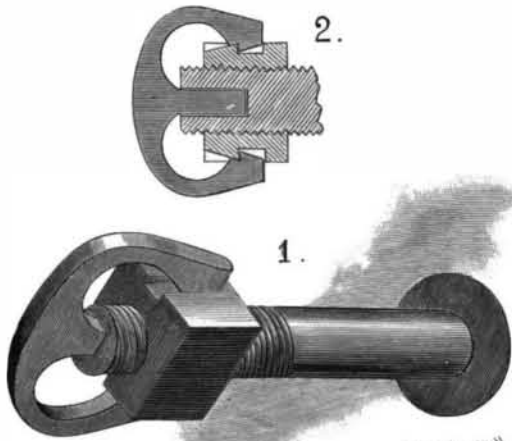


A SIMPLE NUT LOCK.

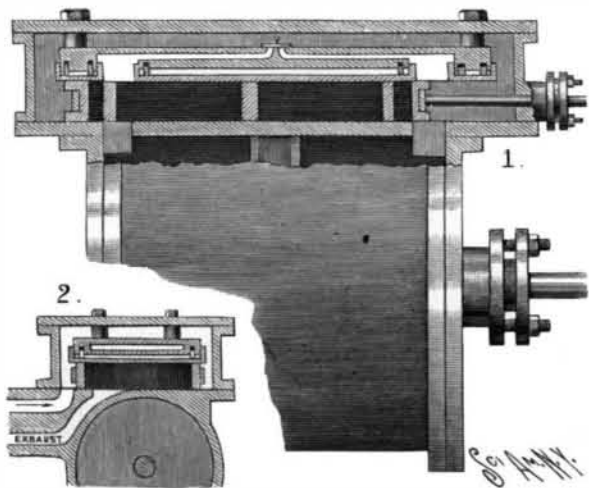
According to the improvement represented in the accompanying illustration, a yoke is adapted for convenient connection with the bolt and nut in such manner as to positively prevent both from turning. The improvement has been patented by John H. Hartman, and correspondence in relation thereto should be addressed to Frank Fisher, Germantown, N. Y. Fig. 1 shows the application of the lock, Fig. 2 being a view in section. In the threaded end of the bolt is a longitudinal recess of square or polygonal cross section, and in opposite sides of the outer face of the nut are inclined guideways connected with recesses of sufficient size to

**HARTMAN'S NUT LOCK.**

just receive heads which form the two terminal portions of the yoke. The latter has a central tongue, of cross sectional shape corresponding to the recess in the end of the bolt, and when the tongue is entered in the recess, and the yoke is pushed forward in the guideways of the nut, both bolt and nut are locked so that the nut cannot turn on the bolt or the bolt turn in the nut.

AN IMPROVED BALANCED SLIDE VALVE.

The accompanying illustration represents a valve of simple and durable construction designed to permit a quick admission and exit of the steam to and from the cylinder, at the same time facilitating a quick exhaust. It has been patented by Isaac C. Griffith, of Vicksburg, Miss. Fig. 1 represents a sectional side elevation of the improvement, and Fig. 2 shows a transverse section. On the top of the slide valve, adapted to open and close the ports at the ends of the cylinder, rests a face plate forming part of a balance plate supported by bolts or other suitable means from the cover of the steam chest, there being between the two plates a suitable packing to prevent leakage of steam, and the packing being so placed as not to be in contact with a rubbing surface. The slide valve ports register at their upper ends with relief ports in the face plate leading to channels in the balance plate, there being over the inner ends of such channels a valve or button adapted to open these channels to the steam chest when back pressure comes from the cylinder. The sides of the relief ports fit into channels in the under side of the balance plate, where a packing is arranged around the sides and ends of the ports, the ar-

**GRIFFITH'S BALANCED SLIDE VALVE.**

angement being such that the slide valve is in contact at its top surface with the under side of the face plate and not with the packings interposed between the face plate and the balance plate. The packing is preferably of an indestructible and expansive material, such as asbestos, and gives sufficiently to firmly hold the face plate at all times in frictional contact with the slide valve, and a metal flange may be made integral with the face plate, fitting in recesses in the balance plate, in which is the asbestos. The steam when compressed in the cylinder to more than boiler pressure will readily flow back into the steam chest, the steam then lifting

the valve or button in the balance plate, and all danger of blowing off the steam chest or cylinder heads being thus prevented, while the slide valve is so equally balanced that the only force necessary to operate it is that required to move the weight of the valve, and overcome the slight friction caused by its weight and the pressure of the face plate on top of it.

Old Age Pensions in Germany.

An English Foreign Office paper just issued contains a report on the insurance in Germany against accidents and in case of old age and infirmity. The accident business is in the hands of trade associations, government insurance establishments, and insurance establishments of 13 building trade associations. The 112 trade associations are divided into 64 industrial and 48 agricultural, and the number of persons insured in 1895 was 17,698,633, subdivided thus: Industry, 5,409,218; agriculture, 12,289,415. Fishermen, domestic servants, and all persons carrying on small industries alone or employing a few apprentices are excluded from the operation of the act. The government insurance establishments insure government employes in the naval, military, postal, railway, transport, forest, and building services, to the number of 690,835.

The year 1895 was the fifth since the institution of the new system of old age and infirmity insurance. The total sums paid were £419,000 to the infirm and £781,500 on account of old age. The total expenditure was about £1,866,000. The receipts from subscriptions from laborers, rent, etc., amounted to £5,337,000. The accumulated fund was thus raised to £19,038,000. The expenses of administration were about five per cent of the total receipts. The increase in periodical subscriptions shows how popular the system is becoming.

The average weekly subscription per person subscribing amounted to about 2½d. The average old age pension was £3 13s. per annum, and of an infirmity pension £3 3s., without counting the subsidy from the state of £2 10s. The sum above mentioned, £19,038,000, bore interest in 1895 at the rate of 3.58 per cent against 3.67 per cent in 1891. The disbursements of the empire under the act of 1889 were in 1895-96 £846,659, and the amount allowed in the budget was £765,625. The amount allowed in the estimates for 1897-98 is £1,065,000. In July, 1896, the number of pensions was 341,973. According to the estimates of 1897-98, the number of pensions which lapse is about 11 per cent of the total number, inclusive of the new pensions granted in the year, the number of which is estimated at about 84,000.

Disease Germs in Soils.

It has been observed in France that, in localities where animals are interred which have died of charbon, the germs of this infectious malady persist in the soils for many years, and that, especially when cereal crops are cultivated upon such soils, there is great danger of contaminating healthy cattle with the same disease. In one case it was observed that many sheep which were pastured in a field in which, two years before, a single animal which had died of charbon was buried were infected with the disease and died. In like manner, it is entirely probable that the germs of hog cholera may be preserved in the soil for many years, to finally again be brought into an activity which may prove most disastrous for the owners of swine. Every effort should be made by agronomists to avoid infecting the soil by carcasses which are dead from any zymotic disease.

Cremation is the only safe method of disposing of such infected carcasses. The investigations of scientists have shown that there are many diseases of an infectious nature due to these germs, and that these germs may preserve their vitality in the soil. Among others may be mentioned yellow fever and tetanus, and the microbe producing the bubonic plague, which retains its vitality in the soil, and thus escapes entire eradication.

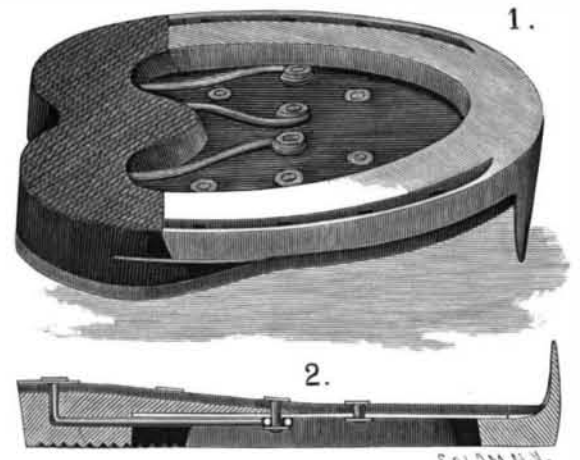
For the reasons given above, the agronomist, who also has at heart the health and welfare of man and beast, can hardly look with favor upon any of the plans which have been proposed for the use of sewage from large cities for irrigation purposes. There is scarcely a time in any large city when some infectious disease due to the activity of germs does not exist, and the sewage is liable at all times to be contaminated therewith.—H. W. Wiley, in Jour. Frank. Inst.

"Perpetual Motion."

In this week's issue of the SCIENTIFIC AMERICAN SUPPLEMENT we commence the publication of a series of articles under the above title which were originally published in the SCIENTIFIC AMERICAN in the latter part of 1870 and early in 1871. The articles are fully illustrated and many of the devices described are extremely curious, while some of the quaint ideas advanced by early investigators, although they may frequently evoke a smile, may yet find a parallel in schemes not infrequently brought forward at the present day. The publication will be continued through several numbers of the SUPPLEMENT, and will doubtless prove especially interesting to many inventors.

AN IMPROVED HORSESHOE PAD.

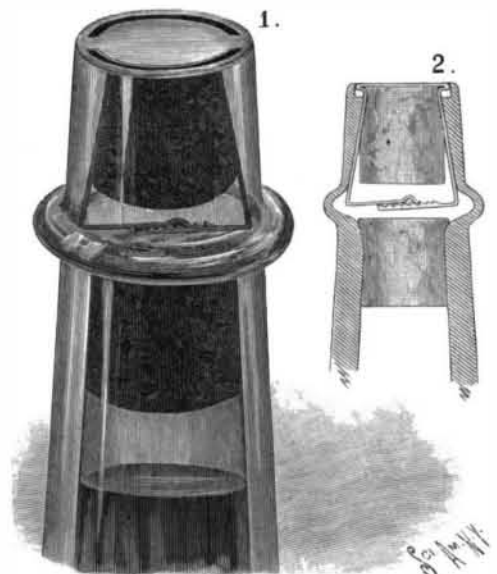
The illustration represents a pad which extends over the entire bottom of the foot, and which is especially designed to ease the heel of the horse, preventing also slipping on smooth roads, the balling of snow under the foot, and injury to the foot by sharp objects. The improvement has been patented by Horace W. Billington, of No. 565 Jersey Avenue, Jersey City, N. J. Fig. 1 is a bottom view of the pad with shoe attached and Fig. 2 represents a central lengthwise section. A

**BILLINGTON'S HORSESHOE PAD.**

sole, preferably of leather, is shaped to cover the entire foot, and on the heel section of the sole is secured a cushion bearing block, over a forward extension of which is a protection plate, preferably of metal, the plate being secured to the sole and cushion block by rivets. A tie plate is located on the upper face of the sole at each side of its center, and these plates serve as anchorages for tie rods carried forward through the body of the cushion bearing block, and terminating in eyes through which are passed rivets, which also assist in connecting the cushion block, protection plate, and sole. The shoe used with this pad is shorter than the ordinary shoe, and its toe extends upward beyond the sole, a portion of which is cut away for such purpose, the shoe being nailed to the foot in the ordinary way, and the nails also serving to hold the several parts of the pad, together with the shoe, firmly on the foot.

A NON-REFILLABLE BOTTLE.

A bottle which may not a second time be used or disposed of as an original package, after having once been opened, is represented in the accompanying illustration, and has been patented by Charles R. Gibson, of Woodville, N. H. Fig. 1 shows in perspective the neck of a bottle having the improvement, Fig. 2 being a sectional view. The neck is made with an outwardly bowed section forming an exterior rib of quite thin glass, permitting the portion above to be readily broken off at this point. Above the rib the inner wall of the neck is beveled, and at the mouth is a flange forming a recess in which is seated the cap of a locking yoke of spring material, the opposite foot sections of the yoke having, respect-

**GIBSON'S NON-REFILLABLE BOTTLE.**

ively, a pawl and ratchet. The bottle having been filled, a cork is placed in its neck below the frangible rib, and a second cork, fitted in the top of the locking yoke, is forced downward into the upper section of the neck of the bottle, when the side members of the yoke expand, and, by their pawl and ratchet engagement, prevent the removal of the yoke and its cork except by breaking off the upper portion of the neck. In seating the locking yoke with its cork in the neck of the bottle, a rubber gasket is preferably placed in the flange or recess between the cap of the yoke and the top of the neck of the bottle.