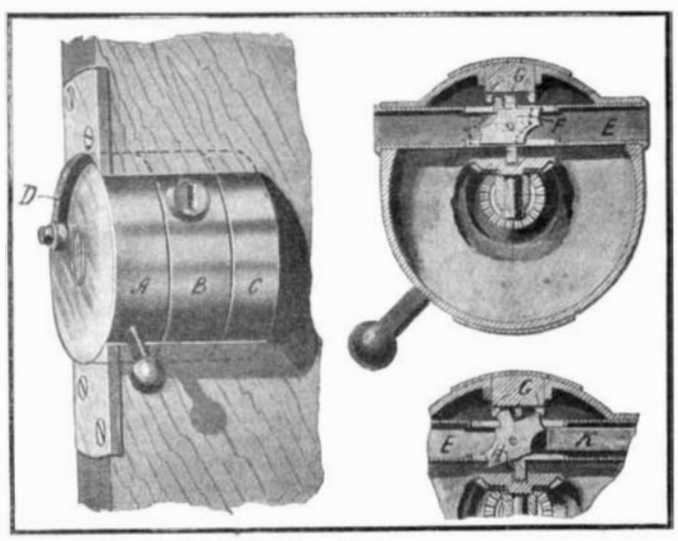
A New Flexible Steam Packing.

The modern practice of using steam at high pressures and temperatures has brought with it certain problems which did not confront the engineer of ten years ago with his low-pressure plant. The chief of these problems is undoubtedly the question of suitable packings, a question which grows rapidly more serious as steam pressures are increased. Practically the only high-pressure packings hitherto available have been either metallic, hence rigid and unyielding, requiring constant regrinding, or of rubber, which is not absolutely impervious to steam, has not the necessary wearing qualities, and cannot withstand high temperatures. Recently, a new type of packing has been invented by Mr. Frederick M. Ekert, which seems to overcome the defects of previous packings. The material is very tough and tenacious, and it is sufficiently flexible or plastic to conform itself to all irregularities, thus absolutely preventing leakage. It is composed principally of rubber and asbestos fibers with which certain pore-filling substances are mixed. The packing is absolutely impervious to water or steam, and is a non-conductor of heat. Furthermore, it is self-lubricating, owing to the presence of graphite in its composition. It is made into valve disks, which will withstand any pressure up to 450 pounds continuous service, and also in sheets for use on pumps, cylinders, steam chest covers, manhole covers, and the like. In addition to these, a nickel-protected disk is made for superheated steam, which is adapted to withstand temperatures up to 900 deg. Fahrenheit.

A similar material, in which cotton fibers are used in place of asbestos, Mr. Ekert provides for the manufacture of puncture-proof automobile tires, mattings, and the like.

A NOVEL DOOR LOCK.

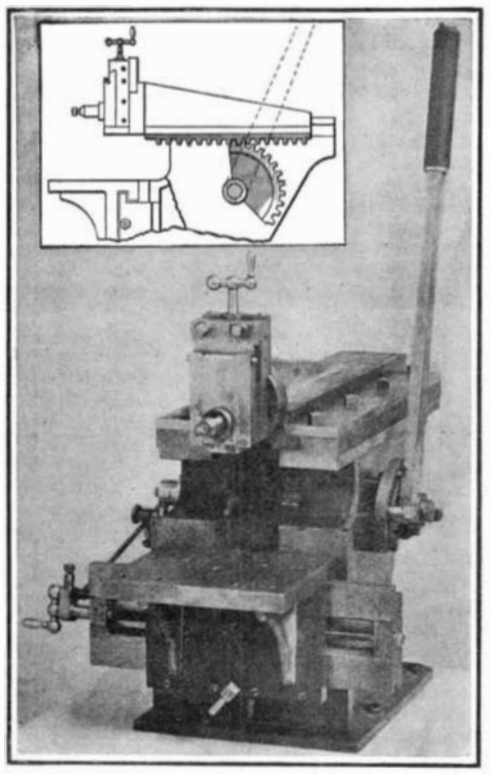
A door lock of decidedly unique form has recently been invented by Mr. Peter Ebbeson, of St. Paul, Neb. While the construction of this lock is not complicated, yet it has been ingeniously designed to prevent operation with a false key. Furthermore, it comprises a latch of such form as to prevent shaking or rattling of the door. As shown in the accompanying engraving, the lock consists of three disk-like sections, *A*, *B*, and *C*, the disk *B* being stationary and the others revoluble. The disks are mounted in a socket in the door and project from opposite sides thereof. The latch is operated by a pair of knobs at opposite sides of the door, which are respectively secured to the disks *A* and *C*. In the face of the disk *A* is an eccentric slot *D*, adapted to receive a stud projecting from the door frame. By operating the knob of disk *A* the latter may be turned to engage the stud in the eccentric slot, thus locking the door. The disk *C* is connected with the disk *A* by a series of bevel gears, so that by operating the knob of disk *C*, it is possible to rotate the disk *A* to latch or unlatch the door. In order to lock the door, a novel mechanism has been provided in the central disk *B*. As shown in the cross-sectional view, a barrel *E* is mounted in this disk. This barrel is provided with a bolt *H*, which is adapted to engage a slot in one of the bevel gears, and thus prevent rotation of the other two disks. In the barrel *E* is a tumbler *F*, which is carried on a short shaft mounted to slide in slots in the barrel. This tumbler is provided with a projection at its upper end adapted normally to register with the central one of three flanges *G*, projecting from a block above. Now, in order to unlock the latch, a key is inserted in the barrel *E*, and this presses the tumbler *F* to the position shown in dotted lines, when the projection thereon clears the central projection *G*, and the barrel may then be rotated to move the bolt *H* clear of the bevel gears. The tumbler is held in normal position by a pair of springs which bear against its shaft. It will be observed that the ends of the tumbler are of odd form, which the key must fit to prevent the tumbler from tilting on its axis when being pushed clear of the projection *A*. If a false key is introduced, as shown at *K* in one of the section views, the tumbler will be tilted up into engagement with the outer projections *G*.



A NOVEL DOOR LOCK.

HAND-OPERATED SHAPER.

The advantages of the shaper for finishing small work are well known in all machine shops. To provide these same advantages for small shops which cannot afford power-driven machines or even for large shops in which a shaper is only occasionally used, Mr. S. N. Malterner, of Canton, New York, has invented the hand-operated machine illustrated herewith. The machine consists of the usual frame provided with guide shears at the top to receive the carriage which is formed with the usual head, carrying an apron tool post of common form. Below the tool post is the table on which the work is clamped. The carriage is formed on its under side with a rack which is engaged by a gear segment rigidly attached to a transverse shaft mounted in the frame. At one extremity this shaft carries a hand lever whereby it may be rocked back and forth and thereby cause the carriage to reciprocate in the usual manner. On the frame of the machine is a curved bracket formed with a slot in which a pair of adjustable bolts are secured. These bolts project in the path of the hand lever and serve as stops to limit the stroke of the tool. If it should happen that the position of the work upon the table is such that the lever does not reciprocate at a convenient point, which is generally the uppermost or approximately vertical position, it is only necessary to remove either of the stop bolts so as to enable the gear segment to be moved entirely out of mesh with the rack. Then the carriage may be adjusted to the desired position and after the gear segment has again been moved into mesh with the rack, the stop bolt may be secured at the proper adjustment.



A HAND-OPERATED SHAPER.

Physical Constitution of the Heavenly Bodies.

Some of the noteworthy of the numerous conclusions arrived at by T. J. J. See in an article on the physical constitution of the heavenly bodies, published in Astronom. Nachr., are the following:

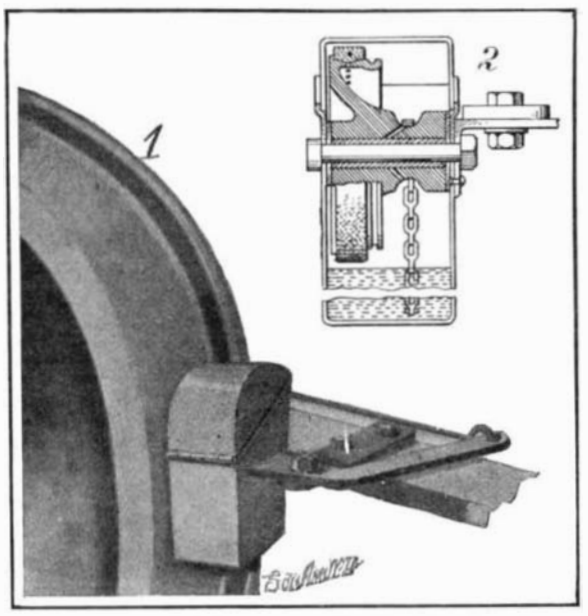
The mean specific heat of the sun must lie between 0.5 and 6.8; it could reach the latter value if all the elements present were as simple as hydrogen. The heat and light from the sun are held to be obtained from the interior solely by radiation, and not by convection currents; the gases in the interior are very transparent, but on the photosphere some elements, such as carbon, can give rise to clouds which are non-transparent to light. Based chiefly upon the density at the solar surface, the heat supply of the sun is held to be sufficient to last 10 million years at the present rate; or taking contraction into consideration, 30 million years. As regards the earth before it had a solid crust, the temperature probably was never sufficiently high for it to be self-luminous. On the major planets the surface temperatures are considered to lie between 300 deg. and 800 deg. abs., so that the surface can neither be thought of as rigid nor self-luminous; these planets are not cooling down at present, but are even becoming hotter. Prof. See considers the monatomic theory, as applied to the sun's condition, to be the only one which gives results which are in accord with known facts.

The Standardized Staircase.

A system of standards is the order of modern life, and in many directions standards are convenient if not, in some cases, indispensable. We have, for instance, standard gages for railways and tramways, standard threads for various screws, standard sizes for boots, shoes, and gloves, standard qualities for articles of food, standard weights and measures, coinage, and so on. But there are still some directions in which the need of a standard is not only indicated but is urgent. The desirability, for example, of standardizing the steps of all staircases is seen in the fact that so often a fall on the staircase is due to the irregularity in the height of the steps. A common cause of accident on the staircase is the kicking of the edge of a stair when ascending. In descending, also, an irregularity in one step may easily upset the equilibrium of a person. To the aged and infirm the descent of an irregularly stepped staircase is a source of terror. Yet how many staircases are constructed absolutely alike as regards the height of the steps? We should say very few; and not only is there little uniformity existing between different staircases but the steps themselves in the same staircase are often irregular. Staircases and the steps in them should be standardized; there should be uniformity of height and breadth, and in regard to the latter there should be room enough on the step to accommodate the whole foot from toe to heel, so that there is no undue call on the energies when ascending, as by going on tiptoe, so to speak, or any feeling of insecurity when descending by reason of there only being room for the heel. Serious falls on staircases are by no means rare and a common cause of such accidents is the fact that staircases are not standardized. Even in dark places the staircase, if standardized, would be more safely negotiated than a well-illuminated but irregular stairway. The perils of an ordinary ladder would be enormously increased if the rungs were placed at irregular intervals.—Lancet.

WHEEL-FLANGE OILER.

The curves of street railways are usually so sharp that it is necessary to keep them well lubricated in order to prevent undue wear and screeching of the wheels as they grind against the tracks. Aside from the expense of keeping the curves lubricated, the practice of greasing them is extremely objectionable to pedestrians who are liable to soil and ruin their clothing by contact with the oily substance. The accompanying engraving shows a method of obviating this objection which consists in oiling the flanges of the wheels instead of the tracks. The oiling device is arranged to be brought into operation at the will of the motorman so that the lubricant is applied only when needed and where needed, because it is on the flanges that most of the friction occurs. This oiler is not limited to street railways, but is also applicable to the curves of steam railways where much power has been uselessly spent because heretofore it has not been the practice to oil these curves. The device comprises an oil chamber in which a wheel is mounted to rotate. The wheel is provided with a wick which is seated like a tire on the outer rim. Oil holes lead through the rim of the wheel to the wick. The wheel does not touch the oil in the chamber, but a loose chain which hangs in the oil is turned by the wheel and serves to feed the lubricant to the rim whence it passes through the holes to the wick. In use the device is mounted on a bracket in such position that it can be swung against the wheel flange by the operation of a lever.



DEVICE FOR OILING CAR-WHEEL FLANGES.

A portion of the oil chamber is cut away permitting contact of the wick with the flange, and thus causing the wheel in the oil chamber to rotate and feed the oil to the wick. The inventors of this improved oiler are Messrs. F. S. Baird and E. W. Carroll, of Congress, Arizona.