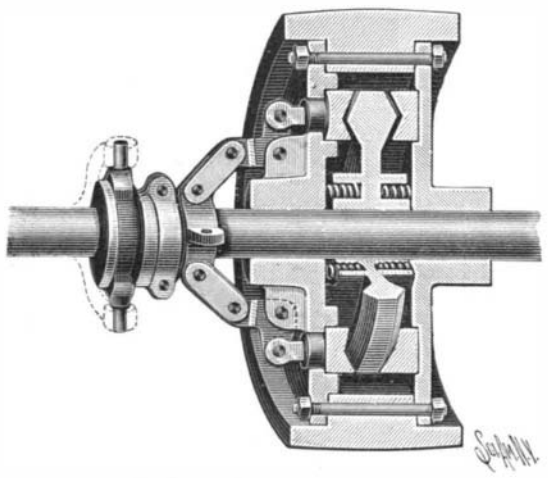
AN IMPROVEMENT IN FRICTION CLUTCH-PULLEYS.

Our illustration represents an improved friction clutch pulley for belting, the invention of Thomas J. O'Brien, of Cairo, Ill., which has an equal friction pressure on both sides, and in which the strain of the belt is directly in the center. The pulley comprises two side pieces or webs loosely mounted on the shaft. To both webs a pulley-rim is rigidly secured. Between the webs and within the pulley-rim is a friction disk fastened rigidly on the shaft and formed with projections, V-shaped in cross-section as shown, which are adapted to engage similarly-formed recesses in two bearing-rings attached to the inner sides of the webs. The one bearing-ring is movable and is provided with projecting stems to which angle-levers are pivoted. These angle-levers are also pivotally connected with the webs through which the stems extend. Loosely



O'BRIEN'S FRICTION CLUTCH-PULLEY.

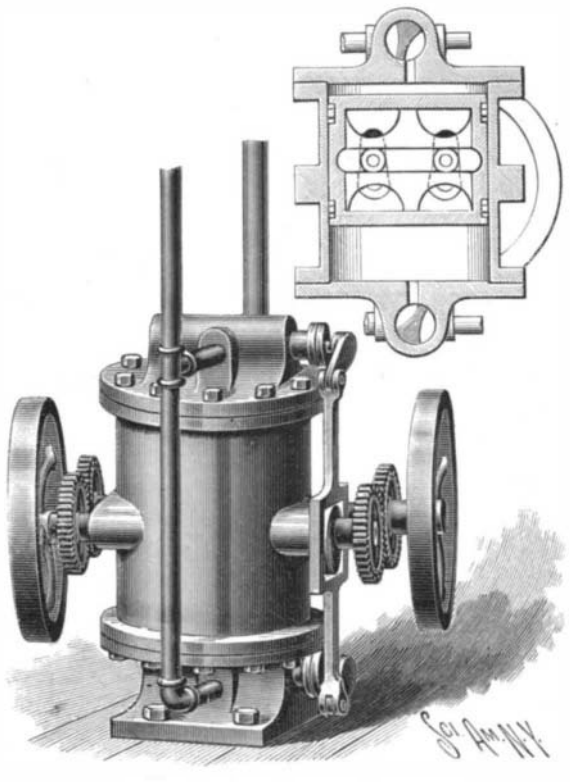
mounted on the shaft is a long sleeve, made in two sections for convenience, which sleeve is connected by links with the angle-levers. In a channel on the sleeve a shifting-ring is seated with which the ordinary shifting-lever is designed to engage.

When the parts are in the position shown in our illustration the centrally located friction disk will rotate with the shaft, while the pulley and sleeve, together with their connections, will remain stationary. In order to set the pulley in motion the shifting-lever is operated to move the sleeve toward the pulley, thereby rocking the angle-levers and forcing the bearing ring, to which the angle-levers are secured, into engagement with the friction disk. A slightly further movement of the sleeve will cause the pulley to be shifted so as to force the friction disk into engagement with the fixed bearing ring.

When the sleeve is moved in the opposite direction coiled springs seated in recesses formed in the hub of the friction disk will press the parts to their loose or stationary position.

A COMPACT HIGH SPEED ENGINE.

A simple form of engine which would occupy but little space and which, nevertheless, would develop considerable power, has long been sought by manufacturers of automobiles and launches; for the motors at present in use are not only very bulky and heavy, but are often too complex in construction to be readily controlled. We have recently had the opportunity of inspecting a small high speed engine, invented by a mechanical engineer, Mr. Gabriel P. B. Hoyt, of Jamaica, Borough of Queens, New York city, which will



HOYT'S HIGH SPEED ENGINE.

probably find its broadest field of usefulness in automobiles and launches in which, as we have already remarked, high power engines of small size are of the utmost importance.

The engine in question comprises essentially a cylinder in which a reciprocating piston is mounted, provided with a slot into which the wrist pins of two crank-arms extend. The crank arms are carried by shafts, which at their extremities, are provided with gear wheels meshing with each other. When steam or any other motive agent is admitted to the ends of the cylinder a continuous rotary motion is given to the shafts by the action of the slotted piston on the crank-arms and wrist-pins. The two shafts being geared together, a uniform rotary motion is obtained without vibration, especially when the piston starts on the return stroke, as the two shafts rotate in opposite directions by reason of the connecting gearing. The piston is always perfectly balanced; for the oppositely turning wrist-pins are at all positions of the stroke at equal distances from the center of the piston. Any suitable valve-gear can be employed.

We have seen a double engine of this type, which although it occupied less than a cubic foot of space, developed 6 horse power at 600 revolutions. The engine was only a rough model, mounted on an old soap box and held in place merely by the steam pipe; nevertheless, despite the unstable foundation, the vibration was hardly perceptible either to the eye or touch.

By changing the construction of the valves the engine can be converted into a gas engine, in which form it will probably be especially serviceable in launches. The lack of vibration, the large power which is condensed within a small space, and the simplicity of construction in which the usual crossheads and guides have been dispensed with, are the chief points of interest in this new engine.

A BOILER WITH A REMOVABLE FIRE BOX.

The relining of the fire box of a boiler is a task which, besides necessitating the expenditure of much time and labor, is often accompanied by difficulties due to the construction of the furnace. It was with the object of facilitating the relining of fire boxes that the boiler-furnace we illustrate herewith, was invented by Mr. Charles W. Baird, of 495 Broadway, New York city—an object which has been attained by the employment of a removable skeleton frame with which the furnace parts are connected.

The skeleton frame in question slides on trucks in the sides of the fire box and is provided on each side with water-legs furnished with blow-offs and cross-connected in the rear by a pipe projecting up into the bottom of the boiler, far enough to prevent the passing of sediment or scale into the legs and to maintain the proper quantity of water in the legs. The water-legs add to the power of the boiler, since they also generate steam. Moreover, they take the place of the usual firebrick lining, which, in the ordinary construction of boilers, hard fired, is usually very short-lived.

Between the sides of the skeleton-frame, cross bars extend which, in conjunction with a dead-plate at the front of the frame serves to support the grate-bars. The door-front is carried by the arch and dead-plates. The arch-plate supports its own bricks but not those of the smoke box above and is completely protected by its firebrick lining so that it cannot readily burn out. A new plate can be substituted whenever necessary without disturbing the construction of the fixed parts of the furnace. When the supporting firebricks are burned the arch-plate is still held in position by metallic blocks mounted on the end portions of the dead-plate. The arch-plate is protected from the fire by a special form of brick which locks into the arch-plate and which can be renewed when burned out in a very short time. By reason of this protection the arch-plate is preserved so that it will at all times sustain the brickwork above it comprising the smokebox, etc.

The skeleton-frame with its water legs, when slid into position on its tracks, is jacked up firmly against the heading course of the upper brick lining and is held in place by wedges forced under the frame. When it is desired to reline the furnace the skeleton frame is raised at each end by jack screws; and the wedges are removed to allow the frame to sink on rollers placed on the tracks. The skeleton frame can then be pulled out, thus leaving the interior unobstructed for any necessary repairs.

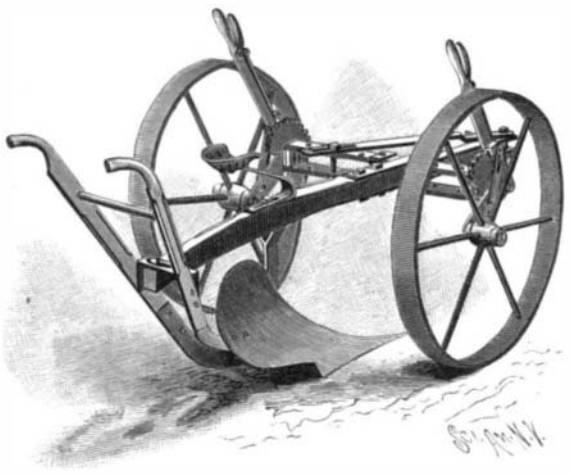
The water-legs are protected at the hottest part by a lining of retort cement, which by experience has been found to be far superior to firebrick.

It is most difficult to obtain satisfactory and adequate translations of catalogues and price lists. There are many firms who profess to make technical translations, but their charges for the work are usually high and the manufacturer has no security that his work will be properly carried out and he has no means of gaging the literary style of the translations. The English press has recently agitated this subject and the last number of Feilden's Magazine has an editoral devoted to it.

A COMBINED WALKING AND SULKY PLOW.

A patent has been granted to James E. Phillips, of Dayton, Mich., for a plow which is designed to be used either as a walking or sulky plow, it being possible to employ as many horses as the hardness of the soil and the width of the furrow to be turned may require.

When used as a sulky, the plow is fitted with a skeleton axle having two series of apertures and adjustable spindles for the wheels. The pole enters the space between the top and bottom plates of the axle and is held in place by a pivot-pin passed through one of the apertures of the series. The pin is shifted from one aperture to another, to permit the working of two, three, or four horses. An equalizing bar is pivotally secured to the outer end of the pole at one end, its other end being slotted to receive a bolt passing through one of the second series of apertures in the

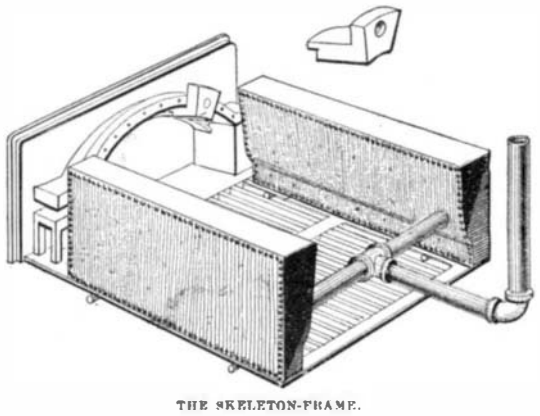


PHILLIPS' WALKING AND SULKY PLOW.

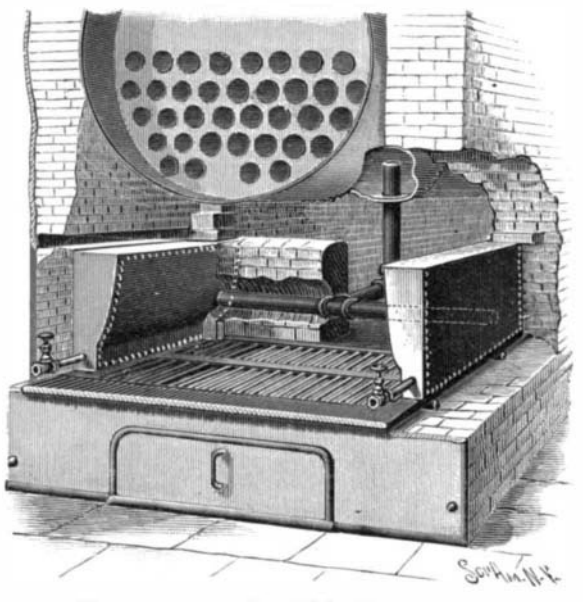
axle. The bolt can likewise be shifted to permit the employment of two or three horses. The axle can be raised or lowered by levers which can be adjusted to suit the driver without changing the depth of the furrow. The plow standard is vertically adjustable and carries a seat which can be shifted to balance the weight of the double-trees, so that the plow will not run too much on its point. The handles for the share are provided with a long, curved slot, with a set-screw passing through the heel of the plow beam and the curved slot. When working two horses the beam is carried to the left hand end of the slot and secured. When three horses are used, the beam is shifted to the center of the slot, and when four horses are employed, to the right hand end of the slot. When the sulky plow is to be converted into a walking plow the share and handles are removed. A longer beam is then attached to the plow standard, and handles and a suitable clevis provided.

The swing of the beam being limited by stops in turning corners, the plow can not turn over, for one wheel will roll back and the other forward.

The novel features of the invention are to be found in the ingenious means devised for equalizing the draft, rendering it possible to employs everal horses.



THE SKELETON-FRAME.



A BOILER WITH A REMOVABLE FIRE BOX.