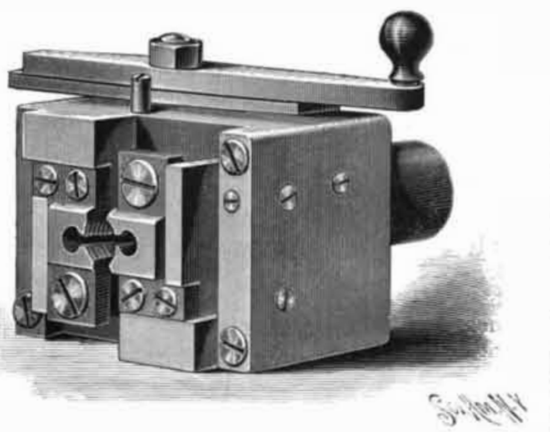
AN IMPROVED DIE HEAD.

The die head shown in the illustration is constructed to approximate as closely as possible to a solid die, and possesses special advantages for makers of fine and exact work, particularly manufacturers of bicycle parts and fittings, etc. It is manufactured by Charles H. Besly & Company, fine tools and manufacturers' and machinists' hardware, Nos. 10 and 12 North Canal Street, Chicago, Ill. It has few moving parts, and such



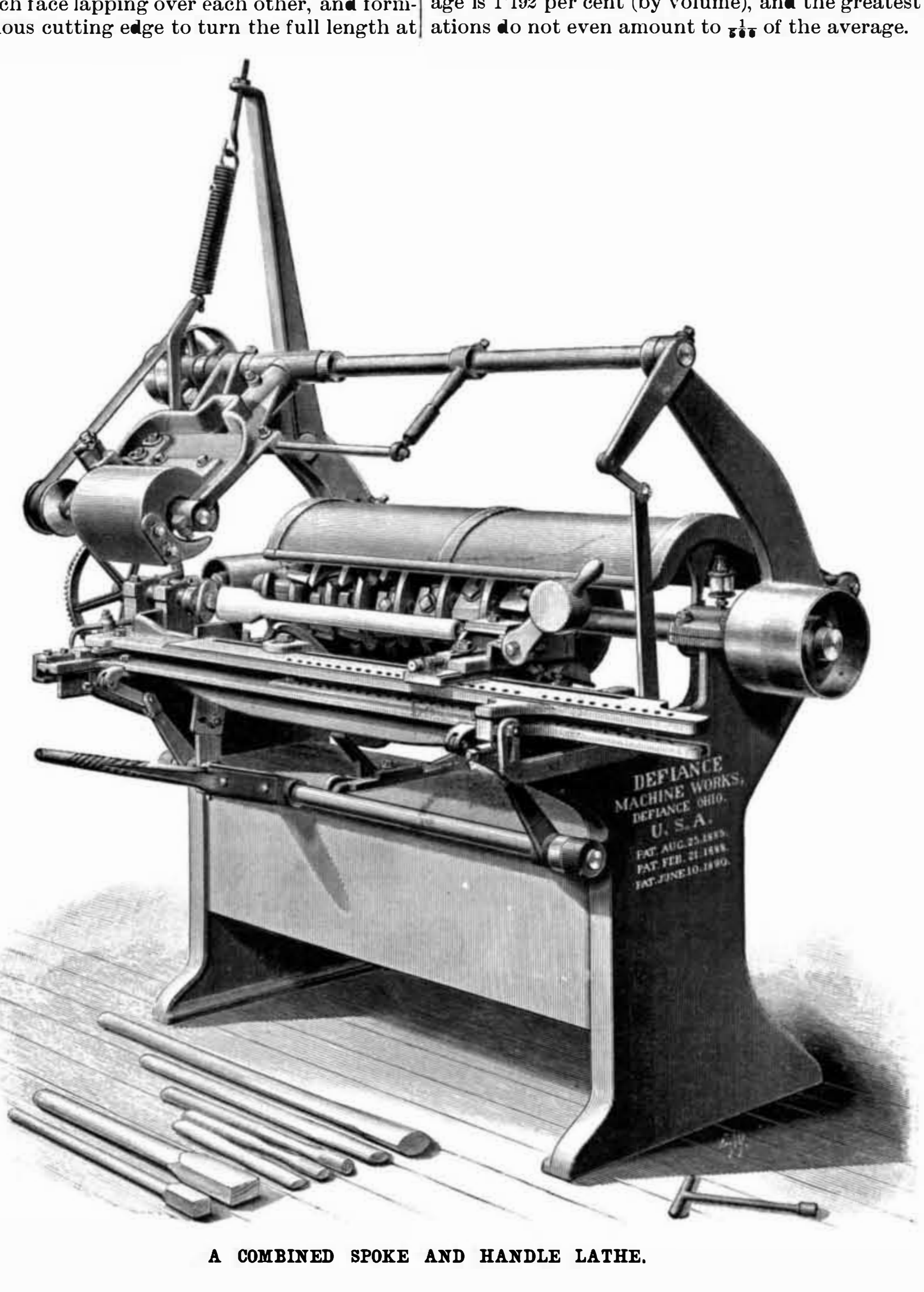
THE GARDNER NO. 94 DIE HEAD.

parts are very stiff. The sliding die carriers extend across the full length of the head, giving long wearing surfaces and great rigidity. The dies are closed by a taper pin forced into the back of the carrier. It will cut threads true to size, has few wearing parts, and will not clog with chips.

AN EFFICIENT WOODWORKING MACHINE.

From twenty-five hundred to three thousand pieces a day of finished spokes or handles can be made from the rough blanks, either sawed or rived, by the automatically operating machine shown in the illustration, which has an automatic swinging cutter head to square the head of the spoke and finish the eye ends of handles. The machine is made at the Defiance Machine Works, Defiance, Ohio, and has the necessary adjustments to turn common, Sarven, or sharp edged shapes, making either light hickory spokes or heavy spokes for wagon, truck, and artillery wheels up to 5 inches diameter and 42 inches long. The cylinder has cutter heads side by side on a 2¼ inch steel spindle to fill the length of turning, each head having three cutters with 3 inch face lapping over each other, and forming a continuous cutting edge to turn the full length at one cut. The table is made in two parts, gibbed, and slides on the frame in angle ways moved to and from the cutters by either hand or foot lever; the upper portion supporting the centers is pivoted to the lower half near the tail center by a steel pivot, in one of the several holes through the table, upon which it vibrates for oval turning. At the opposite end on the head center spindle a cast iron cam is placed of whatever shape desired to turn, the cam riding against an upright shoe extending up from the lower table, and being held snug against the shoe by a coiled spring. When the table is moved toward the cylinder to where the turning shall begin, an automatic feed slowly rotates the object to be turned, and the cam revolving against the shoe oscillates the upper table in a path corresponding with the shape of the cam. When the pivot is placed directly opposite the tail center, the machine will turn the material round at the tail center end with a gradual change in shape toward the opposite end, at which point the turning will agree with the shape of the cam. Long oval or irregular turning, when both ends are required to agree in shape, is turned with the vibrating table locked to the lower half, with the cam revolving against a shoe fastened to the frame, thus vibrating both tables alike at each end. The diameter of turning is regulated with graduating screws, having adjustments sufficient to turn work from ¼ inch to 6 inches diameter. The swinging cutter head advances and retreats from the work automatically, its position being governed by the movement of the table; it is brought down to its work at the same time the turning commences, and when the table is moved backward to remove the turned material from the centers, it is lifted out of the way by spring balance. Its action upon the turning is governed by a cam upon the live center spindle, and it will follow the path of either a square cam for squaring the head of spokes, or oval, oblong, hexagon or octagon shapes suited to finishing the eye end of handles, having the necessary adjustments to turn tapering in either direction, as well as the different diameters. The operation of this machine is very simple. The rough blank is placed between the centers and, when presented to the action of the cutters, revolves slowly and is turned its full length at one time, very smooth and to exact shape, requiring little, if any, finishing after leaving the machine. The material is placed into and removed from the machine without stopping.

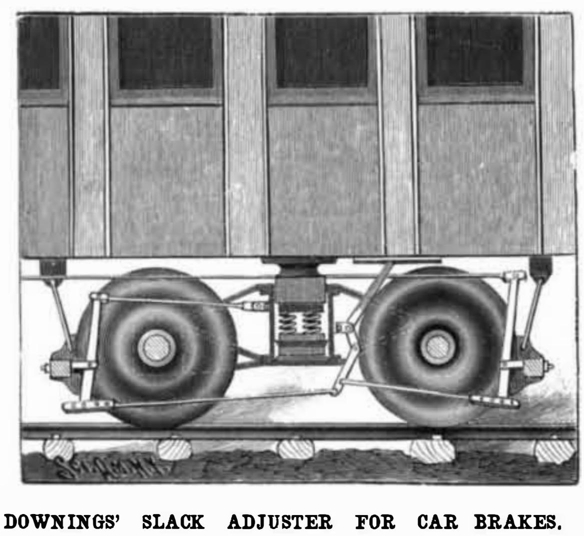
THE proportion of argon contained in the atmosphere is just as constant over all the world as the proportions of nitrogen and oxygen, says Prometheus. The average is 1·192 per cent (by volume), and the greatest deviations do not even amount to $\frac{1}{500}$ of the average.



A COMBINED SPOKE AND HANDLE LATHE.

AUTOMATIC SLACK ADJUSTER FOR CAR BRAKES.

To utilize the rise and fall of the car body, when the car is empty or depressed by its load, to automatically adjust the slack in the brake operating mechanism, Messrs. James B. and Harry E. Downing, of Arkansas City, Ark., have invented and patented the improvement represented in the accompanying illustration. The brake operating means shown are similar to those in common use, each brake beam being connected to a truck lever, and the upper end of the dead truck lever being connected to the truck frame, while the upper end of the live truck lever is connected by a rod to the air brake cylinder or the lever operated thereby. The bottoms of these levers are ordinarily connected by a single rod, but, according to this invention, the rod is divided into two sections, the inner ends of which are pivoted to an equalizing lever suspended upon a bell crank adjusting lever, which is pivoted upon a bracket fastened to the truck frame, and has its upper end bearing upon a plate on the under side of the car body. As the springs are depressed on the loading of the car, the upper end of the bell crank lever is forced down, changing the angle of the equalizing lever, and thus shortening the bottom rod. As the brake shoes bear on the wheels a little below their center, they fall away somewhat from the wheels when the car is loaded, as the levers have been heretofore connected, necessitating



DOWNINGS' SLACK ADJUSTER FOR CAR BRAKES.

adjustment by hand, but with this improvement the levers may be so proportioned as to maintain the slack constant in all positions of the car body.

The Gregorian Calendar.

The present time measurement that is now used by nearly all nations is the remodeled system adopted by Julius Cæsar in the year 46 B. C. There were 354, 360 and 365 days in the Greek year at different times. Under Numa the Roman year had 355 days, and there was so much variance between the civil and astronomical year that the autumn feasts were celebrated in the spring, and those of harvest in midwinter. Every second year [an extra month called Mercedonius was added. This month had no certain length, but was arranged by the pontiffs as they saw fit, which naturally gave rise to corruption and fraud, interfering with the duration of office and the collection of debts. In order to restore the seasons to their proper months it was necessary for Cæsar to make the year in which he inaugurated the change contain 445 days. On the hypothesis that the astronomical year contained 364¼ days, he had each fourth year contain 366 days and the others 365. The extra day was added to the 24th of February, which was called Sexto-calendas, being the sixth before the calendo, or first of March, celebrated in honor of the expulsion of the kings. The additional day was placed next to this feast and known as Bis-sexto calendas.

But this year of Cæsar was too long by 11 minutes and 13·95 seconds, or about three days in 400 years, so that by A. D. 1582 the error amounted to ten days at least. To correct this miscalculation, Pope Gregory XIII ordered that October 5, 1582, should be known as October 15, 1582, and to prevent a recurrence of the error it was arranged that three intercalary days should be omitted in four centuries—that is, one in each centenary year except the fourth. Thus 1600 was a leap year; 1700 and 1800 were not. The passing year 1896 was a leap year, and under ordinary circumstances 1900 would be, but it will not be, in order to come under the rule of the Gregorian calendar. Therefore the years which have 366 days in are, first, those that are exactly divisible by 4 and not by 100, second, those that are exactly divisible by 400 and not by 4,000; hence the year 2,000 A. D. will be a leap year, and the only one in the series of the four centenary years.

All the Catholic countries adopted the Gregorian calendar as soon as the papal bull was issued, but it was not introduced into England and her colonies until 1752, the error then being 11 days. The dates previous to that change are referred to as old style.—Chicago Tribune.