to lock them together.

A nut lock has been patented by Messrs. Alvin B. Neiman and Lewis M. Melhorn, of York, Pa. The nut has a tapered screw hole at right angles to the bolt hole, combined with a tapered screw ping cutting the threads of the bolt at right angles until its threads are deeply embedded crosswise into the threads of the bolt.

A combined square, bevel, protractor, and level has been patented by Mr. William Palmer, Jr., of Rincon, New Mexico. It is an improved instrument for measuring the length of rafters and braces, for marking bevels at their ends, and for forming polygonal figures, the invention covering various novel details and combinations of parts.

A nut lock has been patented by Mr. Orlando L. Castle, of Upper Alton, Ill. It is for use in connection with fish plates at the abutting end portions of railroad rails, and is of that kind in which arch shaped spring plates are used to assist in keeping the nuts from working loose or turning, and to compensate for or take up any slack in the nut lock.

An inkstand and frame has been patented by Mr. Charles Vehring, of New York City. The frame is covered with leather or other suitable covering, and is beveled at its front edge, being adapted to be applied to the base of a writing pad, the casing of the ink bottle being made fast to the frame by tongues of metal, with other novel features.

A stock trap and holder has been patented by Mr. Joshua H. Gentry, of Sheldon, Mo. It is a device which can be cheaply made and set in a fence, gateway, or stock chute, and adapted to any sized opening, as a device for catching and temporarily holding a domestic animal driven into it, by means of a hand lever, ratchet and pawl, and sliding bars.

A road grader has been patented by Mr. Alberto Finks, of New Berlin, N. Y. This invention provides a novel construction and arrangement of parts in connection with a reversible scraper, with means for securing it in different positions, and applying the draught for adjusting the scraper vertically or holding it at any suitable angle.

A wagon jack has been patented by Mr. Rozell Harris, of Hackensack, N. J. Combined with the carrying bar is a curved arm attached centrally thereto, upwardly extending supporting bars integral with the extremities of the arm, and steps secured on the arm beneath the supporting bars, whereby one or both wheels of a wagon on the same axle may be raised as desired.

A theatrical appliance has been patented by Mr. Joseph Arthur, of New York City. This invention provides mechanical means for representing the interior of a city fire engine house, wherein the clothes covering the beds and the harness for the horses may be manipulated simultaneously, the former being lifted from the beds and the latter dropped in position upon the horses.

An electro-medical apparatus has been patented by Mr. Peter Horst, of Sioux City, Iowa. It has a hard rubber grooved disk with a small metallic plate on its under side and a large one on its upperside, with conductors held in the disk and connecting its under side with the metallic disk on top, in connection with a collector for frictional electricity held between the top disk and the hard rubber disk.

A gummed paper fastener forms the subject of a patentissued to Mr. Joseph M. Jones, of Paris, Ky. It consists of a strip, divided transversely at suitable distances by rows of perforations, and having gum or adhesive material applied to both of its sides, to secure, upon dampening, separate sheets or pieces of ungummed paper together, in counting houses and elsewhere.

An automatic fire extinguisher for stoves and heaters has been patented by Messrs. Frederick L. Hotchkin and Pierre A. Raby, of Brooklyn, N. Y. It is designed to be especially applicable for use with car heaters, to automatically act, in case of accident, to extinguish fire in the heater, the invention covering various novel details in construction and the combination of parts.

An embossing machine has been patented by Mr. Michael T. Durkin, of Brooklyn, N. Y. It is a lever press having a follower with variable stroke operated by a lever working on a yielding fulcrum, with an arrangement of movable dies adapted to be readily adjusted for different kinds of work, for forming sheet metal in various designs without the employment of special dies or moulds.

An electric tele-thermoscope has been patented by Mr. Harry W. Hardinge, of Leadville, Col. It has a pulsator consisting of a curved tube with a bulb at each end, additional tubes extending short distances into the bulbs, combined with an air chamber connected with one of the additional tubes, a thermostatic spring and adjusting screws, arranged in an electric circuit, for indicating changes of temperature.

A punching and shearing machine has been patented by Messrs. Claus Weber and Henry Schneider, of Parker, Dakota Ter. The invention consists of a series of different sized punches, and a shear adapted to be engaged alternately at their heads by a link, pivotally connected with a lever fulcrumed on a longitudinally sliding bar held above the punch and shear heads.

A gate has been patented by Mr. Jesse Chandler, of Red Stone, Kansas. Combined with a gate is a three-armed lever on its end bar, a sectional latch, rods pivoted to the opposite arms of the lever and loosely connected to the rear section of the latch, ropes being connected to the other arm of the lever, the object being to facilitate the opening and closing of gates and promote reliability in their action.

A secondary battery has been patented by Mr. Ludwig Epstein, of Martinkenfelde, near Berlin, Prussia, Germany. The electrode consists of a series of composite strips formed of the active material and metallic lead, the strips being arranged at a suitable distance apart, and connected by suitable means to form a grid, which is adapted to permit the free circulation of the electrolyte.

An oven attachment has been patented by Mr. Charles E. Hollingsworth, of Minneapolis, Kansas. It is for use in connection with a gas or gasoline stove, the invention covering a novel construction by which it is designed that baking may be carried on at the time when it is necessary to employ the stove for other culinary purposes, with no additional expenditure for fuel to produce the requisite heat.

A fire escape has been patented by Mr. Henry B. Calkins, of Hyndsville, N. Y. It has friction rollers pivoted near the upper end of a frame, combined with aligning curved carrying arms and angle levers, and other novel features, being adapted for use with a rope, to facilitate the safe descent of a person from any height, the rapidity of the descent being under the control of the operator.

Tubular plaited or braided bands form the subject of a patent issued to Mr. Leedham Binns, of Philadelphia, Pa. The improved band is more especially designed for driving the spindles of spinning and twisting frames, and the invention covers a novel construction, in which the tubular band is formed at its ends with disconnected loops of the same thickness at their bends as the body of the band.

A wheel for hand trucks, casters, etc., has been patented by Mr. Michael J. Cummings, of New York City. It is made of two metallic compressing disks, each having a peripheral flange and an annular shoulder, combined with a tire of rubber or similar material, having annular side grooves to receive the flanges on the disks, the construction being such that the tire cannot be slipped off the wheel by hard usage.

A fire escape has been patented by Mr. Thomas Brice, of Sandy Hill, N. Y. The case is made of two long half boxes, in which grooved pulleys are arranged, a rope passing through the case and winding around the pulleys, with means for making more or less frictional engagement, making a simple and efficient device not liable to be disarranged in the excitement of a fire.

A hay derrick has been patented by Messrs. William A. Hooper and Rodney F. Hamblen, of Maryville, Mo. The base frame has an outer guide pulley at its lower end and an inner guide pulley, in connection with a centrally journaled mast carrying a cross beam on whose ends are pulleys, the mast and its cross beam turning in any desired direction, and there being a windlass on the base frame.

A machine for planing stereotype plates has been patented by Mr. Lucius Goss, of New York City. It is for use with plates cast with several spaced columns, and has trimming knives or cutters arranged to enter the spaces between columns and trim the edges, while the bed plate or frame has a straight edge or offset to align the stereotype plate with the bed plate and its line of motion, to insure accurate trimming of the columns.

A belt punch has been patented by Mr. Hugh L. T. Overbey, of Summerville, Ga. It consists of a vertically reciprocating rod mounted in the arms of a metallic frame, the lower end of the rod being threaded to receive a tubular bit, and there being a handled lever pivoted at the top of the rod, and the rod being surrounded between the arms by a coiled spring, which acts to withdraw the punch after a hole has been made.

A moulder's draw iron has been patented by Mr. George A. White, of Sharon, Mass. It is an improved device for the ready and accurate withdrawal of a pattern from the mould, in which ordinary wood screws are employed, so that as one wears out it may be quickly replaced at slight cost, and by means of the attachment of the handle with the screw the latter may be so controlled in entering the pattern as not to depress or jar it and thereby trouble the sand.

An apparatus for detecting leakage in furnace blocks has been patented by Mr. Joseph Bird, of Saxton, Pa. Combined with the water blocks of a furnace and the discharge pipe is a detachably connected faucet, with a valve near the lower end, an upwardly extending branch above the valve, a glass tube supported by the branch and closed at its upper end, a stop cock below the tube, and a sectional collar attaching the faucet to the discharge pipe, making a simple device capable of application by any workman.

A process of reducing iron ores has been patented by Mr. Gustaf M. Westman, of Stockholm, Sweden. In addition to the reducing furnace, regenerating or carbureting furnaces are employed, with a circulating blast engine, affording means for reducing the ores by means of carbonic oxide, by passing the carbonic oxide through a charge of ore, drawing off the gases from the charge and passing them over glowing coke, cooling the gases and then superheating them, after which they are again passed over or through the ore to be reduced, thus saving fuel without injuring the quality of the product.

A process of reducing zinc ores has been patented by the same inventor. It consists in subjecting the zinc ores in mixture with coal to the action of highly heated carbonic oxide, condensing the zinc from the outgoing carbonic oxide, and subsequently reheating and returning the gas through the charge, the gases taking the oxygen from the zinc oxide and the carbon from the fuel, avoiding the admixture of air or oxygen, and constituting a process of reducing the ores at a low cost, with saving of labor and fuel.

A two-wheeled vehicle has been patented by Mr. Charles C. Spencer, of Cortland, N. Y. It is designed to obviate horse motion by the use of a novel form of springs, having a transverse front spring attached to the body and the side bars, in combination with longitudinal side springs having their forward ends attached at the front of the body and their rear ends curved upward, with a U-shaped bend, and secured to a semi-elliptic spring attached to the under side of the seat, each side spring being likewise susceptible of being made in two parts, to vary its form in front of and behind the point of its attachment to the axle.

NEW BOOKS AND PUBLICATIONS.

A TREATISE ON THE USE OF BELTING FOR THE TRANSMISSION OF POWER. By John H. Cooper. Third edition. Philadelphia: Edward Meeks. Pp. 399. Price $3.50.

This work, from the time of the appearance of the first edition, in 1877, has been looked upon with decided favor by large numbers of users of leather belting, as being eminently practical and covering a wide range of practice. It has numerous illustrations of approved and actual methods of arranging main driving and quarter-twist belts, with rules for calculating the size and driving power of belts, and directions for their care and management. The author also presents liberal quotations covering the views and experience of the best known engineers and managers of machinery, collected through a long series of years.

WOOLEN AND WORSTED CLOTH MANUFACTURE. By Roberts Beaumont. New York: John Wiley & Sons. Pp. 390. Price $2.50.

This book is designed to be a practical treatise for all persons employed in the manipulation of textile fabrics. It treats of the physical structure and clothing properties of the raw materials used in the production of woolen and worsted fabrics, the making of yarns and their preparation for weaving, the manipulation of the loom, designing and coloring, and the operations to which the cloth is submitted after weaving. The author is a lecturer and demonstrator in the textile industries department of the Yorkshire College, Leeds, England, and therefore brings to his task a knowledge of the technical details in one of the foremost manufacturing districts in this specialty in the world.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.
References to former articles or answers should give date of paper and page or number of question.
Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or in this department, each must take his turn.
Special Written Information on matters of personal, rather than general interest cannot be expected without remuneration.
Scientific American Supplements referred to may be had at the office. Price 10 cents each.
Books referred to promptly supplied on receipt of price.
Minerals sent for examination should be distinctly marked or labeled.

(1) C. H. writes: I have just completed a small motor, made after the instructions given in your valuable paper, but on a smaller scale. I made the magnets one-half the width and thickness as the one you described, put the same number of layers and convolutions, and wound the magnets with No. 20 covered wire. I applied it to the wires from a dynamo, and found it to work excellently. This is my first attempt at such work. Would you please give me the dimensions of a motor, such as the size of field magnet, length of armature core, size of wire, and the number of convolutions and layers to be wound on each, so that I could make a motor with power enough to propel a small row boat about 18 feet long? A. We are pleased that you have succeeded so well in making your motor. We shall in the near future publish a description of a larger electric motor adapted to your wants.

(2) J. J. E. writes: I have built a dynamo according to description given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161, and it works beautifully both as a dynamo and a motor. As a motor it runs with a small current, and where I run it and magnetized the field magnets, they put the current from 4 arc lamps as used on the streets, and it ran with uncountable speed without heating at all. The first few turns of the drive wheel generates a current. I have made an arc lamp 18 inches by 6 inches, ¼ inch carbons. Can you give me an idea how I can make some electric magnet that will cause the upper carbon to be raised about ¼ inch when the current is turned on, so as to make an arc? A. An axial magnet formed of a few turns of wire heavy enough to carry the entire current, and provided with a hollow cylindrical core or armature, carrying clutch adapted to engage the carbon or the carbon supporting rod, will probably answer your purpose.

(3) W. C. S. asks: 1. Will the motor used as a dynamo, wound with 16 and 20 wire, develop as much current as the one in SUPPLEMENT, No. 161, when driven by a half horse power engine? A. Yes. 2. Can the so-called burglar alarm wire wound with two layers of cotton, costing 40 cents a pound, do in place of regular magnet wire to wind it? A. No. The insulation is too thick. 3. Would a better commutator, like that of the eight light dynamo recently described in SCIENTIFIC AMERICAN, increase its efficiency as a dynamo? A. It would undoubtedly be a better commutator to use, but it would not be in accordance with the spirit of the article, which calls for a commutator made with few tools. Such a commutator would not increase its efficiency.

(4) H. H. W. asks: Will increasing the amount of wire on the field magnet increase the lighting capacity in number of lamps from dynamo, in No. 600 of the SUPPLEMENT? A. You can increase the capacity of the machine by adding two layers of two parallel No. 18 wire each, or two layers of No. 12, which is the equivalent of two No. 18 wires, and, by increasing the size of the wire on the armature from 20 to 19, and increasing the speed about 25 per cent. This modification will enable you to run about 12 lamps, but at a corresponding increase in the expenditure of power.

(5) H. A. Z. asks: If an armature can be made to fit in the field magnets of dynamo described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 161, that will give a stronger current in volts than 6·3, can it be made on same principle as the eight light dynamo armature, and what size wire and number of coils? If soft iron wire or washers would be best for core? A. We cannot advise you to make a drum armature for your small dynamo. You can increase the voltage by reducing the size of the wire upon the armature and field magnet. The reduction of one or two sizes in the wires will make a marked difference in the results.

(6) D. T. G. writes: I anticipate using the hand power dynamo for a motor, in a canoe. If I wind it as directed in the article on making a drum armature for it, for motor, how much battery power will it take to run it? A. The hand power machine described in SUPPLEMENT, No. 161, will answer very well as a motor without any alteration, except possibly the reduction of the amount of wire upon the field magnet to about one half its present quantity. A drum armature of a diameter suitable for this machine we think would not be as efficient as an H armature.

(7) J. O'D. writes: I am trying to make the simple electric motor. I would like to know if the copper wire as used in the telephone will do? A. The wire used in the telephone is too fine for the motor. 2. I would like to know the size of the vulcanite. A. The vulcanite is 2¼ inches in diameter and ⅛ of an inch thick. It need not be exactly of this size. Consult SUPPLEMENT, No. 641.

(8) C. K. S. asks if the simple electric motor described in your issue of March 17 would be capable of running a small dynamo of same dimensions, and if this dynamo would be capable of sustaining two 16 candle power 40 volts incandescent lamps. A. The motor is incapable of running a dynamo of sufficient size to sustain two 16 candle power lamps; better use the current employed in driving your motor for running your lamp.

(9) W. T. asks: Can we decompose water by a dynamo-electric machine, and how? What quantities in cubic feet of H and O per hour can two horse power engine with a dynamo in favorable circumstances produce? A. Yes. By using iron terminals and immersing them, not touching, in a vessel of caustic soda, oxygen and hydrogen will be evolved, one gas from each pole. It is an expensive way of working. A 2 horse power engine will give about 5 cubic inches of hydrogen and half as much oxygen per second.

(10) M. F. D. asks: Is Fordham a part of New York City? A. Yes.

(11) H. M. P. writes: We have constructed the electric motor, following as near as possible the instructions given in your paper. Being unable to get 12 coils on the armature, we wound it with 8 coils No. 16. The commutator is made of a brass tube 1 inch long and 1 inch diameter, divided in 8 sections. The battery consists of eight 1 gallon earthenware jars, each jar having 1 plate of zinc and 2 plates of gas carbon cut roughly in shape, and separated from the zinc plates by vertical strips of wood nailed to a horizontal strip that supports the zincs. This battery runs the motor for two or three hours, but does not give power enough for any work. The motor attains a high speed when in the circuit of a small dynamo. How can we increase the efficiency of the motor so that it will run a lathe? Is it necessary to make a new solution every time we use the motor? You say to connect the coils 2 inches parallel. What is meant by this? In taking twice the dimensions of motor, should there be 24 coils on the armature? Is the power of motor increased by adding to the number of coils? How can I mould plates for a battery from gas carbon? A. You would probably secure better results if you were to connect your battery for "quantity," that is, connect all the zincs together for one pole of the battery, and all the carbon plates together for the other pole. It was a mistake to reduce the number of coils—better increase the number than reduce it. To connect coils in parallel is to connect corresponding ends of the coils together, so that the current will pass through both at once, instead of passing through one after the other. If you double the diameter of your armature, you should use 24 or more coils. The power of a motor will be increased by adding to the number of coils, but there must be a corresponding increase in the current. You cannot readily make your own battery plates. You will find it far cheaper and better to purchase them. You will, however, find in recent answers to queries full directions for making battery carbons.

(12) E. C. B. asks: 1. Should the armature touch the field magnet in the electric motor described in SUPPLEMENT, No. 641? A. No. 2. How can I make the vulcanized fiber disk for the motor? A. You will have to purchase the vulcanized fiber from a dealer in electrical supplies. A disk of hard rubber will answer the same purpose. 3. Would it be practicable to use a storage battery and dynamo run by windmill to run the motor? A. The power of a windmill is too unsteady to run a dynamo direct for charging storage batteries. 4. How could I make the dynamo and storage battery? A. For information on dynamos consult SUPPLEMENT, No. 600. For information on storage batteries, consult SUPPLEMENT, Nos. 346, 416, and 342. 5. How is adhesive tape made, and where can I procure it? A. Adhesive tape is made by covering cotton tape with a varnish formed by dissolving pure rubber in benzole or turpentine, and adding a very small percentage of a fixed oil to prevent it from drying hard. 6. Where can I procure loadstone? A. From any dealer in physical machines or apparatus. 7. How can I temper a steel spring? A. Heat the spring to a cherry red, plunge it in oil; hold the spring over an open fire and heat it evenly from end to end until the oil blazes. A great deal of practice is required to properly temper a spring. In the first place, to secure a proper spring temper, good spring steel is required. The steel must be uniformly heated to a cherry red, and care must be taken to not overheat it. 8. Does an engine take any heat out of steam except what is due to expansion? A. A great deal of heat is lost by conduction through the walls of the cylinder. 9. What is the best form for an account book for a mechanic working by the day? A. Consult any work on bookkeeping. 10. Where can I get rules for figuring on a building? A. Consult "Building Table and Estimate Book," by Brown. Price $1.50. "Builders' Guide and Estimators' Price Book," by Hodgson. Price $2. Or "Architects' and Builders' Pocket Companion and Price Book," by Vodges. Price $1.50. Which we can supply.

(13) F. McF. asks: 1. Would a motor made one-half the size of one described in March 17 number be strong enough to work one sewing machine? A. If made one-half the size (linear), it would have but one-quarter the power of the machine as described. We think it advisable to adhere to the present proportions except in the matter of winding the armature. You might fill up the sections of the armature ring with No. 20 wire, about six layers deep. 2. Will four bichromate batteries be sufficient? A. Yes. 3. Is field magnet wound with same kind and size of wire as armature? A. The size of the wire on the field magnet may remain the same. 4. The brushes are connected up by means of flexible cords. Please explain. A. The connections of the brushes are clearly shown in the drawings. The flexible cords are used to permit of turning the disk which carries the brushes.

(14) G. I. K. asks for the calorific powers of natural gas and coal gas. A. Natural gas varies greatly in its composition. A fair tabulation would give per 1000 cubic feet:

Natural gas.....650,000 foot pounds.
Coal gas.....450,000 to 500,000 " "

Water gas is about the same as coal gas. 1 foot pound = 766/10 pounds avoirdupois of water heated 1 degree Fah.

(15) A. K. asks: What substance in the form of a varnish or paint, or similar covering material, will resist the action of hydrofluoric acid? A. Melted beeswax or paraffin may be used as a resistant varnish, or solution of gutta percha in bisulphide of carbon.

(16) J. W. I. asks for something to put on posts to keep them from rotting in the ground. We have nothing but spruce and some cottonwood, and find the spruce posts will only stand three or four years, when they rot off at the ground. A. Creosote oil is an effectual preservative. Make a small shallow tank into which pour one or two barrels. Place the ends of the posts in the tank, as many as convenient. Allow them to remain a few hours, then drain off excess of oil and lay by ready for setting. If the posts are of such size that you can burn the portion going into the ground, before creosoting, so as to make on them a coating of charcoal, that is a good protection.

(17) J. T. asks (1) how to make a fire bed in a forge that will not crack and get loose. A. Make the fire bed of your forge of pulverized fire brick, which can be done with a hammer. Mix with just enough common clay and water to make the mass stick together, ram the bed slightly with a stick or hammer, let it dry, and build a slow fire at first. 2. What is the best way to temper small flat springs, such as main springs in guns, etc.? A. Small springs as for gun locks should be dipped in salt water edgewise, so that the water will flow through the bend. Use as low a heat as will allow of hardening. Much depends upon the quality of steel used as to heat required. To draw temper, dip the spring in lard oil or linseed oil, and heat over the fire until the oil takes fire, then dip in oil.

(18) Mrs. F. P. writes, concerning how to keep jelly from moulding. Grease a soft paper with butter, and place it very carefully on the top of your jelly, buttered side up, and do not leave the least air bubble visible, placing the paper close to the side of the cup all round, then paste another good paper, not too stiff, over the top of cup; you will find your jelly afterward as good as when first put up.

(19) H. A. S.—Kerosene and petroleum are used in burners for cooking purposes, and in a small way for generating steam without the steam jet. Steam pressure of 3 or more pounds pressure is needed to make any reliable flame for steaming a boiler. It has been tried without pressure on burners to boilers for house heating, but all such devices have been failures from the fact that they cannot be trusted and are therefore a source of danger. We do not know enough of the particular burner you mention to venture an opinion.

(20) F. W. J. asks: 1. Will the lines of vision of a man standing on the equator and a man standing in the temperate zone, both looking in a westerly direction, be converging, diverging, or parallel lines? And if so, why? A. They will be parallel. All horizontal lines at right angles with a meridian are parallel for every degree of latitude. The reason is a geometrical one, derived from the axiom that a meridian of the earth is in a geometrical plane, and all lines at right angles to a plane are parallel. This has no relation to the dip of the horizon, which will make all lines converge from a meridian or other circle.

(21) L. C. N. asks how to enliven the cushions on a billiard table. A. The cushions of billiard tables are usually made of rubber, vulcanized; when they become hard by age and use, there is nothing that can be done but renewal.

(22) P. C. C. asks (1) a receipt for making chloroform liniment. A. Take 1 ounce each chloroform, ether, spirit of camphor, and laudanum, and ½ ounce tincture of Cayenne pepper. 2. How to make a blood purifier. Mix ½ ounce sulphite of manganese with 1 pint of water. Take a wineglassful three times a day.

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