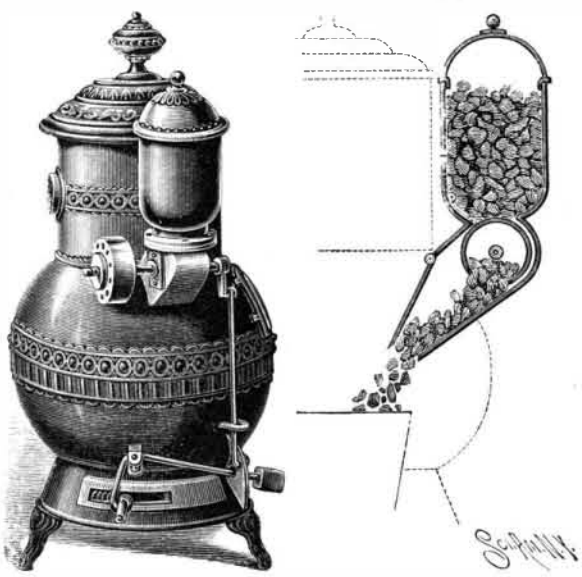
The Great Railway Station, Jersey City.

The new terminal station of the Pennsylvania Railroad, Jersey City, N. J., opposite New York City, has the largest train shed in the world, surpassing that of the St. Pancras terminal of the Midland Railway, in London. It is 652 feet 6 inches long, 256 feet wide, 86 feet clear height at the center, and 110 feet from rail level to top of skylight. The structure consists of twelve pairs of main roof trusses, 252 feet 8 inches between centers of end pins, with the lower chord or tie rod running across under the platforms. The trusses are of riveted connection, and are hinged at each foot and at the apex to allow for contraction and expansion. The ends are filled in with glass, and half of the roof area is of glass, with wire netting inside to prevent the fall of glass in case of breakage. Along the apex of the trusses is a large skylight, with open sides for ventilation, and there is also a skylight along each side of the main arch. The radius of the outer line of the main arch trusses is 215 feet at the sides and 150 feet at the middle, while the inner line is 125 feet radius at the middle, 162 feet 6 inches at the sides and 45 feet to the platform level. There are twelve tracks, arranged in three double-track and six single-track lines, with platforms 12 feet 2 inches to 22 feet wide. The station is approached by a four-track plate girder deck elevated viaduct, which has already been described, as well as the complete switch and signal and interlocking plant. A station and office building will be erected, the former having waiting, refreshment, and ticket rooms, etc., and the latter a five-story building for the general offices of the New York division of the road. The railway platforms are about on a level with the upper decks of the new ferry boats connecting with New York across the river.

A FEEDER FOR STOVES AND FURNACES.

A device designed to automatically feed a desired amount of fuel at regulated intervals to a stove or furnace, and which will also shake the grate to prevent the accumulation of ashes, is shown in the accompanying illustration. It has been patented by Mr. William Jones, of No. 2551 Bloomington Avenue, Minneapolis, Minn. The hopper has a lower opening leading into a chute which delivers into the fire pot, the inner end of the chute being closed by a swinging door when the coal is not passing, so that gas from the fire pot cannot escape by this channel. A shaft extending through the upper portion of the chute carries a cylindrical bucket, turning immediately beneath the mouth of the hopper, and which has on one side an opening admitting coal from the hopper, the coal being discharged from this opening down the chute when the bucket is turned over, as shown in the sectional view. A tongue pivoted in the lower portion of the hopper extends over the edge of the opening to prevent the coal in the bucket from clogging and facilitate the rotation of the bucket. On one end of the bucket shaft, within a suitable casing, is a clock-work mechanism to turn the shaft, the mechanism being operated by a simple form of spring motor which can be easily adjusted to run as fast or slow as desired, according as the feed is to be regulated, this being effected by sliding in or out the blades of a fan, thus causing an increased or diminished air pressure. It is preferred that the bucket be not too large, and be made to turn comparatively often, thus supplying small quantities of coal at frequent intervals. On the other end of the bucket shaft is a crank connected by a rod with a block engaging the longer

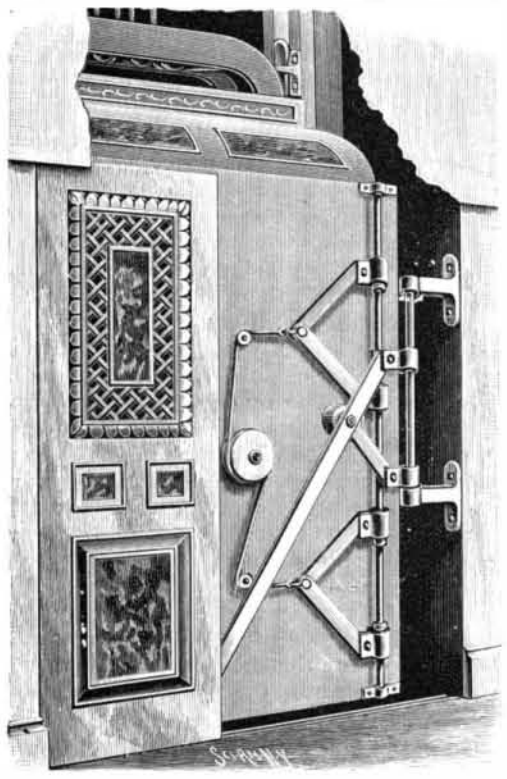


JONES' FEEDER FOR STOVES AND FURNACES.

arm of a bell crank to operate a grate-shaking attachment. The grate does not tip, but oscillates, and has a laterally extending jointed arm supported in a longitudinal slot, this arm being connected with the short arm of the bell crank. The longer arm of the bell crank has at its free end a weight, and this arm is designed to be raised and dropped by the revolution of the bucket shaft, causing the oscillation of the grate from the connection of the latter with the short arm. To give the grate more of a vibrating movement, a spring is arranged at one end of the slot through which the arm of the grate extends, the opposite pressures of the spring and the weight acting to increase the movement of the grate, whereby it will be effectively shaken, to keep the fire free from ashes, each time a charge of fuel is delivered into the fire pot.

AN ELEVATOR DOOR OPERATING DEVICE.

The improvement shown in the accompanying illus-



BUTLER'S ELEVATOR DOOR OPERATOR.

tration is designed to automatically close the door of an elevator shaft, in conjunction with an ascending or descending car. It forms the subject of a patent issued to Mr. Louis W. Butler, of No. 1 Broadway, New York City. Upon the front of the car, and held slightly out from it by end and intermediate bearings, is a vertical rod, upon which slide four sleeves, arranged in pairs, to which the ends of levers are pivoted, the levers of each pair of sleeves being pivotally connected. The sleeves bear at their inner ends against the intermediate bearings, and when the levers are pressed toward the rod the sleeves of each pair slide up and down, the levers tending to assume a vertical position. The levers are normally held in their triangular position, as shown, by a spring-actuated drum pivoted on a stud, a cord or chain wound around the drum and passing over guide pulleys being connected at one end with the upper set of levers and at the other end with the other set of levers. Upon the inner wall of the elevator shaft, and preferably a slight distance above the shaft opening, is held another rod, on which slides the sleeve of a door-shifting rod, the lower end of which is pivoted to the rear edge of the door near the bottom, while on the inner side of the rod a friction roller is journaled upon a stud, and the rod is pivotally connected by a link with a lower sleeve on the rod held on the shaft wall. In operation, as the car moves up or down, in passing a closed doorway, the friction roller easily presses in the levers sufficiently to allow the car to pass without moving the door. When the car stops at a floor the friction roller stands between the two sets of levers, and the door may be readily opened. When the car commences to ascend, the door being open, the shifting lever will be in a nearly vertical position, and the friction roller on the lever will then contact with the upper lever of the lower set and travel out on its inclined surface to force the door to a closed position. If the car is going down, the contact will be upon the lower lever of the upper set, the door being closed by a similar movement in both cases. The tension of the spring in the drum connected with the levers is such that, should any one entering or leaving a car be caught between the door jamb and the door, no serious injury will be inflicted, as the door may be readily forced back against the tension of the spring.

The Rain-Making Experiments.

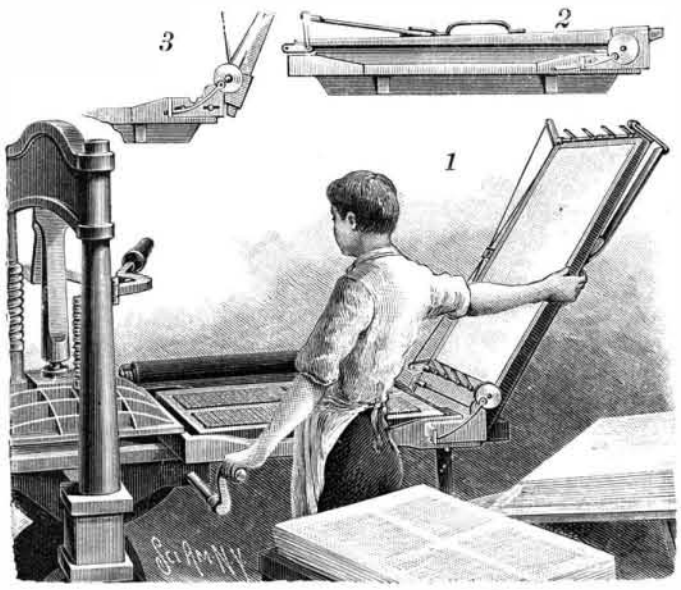
A letter from a citizen of Texas who witnessed the recent Dyrenforth rain-making experiments in that State pronounces them the most veritable humbugs and absurd waste of public money of which it is possible to conceive. He says that the trial party were shrewd enough not to begin operations before the season when, from time immemorial, rain has come down plenty and often in that region. In his belief, too, unwarranted claims and representations were sent out as to the results of the experiments.—*Boston Journal.*

Testing Oil of Turpentine.

G. Vulpius finds that reliable determinations of petroleum in turpentine oil may be made by the following modification of a method proposed by Hinsdale: 1 gramme of the sample and 1 gramme of a pure oil of turpentine are weighed on separate watch glasses, which are then floated on a basin of water maintained at about 80° C. As soon as the pure turpentine has evaporated, both watch glasses are weighed. The weight of the residue from the pure oil of turpentine (small quantity of resin always present in pure turpentine) is deducted from that of the residue in the watch glass which held the sample. The difference is petroleum, which may thus be determined to one-tenth of a per cent.

AN AUTOMATIC FRISKET FOR PRINTING PRESSES.

The improvement shown in the accompanying illustration is designed to facilitate the keeping of a perfect register in doing work on hand presses, while saving the pressman the labor of operating the frisket. It has been patented by Mr. Lorenzo D. Clark, of Fort Jones, Cal. The large view represents a press to which this improvement has been applied, Fig. 2 being a side view of the bed only with the tympan folded down upon it, and Fig. 3 being a partial section of the device in open position. At one side of the bed, adjacent to the tympan, is adjustably secured a shoe, having a vertical offset or ear with a cam surface. Near the lower end of the tympan a shaft is transversely journaled in three bearings, the bearings being so constructed as to admit of adjustment to any size of form. Upon the end of the shaft projecting over the offset of the bed shoe, is a disk, provided with a wrist pin projecting from both its faces, the inner portion of the pin being adapted to ride upon the cam surface of the offset, while the outer end of the pin is connected by a curved link with the ear of the bed shoe. One end of the link is pivoted to the pin, and its other end is bent to form a hook, and has a sliding connection with the ear, whereby the link will draw upon the wrist pin to turn the disk and its shaft when the tympan is being thrown back, but will slide freely in a slot in the ear as the tympan is being put down. Upon the opposite end of the disk-carrying shaft is a head block, with a perforation at each end to receive a connecting rod, the other end of each rod being similarly connected to a head block on the end of a shaft journaled on the tympan near its top. The rods cross each other near their central portion, where they pass through guide sleeves, the crossing of the rods causing the shafts to be rotated in opposite directions, and the upper shaft has at its opposite end a crank arm, which is pivotally connected by a link with a spring, the tension of which is away from the tympan. Each of the shafts at the top and bottom of the tympan is provided with grippers, and as the tympan is put down, after a sheet has been placed in position, the pin on the inner side of the disk engages the cam of the bed shoe, whereby the disk is revolved and both shafts are turned, the tension of the spring then operating to press the grippers firmly upon the sheet. When the tympan is raised, the link connecting the bed shoe with the disk causes the shafts on the tympan to be revolved sufficiently to release the grippers, when the tension of the spring, as the crank arm to which it is connected is carried over the center of its radius, holds the grippers open. It is also designed, where desired, to use guard strips in connection with the gripper



CLARK'S FRISKET FOR HAND PRESSES.

shafts, to prevent the soiling of the sheets, the guards being so placed as to stand out at an angle when the tympan is raised, and not interfere with the work of the pressman.

A MOST important feature of the scientific instruction in the lower grade of schools should be the collection of specimens which should form the subject of object lessons.