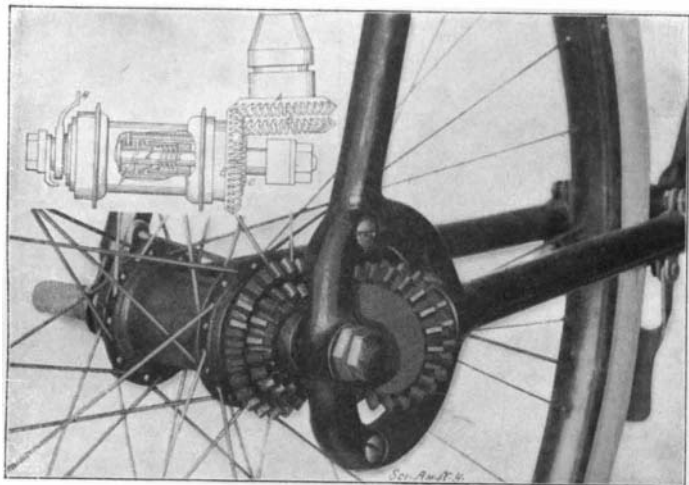


THE CHAINLESS-BICYCLE COASTER-BRAKE GEAR-CHANGER.

From the very advent of the safety bicycle inventors began to devise speed-changing gears, which, as a general rule, were so fearfully complicated as to be utterly impracticable. Difficult as the problem has been, so far as the chain bicycle is concerned, it must be confessed that it has not become simpler in the modern chainless wheel. The chief requisites of simplicity of construction and certainty of operation have been so woefully lacking in the speed-changing gears devised for both forms of bicycles that bicycle manufacturers have almost given up the hope of ever securing the contrivance they desire. Among the inventions recently patented in the United States is



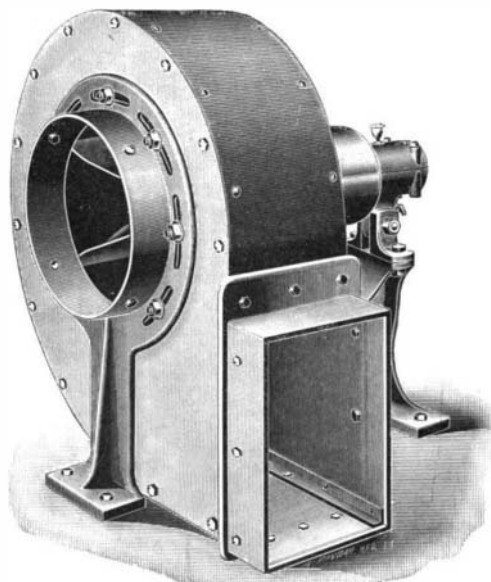
THE MAYNES CHAINLESS SPEED CHANGING GEAR.

a differential gear for chainless bicycles which seems to possess all requisites to such an eminent degree that it will shortly be adopted by one of the leading bicycle companies. The inventor of the device is Hyla F. Maynes, of Corning, N. Y., formerly of Gaines, Pa. The accompanying illustration is reproduced from a bicycle to which the invention has been practically applied.

Broadly speaking, the changeable gear consists of two gears, A and C, carried on the drive-shaft passing through one of the hollow, lower braces; independently acting gears, B and D, respectively meshing with the gears, A and C, and carried by hubs adapted to rotate within the hub of the rear wheel; and a clutch mechanism of approved form, which is operated by back-pedaling. The gears, A and B, and C and D, provide two speeds; when the one set is in operation, the other set is left to rotate. The gears run one within the other and are never disengaged from each other. If the rider wishes to coast the pedals are held still. In order to apply the brake, which is of the well-known A. B. C. type, the pedals are pushed back about 1-16 of a revolution. A backward movement of about 1-32 of a revolution will change the gear from high to low, or from low to high. The brake can also be applied without changing the gear. The clutch mechanism employed locks the gear to be used to the driving axle, and releases the other gear. A clutch, G, shown in the diagram serves the purpose of separating the clutch members. In the diagram the letter H represents the brake lever of the A. B. C. brake. The wheel from which our photograph was taken has been ridden for two years without serious accident.

THE HARTFORD STEEL-PLATE EXHAUSTER.

The accompanying cut illustrates the Hartford patent adjustable, interchangeable and reversible steel-plate exhauster. The journals are supported by self-oiling bearings, secured to standards which are adapted to be bolted to a floor or to overhead timbers. On the inlet side of the shell is a supporting standard



THE HARTFORD STEEL-PLATE EXHAUSTER.

that has an annular head, and on the pulley side of the shell is a standard that has a disk head. These heads are circular, and near the outer edge of each is a circular series of slots. Bolts extend from the side walls of the shells through the slots of the head, and are provided with washers and nuts. If these nuts are loosened the shell is free to be adjusted about the axis of the blast wheel in either direction; and if the bolts are removed the shell may be completely revolved and set with the discharge outlet pointing either vertically up or down; 30 deg. up or down; 45 deg. up or down; 60 deg. up or down, or horizontally to either side or to any intermediate angle. When the discharge is pointed in the desired direction, so that the discharge pipe may be connected in the most convenient manner without elbows or angles, the bolts are replaced and the nuts tightened to secure the shell in that position; also, when the bolts are removed the shell may be taken from between the standards and replaced in a reversed position—i. e., with the inlet on the opposite side—thus converting a right-hand machine into a left-hand machine, or *vice versa* as may be desired.

This construction enables the user to place the exhauster either on the floor, or reverse it and bolt direct to overhead timbers, thus saving the cost of building an expensive platform on which to place the exhauster, allowing the machine to be operated to the best advantage without the use of cross belt, etc. After using the machine for a time in one place, if the user desires to make changes in his plant, thus changing the piping system, he may change the exhauster from a right-hand to a left-hand, or *vice versa*; change the discharge so it will point in any desired direction; place the machine on a floor or reverse it and bolt direct to overhead timbers, etc., and not be required to purchase a new machine in order to comply with the conditions of the altered arrangements. The simple construction of this exhauster combines over twenty machines in one, and all the changes and adjustments can be made with the aid of a monkey wrench only.

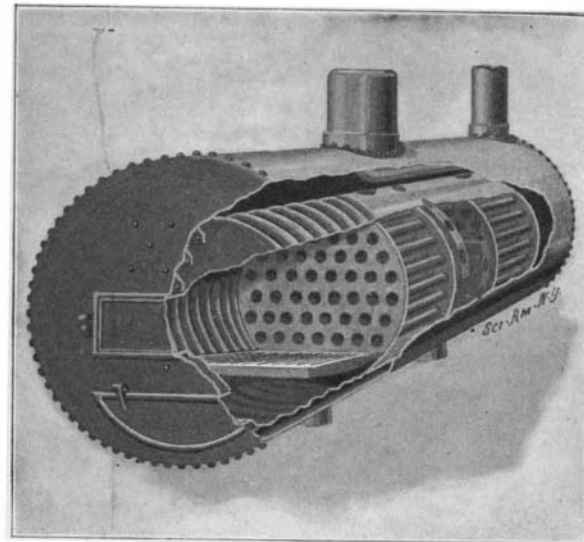
The shells are built of sheet steel, while the other parts are of gray iron castings with the exception of the shaft, which is of best steel for the purpose. The machine is fitted with reversible bearings of the well-known ring-oiling type, which allow it to be operated with very little attention; all that is necessary is to keep the oil reservoirs supplied with oil. It is made with very heavy blast wheels in order to withstand the wear and tear of shavings, chips, blocks, etc., which pass through the machine. It is especially adapted for handling shavings, sawdust, chips, etc., from woodworking machinery; dust, lint, etc., from polishing and buffing wheels; for conveying wool, cotton, and all kinds of like material; for removing steam, gas, smoke and odors; for heating and ventilating purposes, and for mechanical forced and induced draft apparatus. The manufacturers are the Hartford Blower Company, 70 Suffield Street, Hartford, Conn.

THE REGAN LOCOMOTIVE BOILER.

A locomotive boiler, which is arranged to provide a large heating surface and to insure complete combustion of the fuel, has been recently invented by Mr. John J. Regan, of 166 Third Street, Jersey City, N. J. It consists essentially of two shells, one being arranged eccentrically within the other. There is thus formed between the shells a steam and water compartment leading to a steam dome, from which extends the usual supply-pipe carrying generated steam to the engine. The near end of the internal shell, as shown in the illustration, forms a fire-box, from which a set of smoke-flues extend, through a water-compartment, to an auxiliary combustion chamber containing water-jacketed deflectors. Thence a second set of smoke-flues extend through a second water-compartment to the smoke-box. Under the grate in the firebox is an air inlet which is provided with a valve under the control of the engineer. A similar inlet is located in the auxiliary combustion chamber. The smoke and gases, passing through the first set of flues, enter the auxiliary combustion chamber, and after passing downward under the first deflector and upward over the second, continue through the next set of flues to the firebox.

It is evident that this arrangement provides a large heating surface resulting in greater economy in the consumption of the fuel. There is a complete circulation of water, which is an important factor in keeping all surfaces at a uniform temperature. The combination of two sets of flues with an auxiliary combustion chamber results in utilizing more of the heat in the gases, and this, together with the arrangement of the deflectors, insures the consumption of a large proportion of the sparks now thrown out of the stack. When it is found necessary, air can be admitted to the fire-box and the auxiliary combustion-chamber to insure

complete combustion. There are no flat places or corners in the boiler where mud can collect and cause overheating of the seams. All flanges look outward, thus greatly facilitating the calking and inspection

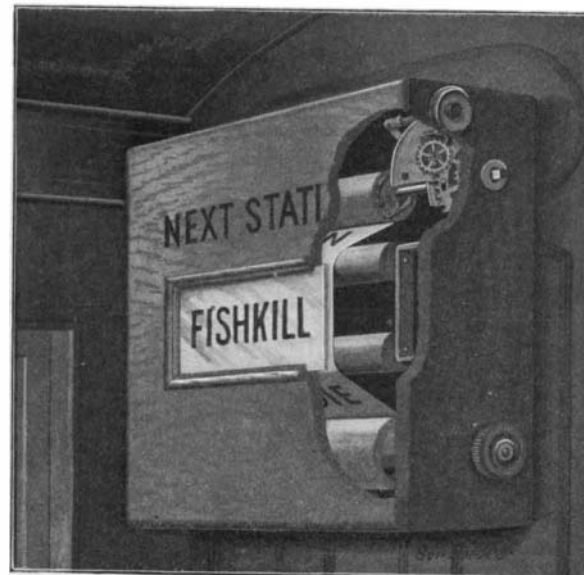


THE REGAN LOCOMOTIVE BOILER.

of the seams, and the flues being shorter than in present boilers, will necessarily have a longer life.

STATION INDICATOR.

Our illustration shows a simple and durable apparatus which is designed for use in railroad cars and street cars to display the name of the next station or street prominently. It is the invention of A. M. Taylor, of Port Ewen, N. Y. The apparatus is contained in a neat casing which may be secured to the side of the car. Within the casing and mounted on a roller at the bottom, is a web of paper on which the station or street names are printed. The web passes up over two idlers at the center of the indicator, and thence to a take-up roller at the top. The portion of the web between the two idlers is displayed through a window in the front of the casing. The take-up roller is loosely mounted on a shaft, to which is fastened a ratchet wheel adapted to engage a spring-pressed pawl fulcrumed on the end of the take-up roller, so that the latter moves with the shaft when the paper is being wound up, but is independent when the motor-spring is being wound up, or when the paper is being wound back and reset. A gear wheel is loosely mounted on one end of the shaft and is connected to it by means of a pawl and ratchet, whereby the gear is caused to turn in the direction in which the paper is wound, but is stationary when the shaft is turned in the opposite direction to wind up the motor-spring. The spring is secured to and coiled about the shaft, its outer end being attached to the casing. Near the periphery of the gear-wheel is a slot adapted to receive a pin which keeps the wheel from turning. By pressing the button near the top of the indicator,



A NOVEL STATION INDICATOR.

this locking pin can be withdrawn, thus permitting the wheel to rotate until it has made one complete revolution, when the pin, under tension of a spring, snaps again into the slot and locks the mechanism. A suitable escapement is connected with the gear-wheel to govern its motion.

In operating this indicator the attendant of the car needs merely to press the button and the mechanism will automatically wind up, the web stopping when the roller has made one complete revolution, which will bring the next station or street name into view. The web is long enough to have the return stations indicated on the unrolled half. A thumbnut is attached to the shaft of the lower roller, by the turning of which the web can be wound back and reset. The motor-spring may be wound up by a key or crank applied to the squared end of the take-up-roller shaft.