

fortable, especially in summer, and in many cases the backs are removed at such time, and it is often necessary to open the hot water faucet so as to cool the boiler. This device dispenses with such inconvenience and also avoids heating water when not wanted, thereby economizing in fuel.

**HYDROCARBON-BURNER.**—A. W. GEARHART, Fresno, Cal. The burner is for use in burning low grade distillates. The angle at which the air enters through the front air flue in connection with the air from the top air flue is such that much stronger and steadier flame is produced than by burners of this general class. The draft is sufficient to draw all flame arising in the burning pan and to deflect the same into the fire box, thus eliminating all danger of flames to the user.

**FURNACE.**—W. J. HATCHER and J. W. CRIM, Johnston, S. C. In the present patent the invention is an improvement in furnaces. By this construction of furnace the inventors provide an efficient heating means, requiring but a small amount of fuel and adapted for use in or out of doors. For out of door use it is unnecessary to have a bottom or casing in the furnace.

**GAS-REGULATOR FOR BURNERS.**—C. F. GAFFNEY, New York, N. Y. The object in this case is to provide an attachment to a burner, whereby when a vessel or object to be heated is placed over an opening in the stove above the burner a full head of gas will be automatically supplied to the burner, and upon removal of such vessel or object from over the opening the supply to the burner will be automatically reduced to a greater or lesser extent according to the set adjustment of the device, the supply cock being meanwhile open.

**ACETYLENE-GAS GENERATOR.**—L. H. HALLAM, Roswell, Tex. New Mex. The invention pertains to a mechanism for automatically generating acetylene gas. In this apparatus the water supply means are entirely automatic and absolutely reliable, their action not depending upon valves and other complicated devices. The filter lies above the carbide bed and precipitates into the same any solid matter rising from the gas. The filter is not liable to saturation and keeps always in proper condition.

**VAPOR-BURNER.**—A. H. WAITE, El Paso, Ill. This invention pertains to burners using gasoline or like liquids as fuel, and its object is to provide a burner arranged to quickly start the generation of the vapor without creating undesirable smoke, and to prevent the formation and escape of gas into the room after the burner is turned out, thus rendering the latter smokeless and odorless.

#### Household Utilities.

**INSECT-TRAP.**—B. J. MATTINGLY, Beeville, Texas. Vermin of the insect type seek refuge in the slot, the sockets and the bores of the trap. To destroy the vermin, the trap is seized by the handle and the body thereof thrust into hot water, and then the dead are shaken or knocked out of the hiding places. The form of trap enables it to lie or retain its place upon a bed slat or spring or other part.

**WINDOW-SCREEN.**—J. STORK, San Diego, Cal. In this instance the invention relates to improvements in screens for windows of the casement type, that is, in which the sash is hinged to the casing so as to swing, the object being to provide a simple means of mechanism whereby the screen may be easily raised and lowered and wholly independent of the sash.

**FOLDING BED.**—ANNA C. THEW, New York, N. Y. The invention refers to improvements in folding beds, and more particularly to means whereby the bed may be concealed and supported in the minimum amount of space when not in use, and capable of being separated from its inclosing casing and moved to any point when about to be used. The inclosing casing resembles a bookcase, and the upper portion of the casing is adapted for storing bedding and the like.

**BROOM-HANGER.**—BERTHA CLARK, New York, N. Y. The main object of the invention is to provide suitable means adapted to be attached to the handle of a broom, sweeper, mop, or the like, to enable such article to be hung on a wall or bracket. When the broom is in use means are provided to make the top and sides of the handle smooth and free from any projection that would interfere with the comfort of the user.

**BED.**—W. H. CLING, Charleston, S. C. In carrying out the invention, Mr. Cling adapts the improvements for application to an ordinary metal bed. It is an improvement in beds especially designed for use of invalids. The mattress cover of the middle section has a suitable cut out portion in register with a seat and a pad to close the same when the commode is not in use and the bottom sheet of the bed may have a flap cut away on three sides to register with the pad.

**KITCHEN-CABINET.**—H. HARRILD, Spokane, Wash. The invention is an improvement in kitchen cabinets, being in the nature of a combination kitchen table, kitchen safe or cabinet and dining table. A stand is provided below the top board with pans which may be used for meal, flour, and the like, and between the same with a drawer for knives and other

cutlery and below the drawer with a bread board, which may slide in and out.

**DOUGHNUT-CUTTER.**—A. E. BAUM, A. SCHOEL, and C. E. EDWARDS, Waterloo, Iowa. In carrying out the invention special means have been provided for readily shifting the machine from the bowl or other receptacle containing the dough to the kettle containing the hot grease in which the doughnuts are cooked. The cutter positively feeds dough or the like of varying consistencies and forms it rapidly into uniform rings known as doughnuts.

#### Machines and Mechanical Devices.

**SAWING-MACHINE.**—T. R. KING, Hope, Ark. The pattern and work in position in the support and the saw started, the support is moved from left to right, a strip being removed from the work by the saw during the movement. The support returns to original position, and the pattern is partially rotated to bring another surface in contact with rollers of the rocking frame. Work moves in accordance with the pattern, and when the support is again moved from left to right, another strip is removed from the work. The less the amount of rotation of pattern between each successive movement, the more nearly will the finished work correspond to the pattern.

**SAWING-MACHINE.**—C. A. KALLSTROM, Luffenholtz, Cal. The principal object in this case is to provide an apparatus which may be conveniently adjusted and guard an operator from accident. As the carriage moves vertically there is substantially no friction on the track and no lost motion; and as the cutting takes place at the sides of the saw, the dust will leave it in a vertical direction, rendering it easier to dispose of. With this improvement it is possible to use thinner saws, thus saving lumber, and the saws may be used longer.

**STICK-FEEDER.**—I. E. BEDELL, York, Pa. This improvement refers to drying machines for wall paper and the like, and its object is to provide a stick feeder, arranged to feed flat sticks singly and accurately spaced apart onto an endless carrier, without danger of the sticks being wedged or clogged in the machine or broken or irregularly placed in position on the carrier.

**AUTOMATIC GROOVE-CUTTING MACHINE FOR WOODEN SHOE-SOLES.**—H. BUSSE, 96 Augsburgstrasse, Berlin, Germany, and W. SCHOU, 3 Peder Skramsgade, Copenhagen, Denmark. This invention relates to a cutting-machine, by means of which it is possible, through a simple but automatic device, to effect a regular cutting of the grooves in such objects as the soles of wooden shoes, in which are secured the leather uppers. It has for its principal objects the provision of mechanism whereby the sole as it is rotated is varied in its angular position so that the cutter will follow the curve of the sole.

**AUTOMATIC PUMP-COUPLING.**—C. B. HALDEMAN, Aurora, Kan. This coupling is especially adapted for use with wind mills. When the lever is in position against the pump handle the motion of pumping will automatically couple the piston rod and the pump handle, and when the handle is released, the mill will be automatically coupled with the piston rod. The angular portion of the upright bar is provided at the end adjacent to a brace with lugs, against which a friction roller of the frame is adapted to rest when the handle is released from the pump.

**SAWMILL-GAGE.**—A. M. DOW, Burkettsville, Maine. The invention relates to improvements in gages for lumber saw machines, the object being to provide a gage of simple construction that may be quickly adjusted for different thicknesses of boards to be cut from logs. The sawyer standing in front of the machine may readily change the position of the block and therefore change the distance of the gage roller with relation to the log of the sawmill carriage.

**MINING-COLUMN.**—J. W. KITTREDGE, Boulder, Col. This column is intended for use in mining operations and elsewhere, where great pressures are required. In mining it is adapted to be held in place by extending the column so that it presses tightly against the floor and roof, or against opposite side walls, of the tunnel or drift in which the column is being used, and which is adapted to support pneumatic drills or heavy tools used in mining purposes.

**VARIABLE-SPEED MECHANISM.**—W. BOWNE, JR., and M. CRONKHITE, New York, N. Y. In the present patent the invention has reference to means for varying the speed of a driving shaft, and the improvement is especially designed to be used in connection with motor vehicles, although adapted for various uses. When the device is in operation, the driving shaft is rotated by the motive power operating the device, and the gear on the driving shaft rotates the gear mounted upon the stud.

**DITCHING-MACHINE.**—J. S. BLACKIE, Carson City, Nev. The aim of this inventor is to provide a ditcher that will rapidly handle the dirt, gravel, and other matter in the excavating of ditches, and to so construct the machine that the width of the trench may be gradually diminished as the depth increases, thus providing side walls or banks

at any desired angle which will aid materially in preventing washing out or caving.

**TRANSMISSION MECHANISM.**—G. H. WOOD, Glen Cove, N. Y. This mechanism is especially useful in driving machinery at different speeds. The invention is especially applicable in the driving mechanism of vehicles, motor boats, and under similar conditions where the machinery must have a wide range of speeds. The mechanism can be quickly controlled so as to change the speed as desired.

#### Prime Movers and Their Accessories.

**FRICITION-CLUTCH.**—J. W. LEONARD and H. E. BROWN, Washington, Pa. In this instance the invention has reference to friction clutches designed to be used on convertible gas and steam engines, and has for its object the provision of a device simple in construction, effective in operation, and durable in use. The clutch may be adjusted to be used with a gas or steam engine, by simply adjusting the outer nuts in contact with or away from the fixed collar of the threaded bolt.

#### Railways and Their Accessories.

**AUTOMATIC CONTROLLER.**—A. E. OSBORN, New York, N. Y. The principal object here is to provide for automatically closing the throttle valve of a locomotive should the engineer disregard a signal to stop or slow down his train to which end Mr. Osborn provides a fluid pressure motor in connection with the throttle and with means for automatically affecting the operating pressure so as to operate the motor at the proper time. Provision is made for venting the train line of the automatic brake system thus applying brakes as well as throttling the engine.

**TRAIN-STOPPING DEVICE.**—G. J. GUMM, Chetek, Wis. The invention is in the nature of an apparatus for stopping trains automatically in case of a misplaced switch, open drawbridge, etc., and it consists in the construction and arrangement of the switch operating mechanism in connection with track devices set at a distance away from the switch, and co-operating devices carried by the train, so that if the switch be open the air brakes on the train are set, and the throttle valve closed in an automatic manner, thereby bringing the train to a stop before the open switch is reached.

**CAR-FENDER.**—G. M. ANDERSSON, Hyde Park, Mass. The object in this instance is to provide a fender with means adapted to compensate for vertical vibration of a car body on its truck, and thereby maintain the forward portion of the fender at a constant elevation from the track, to provide for adjusting the fender bodily at the desired elevation, to enable the forward end of the fender to be dropped automatically by an object in its path, and to pass under an object and raise it on to the fender instead of striking it, and to operate promptly without attention or assistance of the motorman.

**SUPERHEATER.**—S. MUNSON, Fowler, Col. The superheater is designed to be used in connection with tubular locomotive boilers, and the object of the inventor is to provide a superheater having an ample heating surface and adapted to permit of the passage of a large volume of steam, and to be firmly secured in the smoke box of a boiler with its center of gravity so placed as to exert the least strain on the boiler, and so arranged as to provide ample accommodation for the exhaust and connecting mechanism and to permit free access to the ends of the boiler tubes.

**LOCOMOTIVE.**—J. W. FINCH, Elizabeth, Miss. In operation when high speed is desired, a block is moved in the slot to bring the gear wheel into contact with the pinion, while when low speed with greater power is needed, the block is moved to bring the same in mesh with the internal rack. Since the gear wheel is rigid with the connecting rod, it must rotate the drive wheel in same direction with revolution of the connecting rod. When the gear wheel is placed in position intermediate the rack and pinion, the driving mechanism is out of engagement with the drive wheel, which may rotate freely without wear upon cylinder and valve mechanism.

#### Pertaining to Vehicles.

**VEHICLE-WHEEL.**—O. SKOG, New York, N. Y. In the present patent the invention is designed to provide a vehicle wheel with means simple in construction, effective in operation, and durable in use, adapted to overcome the shocks and jars caused in traveling over a rough or uneven roadbed without the use of pneumatic tires.

**HYDRAULIC CONTROLLER FOR VEHICLES.**—J. W. ANDERSON, Weed, Cal. This invention relates to a new and improved means for controlling motor vehicles, and comprises a hydraulic cylinder operated by water or other liquid under pressure, and preferably by a portion of the water normally used for circulating around the gas engine or condensing the steam on an automobile if a gas engine or a steam engine be employed.

**NOTE.**—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of this paper.



#### 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. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. 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.

(10601) H. F. B. asks: 1. We have learned from reference books that the stereoscope is an optical instrument, by means of which two pictures, each taken from slightly different points of view, are magnified, and so combined into one that, in the resulting picture objects have the appearance of solidity and relative distances are easily conceived. This effect, which the cyclopaedia calls an illusion, gives to a picture, or rather the things in it, an appearance as observed in nature. Now a friend of ours claims that nature has given us two eyes with the very same purpose in view, i. e., to observe solidity of objects and relative distances. He says that when one becomes blind in one eye, the imagination makes up for the deficiency; that to a person, fairly educated, and blind in both eyes to a certain age, when sight is suddenly restored to one eye, all objects in the background and foreground would blend, and form a flat picture, as observed in a photograph. We claim that nature gives us two eyes for the same reason that she gives us two ears, nostrils, and lungs, that we become accustomed from childhood to notice solidity and relative distance; that the man who suddenly sees from one eye, would in time have no more difficulty in noticing these properties of nature, than a man suddenly seeing from both eyes. Who is correct? A. We have never been blind in one or in both eyes and had sight restored, so can say nothing from experience regarding the vision of solidity of objects by persons who have had this experience. We, however, do know that persons, one of whose eyes is covered by bandages, cannot tell the distances of objects with any accuracy. We have many times seen the experiment tried upon people, and always with the same result. We are told by people with one eye that they do not gain the ability to tell unknown distances with any degree of certainty. We are very certain that we have two eyes for the purpose of determining distance and the solidity of objects. 2. What causes the phenomenon noticed over a field on a hot day, or a stove—radiant heat or convection currents? I say the latter. A. We presume by your second question you refer to the apparent trembling of objects when seen over a stove or over a hot radiator. The phenomenon is due to the unequal heating of the air, so that the light is unequally refracted as it passes through the layers of air of different densities. The convection currents set up in the air are the cause of the waving motion of the objects seen through the heated air. 3. We read somewhere that a perfect clock would be about fifteen minutes fast at one time of the year, and fifteen minutes slow at another; but again and again we hear of clocks and watches which require no regulation for months at a time. Please explain the inconsistency. A. A mean-time clock will be ahead of and behind the sun as you state. No clock can be made which can keep apparent solar time, since the days by the sun are not of the same length throughout the year. The word *day* here does not mean the time from sunrise to sunset, but the time from apparent noon to apparent noon again. See Moulton's "Astronomy" for this and the Equation of Time. We send the book for \$1.60. All common clocks keep mean time, and not solar time. There is no inconsistency. 4. We know that a feather and piece of lead weighing the same have an unequal fall in atmosphere, and an equal fall in vacuum; but some claim that all bodies, without respect to weight, have an equal fall in vacuum, which seems preposterous to us. What is the truth? A. All bodies fall with the same velocity at the same place in a vacuum. It is not preposterous. If a feather and a piece of lead will fall with the same velocity in a vacuum, then all things will do so.

(10602) Lieut. J. C. says: You would be very kind informing me the quickest possible of the value of the resistance of the insulation of the armature of a dynamo compound of 80 volts, 400 amperes, direct current, to be considered in good order. A. If the insulation resistance of this machine from frame to winding is one megohm, it is very likely in good condition. Be sure that all carbon dust, oil, and dirt are removed from the brush rigging before testing in order to give the machine a fair chance.