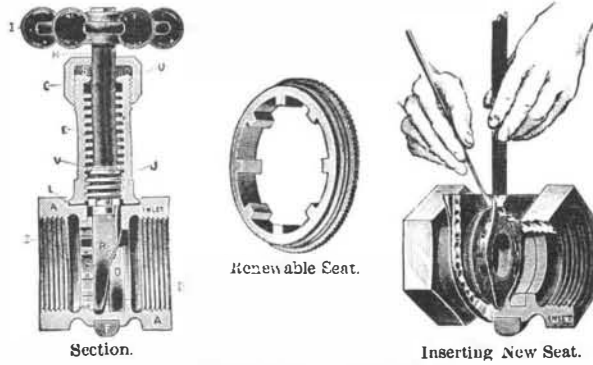


**THE "LUNKEN" GATE VALVE.**

The illustration represents a valve of great strength, whose seat is renewable without disconnecting from pipes, which has been placed on the market by the Lunkenheimer Company, of Cincinnati, Ohio. Its disk is balanced, thus operating easily regardless of high pressure, and it has been found in practice to possess superior merit as a reliable straightway steam valve. The valve can be easily taken apart without renewing the packing washer, and it is furnished with a renew-



**THE "LUNKEN" GATE VALVE.**

able seat, at small cost, whereby in a few minutes a worn-out valve can be made practically as good as new.

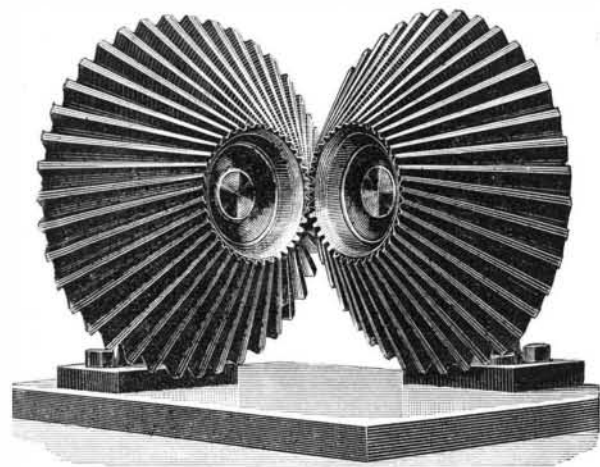
**BEVEL GEARING CUT THEORETICALLY CORRECT.**

The display in Section 15, Machinery Hall, of the World's Columbian Exposition, made by Hugo Bilgram, of Twelfth and Noble Streets, Philadelphia, Pa., is very notable, and illustrates the perfection that has been attained in the production of cut bevel gear wheels. In addition to numerous bevel and miter wheels, ranging from 1 inch to 30 inches in diameter, two pairs of miter wheels are exhibited, driving overhead shafting set at right angles, and several sets, embracing every variety of bevel wheels, are mounted on stands, to be examined by hand, as to the smoothness of running and the absence of backlash. The wheels overhead, although running at a high speed, make very little noise indeed, and an examination of the mounted wheels will convince any one conversant with the difficulty of cutting bevel wheels, that a further improvement in this line is hardly conceivable.

Among the mounted wheels there are two sets which are of special interest to the student of kinematics, and are illustrated in detail. One is a pair of miters with teeth cut inclined, with the object of having at all times at least one tooth in deepest gear. The other is a set of four, namely, one wheel of 36 teeth and three pinions having 12, 18, and 24 teeth respectively, the pinions meshing at right angles with the wheel. Most authorities on gearing have heretofore considered this theoretically impossible; but the exhibited wheels show that it is both theoretically and practically possible, for the wheels, which can be turned by hand, run smoothly and with practically no backlash.

**The Great Enemies of Man.**

The change in the conception of tuberculosis, produced by a discovery of its true cause, calls for a reconstruction of many of the heretofore approved statistics of mortality. It is not very long ago since text books stated that tuberculosis,



**THE WORLD'S COLUMBIAN EXPOSITION—BILGRAM'S EXHIBIT OF CUT BEVEL GEAR WHEELS.**

meaning especially pulmonary consumption, affected most often persons between the ages of fifteen and thirty years. The tubercular infection is now known to be most frequent as a cause of death in infancy. At this time it is the mesenteric and other lymph glands and the meninges that are involved; in childhood the bones are prone to be attacked, in adult life the lungs.

Taking tuberculosis in every form as a cause of death, Professor Hugo Holsti, of the University of Helsingfors, has compiled interesting facts showing the relation of age to this disease.

During the years 1882-1889 there died in the Swede-

Finnish district of Helsingfors 1,771 persons of tuberculous diseases. The mortality rate per 10,000 living persons is much the greatest during the first two years of life (25 per cent). It rapidly falls until, between the ages of six and fifteen, it hardly exists (about 0.15 per cent). It then steadily rises until the decades thirty-one to forty, forty-one to fifty, and fifty-one to sixty, where it remains at about 0.6 per cent and then falls again.

Males are more subject than females in the proportion of 990 to 781, but this holds true more for adult than infant life.

Professor Holsti's tables show in a striking way identity of the period of greatest mortality from tuberculosis with the time when children are fed on milk.

May it not be that, after all, the cow is the great enemy of mankind, and that without the cow there would be no tuberculosis? The history of Japan, which is a cowless country, favors in a measure this view. Science seems to be pointing toward the conclusion that there are two great and potent poisons constantly diffused among civilized peoples, and these are milk and water. Not that these substances are essentially bad, but that they are accidentally so. It is not proposed to abolish, but to purify them.—*Medical Record.*

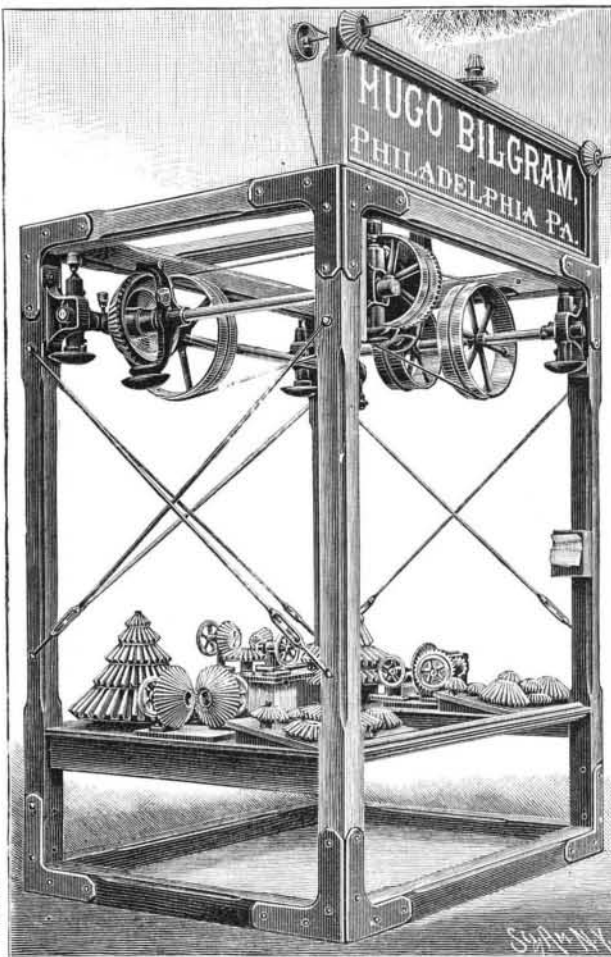
**The New Revenue Cutter William Windom.**

The William Windom is a new revenue cutter intended for use at the port of Baltimore. This vessel, which is now being built at Dubuque, Ia., at a cost of \$98,500, has many new features. The Windom is 171 feet long, 27 feet wide and 13 feet deep. Her engines will be triple expansion twin screw, a new departure for a revenue cutter. Steam is supplied by a Scotch marine boiler weighing 60,000 pounds. There will be a cabin on the main deck, handsomely finished in cherry and mahogany.

**How Congressmen Choose Their Seats.**

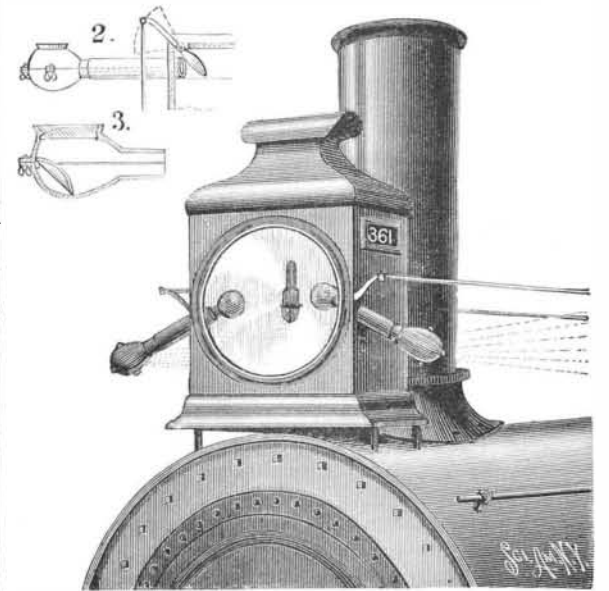
The following are the rules of the House in respect to the selection of seats:

1. At the commencement of each Congress, immediately after the members and delegates are sworn in, the clerk shall place in a box prepared for that purpose a number of small balls of marble or other material equal to the number of members and delegates, which balls shall be consecutively numbered and thoroughly intermingled, and at such hour as shall be fixed by the House for that purpose, by the hands of a page, draw



**A LIGHT REFLECTING APPARATUS.**

A device to facilitate the direction of light in different paths from a central point is shown in the illustration, the improvement being shown applied to the head light of a locomotive. The invention has been

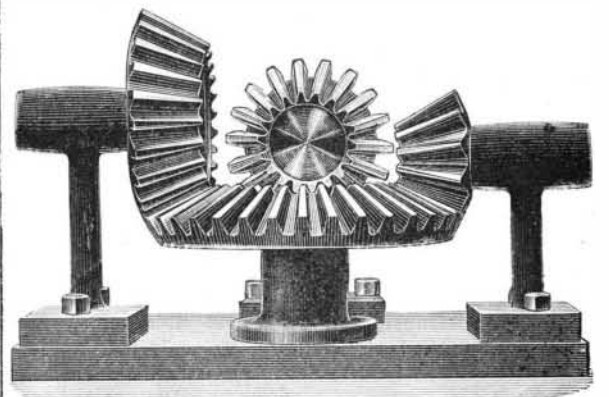


**AN IMPROVED LIGHT REFLECTING APPARATUS.**

patented by Messrs. Arthur B. Moore, George W. Rue, Coral D. Smith, Frank H. Roebuck, John F. Mills, and John R. Kirk, of East Las Vegas, New Mexico. In the sides of the lantern are inserted tubes to the inner ends of which are hinged concave reflectors, as shown in Fig. 2, and with which are connected levers pivoted to rods extending to the cab of the locomotive. In the outer ends of the tubes are inserted the necks of the light distributors, shown in section in Fig. 3, there being in the side of the casing an aperture in which is a plano-convex lens, while within the casing, opposite the opening of the neck, is a convex reflector, arranged at an angle of forty-five degrees to the axis of the neck. The light is reflected by the inner concave reflectors through the tube upon the outer convex reflector, which reflects it through the plano-convex lens in the side of the casing. The inner concave mirrors are adjusted by means of the rearwardly extending rods so that the light may be sent in any required direction.

**Opening of the Corinth Ship Canal.**

The Corinth ship canal, connecting the Gulf of Lepanto with the Aegean Sea, was formally opened on July 29, in the presence of the Grecian royal family, the court, and representatives of the army, navy, and also foreign diplomats. The first sod of the canal was cut by the King of Greece in April, 1882. The company which held the concession was originally French, but work was suspended in March, 1890, owing to the financial crisis in Paris, and the canal was then transferred to a Greek company, under which it was finally completed. The canal is three and nine-tenths miles long and the minimum depth is 25 feet, while the average breadth is 100 feet. A bridge crosses the canal about a mile from the west end and is 230 feet above the water level, so that vessels can pass freely. A light house, 265 feet above the sea level, has been built



on the isthmian ridge, so that its light can be seen from both directions. The canal is protected by breakwaters, on which are lighthouses. Steamers from the Adriatic, bound for Constantinople, will save eighteen hours by the new canal, and steamers from Marseilles will save eight hours.

It has been estimated that 25,000 horses are employed in the London carrying trade, that their value is £1,250,000, and that the cost is, for food, £800,000 a year. A rule prevails of foraging the horses on the expense an inch per week—that is, a horse costs as many shillings a week as it stands hands high.