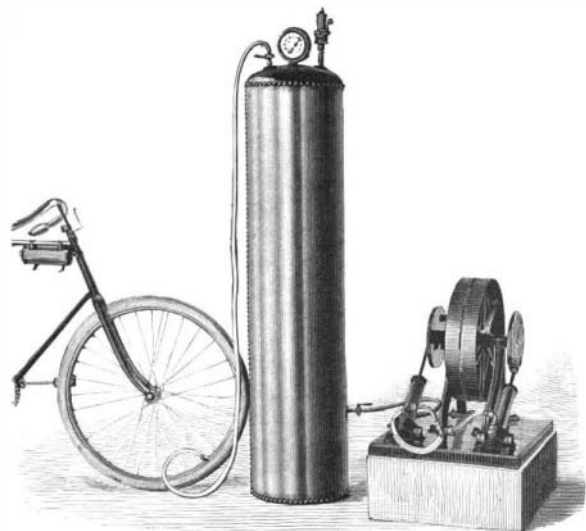


BICYCLE POWER AIR PUMP.

The illustration represents a highly efficient apparatus more especially designed to serve the convenience of bicycle manufacturers for inflating pneumatic tires, and for which a patent has recently been granted to Frank N. Stevens, of the Davis & Stevens Manufacturing Company, Seneca Falls, N. Y. The pump is double acting and has two oscillating brass cylinders, each two by eight and one-half inches and each screwing at its lower end into a head with trunnions turning in bearings on the base, there being in the bottom of each head a packing ring which makes a very tight joint to prevent leakage. The piston rods, extending through the open ends of each cylinder, connect with

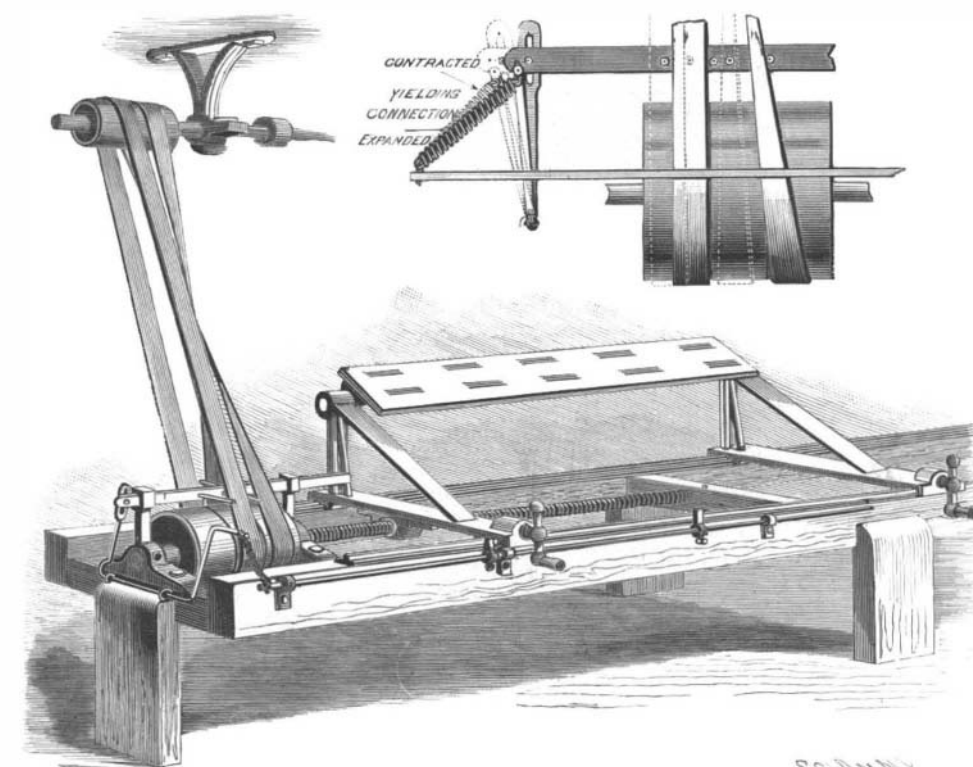


THE STEVENS POWER "CYCLONE" PUMP.

crank disks on a driving shaft on which are tight and loose pulleys eighteen inches in diameter, the disks having their wrist pins set opposite each other, so that the pistons compress the air alternately to insure a continuous operation of the pump, which is also adapted to be operated by hand power. Each piston is formed with a cup of leather or rubber, into which fits an expansible disk or spreader with slotted flaring sides, in which washers are held by a nut screwing on the lower threaded end of the piston rod, so that the sides of the cup are made to form a close contact with the inner surface of the cylinder. The valve casing at the bottom of each tube has an outlet valve communicating with a tube which is connected near its middle with a tank or reservoir in which the compressed air is stored, this tank being made of different capacities and being provided with pressure gage, safety valve and stop cock. The construction of the pump is such that any part may be readily repaired in case of wear or injury.

AN AUTOMATIC BELT SHIFTER.

The illustration represents an improvement in belt-shifting devices where the operating shaft has a central fixed or drive pulley, a pair of loose pulleys at each end, and a straight and a crossed belt, the shifting bar being automatically moved by the running machine. The improvement has been patented by George A. Smith, and is being introduced by Cohoke Woodenware Manufacturing Company, Cohoke, Va. With the ordinary belt shifting devices the throw is frequently insufficient, and sometimes, when shifting the crossed belt from the loose to the fixed pulley, both belts will be left upon the loose pulleys, and the improvement provides a shifting mechanism which, when



SMITH'S AUTOMATIC BELT SHIFTING MECHANISM.

acted upon by the first part of the movement of the operating rod or bar on the machine, stores up power sufficient to cause the shifting bar to move continuously to the completion of its stroke. The larger view shows the improved device applied to a grinding machine, where the front end of the shifting bar is pivotally connected to the inner crank end of a rocker or vibrating member, which has on its outer end a corresponding crank arm adjustably connected by a stout coil spring with the operating rod or bar on the frame of the machine, stops on the latter bar being engaged by the carriage at the end of each reciprocal movement. Eyes at the ends of the coil spring afford means for adjusting the tension of this yielding connection, by which power is stored up to continue or complete the shifting action of the shifting bar, and make positive the shifting of the belts. The smaller figure shows the position of the belts and the shifting bar in full lines, the dotted lines indicating the position to which they are brought by the yielding connection, such position being attained instantly after the carriage and operating shaft is momentarily stopped, the fast pulley having been freed of either of the belts.

Fire Balls at Sea.

One of the most remarkable electrical storms at sea, which probably seemed intensified by reason of the fact that a cargo of Spanish iron ore passed through it, was experienced by the British steamship Mercedes, which arrived at this port recently from Bilbao. On the Grand Banks of Newfoundland during the nights of December 3 and 4 the ocean appeared like a mighty mass of flames or an endless stretch of prairie fires. Balls of electric fire hissed and exploded in all directions and darted among the vessel's masts and rigging.

The Mercedes' escape from going down on December 1 seemed little short of a miracle. She was struck by a south-southwest gale, which was accompanied by seas rolling fearfully high. During the height of the storm a huge deck derrick, weighing many tons, was torn loose from its fastenings and swept overboard, leaving a hole in the vessel's deck through which the water ran into the cargo. In its course it carried away the maintopmast, which was also of iron; part of the flying bridge, the after winch, and part of the deck fittings. The decks were flooded with tons of water, the ship rolled at an angle of seventy degrees, and the sea broke in all directions, filling the cabin and the officers' quarters.

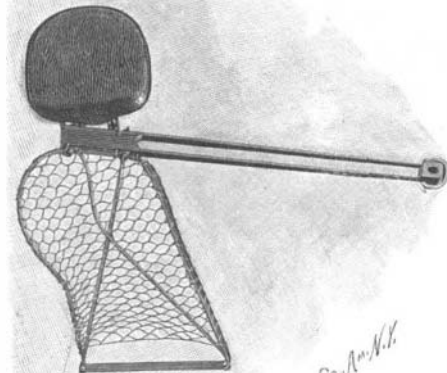
Soon afterward the storm partially subsided, when the electrical fire appeared in all directions. It hung in big balls for two nights from the masts and fore and aft stays, and practically turned night into day. As the big fire balls came together they would burst with a loud report upon the vessel and disappear. Under this light at night such temporary repairs were made as were deemed necessary to reach port.

Captain Tait of the Mercedes stated that the passage was one of the most trying experiences of his life. The rolling and lurching of the vessel in the storm and the fury of the gales were terrific in the vicinity of 25° longitude. Only the heroic work of the officers and crew saved the vessel.—Phila. Record.

ALUMINUM is being used in making the bodies of cabs.

A BICYCLE ADAPTED TO CARRY TWO PERSONS.

To facilitate carrying on the ordinary wheel a passenger in addition to the one who is propelling the machine, and to hold a lady's skirts out of contact and entanglement with the wheels, the improvement shown in the accompanying illustration has been patented by Harry J. Getman, and is being introduced by Henry A. Lederle, of Traverse City, Mich. It consists of an elongated clip frame attachment, shown separately in the small view, and composed of two par-



LEDERLE'S BICYCLE ATTACHMENT.

allel rods joined at the front by a block, and connected to the rear upright by a bolt, the front portions of the frame resting on the collar of the bicycle frame. Securely attached to the front of the clip frame is a transversely bent rod extending to one side, on which is a seat, while bolted rigidly to the opposite side of the clip frame is a skirt or leg support, composed of a framework of metallic rods, over which is secured wire gauze or netting. This support extends rearwardly and outwardly from the left hand side of the machine, and curves downwardly from the clip frame, to conveniently support the limbs and skirts of the person on the forward seat and afford such a balancing of the weight as will prevent undue torsional strain of the parts, and avoid liability of breaking or bending.

Force of the Human Jaws.

Experiments are reported to have been made by Dr. Black, a dentist of Jacksonville, Fla, to determine the force exerted by the human jaws in chewing food, and also the greatest force which the jaws are capable of exerting. By means of a spring instrument provided with a registering device he took—according to the account given—records of about one hundred and fifty bites of different persons, fifty of these being preserved as characteristic of the ordinary man, woman, and child. The smallest pressure recorded was 30 pounds, by a little girl seven years old, with the incisors, but, using her molars, the same child exerted a force of 65 pounds. The highest record was made by a physician of thirty-five, the instrument used registering only 270 pounds, and he simply closed it together without any apparent effort, there being also no method of determining how far above that figure he could have gone, and the test was made with the molars. Several persons exceeded a force of 100 pounds with the incisors and 200 with the molars. Dr. Black states that the physical condition of the persons experimented upon seemed to but slightly influence the result, and he is of the opinion that the condition of the periodontal membranes is the controlling factor, rather than muscular strength; and further, that in the chewing of food much more force is habitually exerted than is necessary.