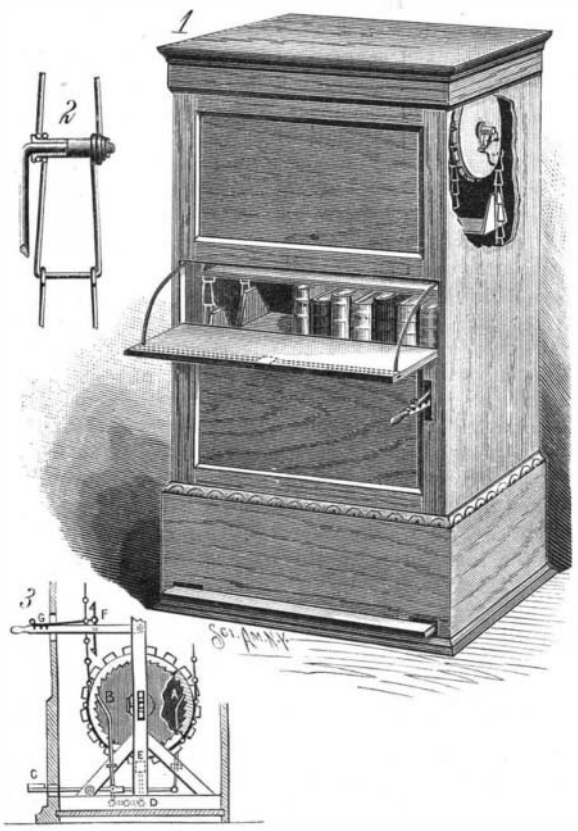
IMPROVED ARRANGEMENT OF MOVABLE SHELVES.

A method of suspending pendulous shelves from endless carriers, whereby any of the shelves will be easily accessible without changing one's position, is illustrated herewith, and has been patented by Mr. Francis V. Comfort, of Stillwater, Minn. Fig. 1 shows such shelving arranged within a case, Fig. 2 is a detail view of one mode of suspending the shelves, and Fig. 3 is a sectional side elevation, showing how the carrier is operated. The endless chains or carriers, from which the shelves are suspended, run over upper and lower sprocket wheels, the ends of the lower shaft being vertically adjustable. The carriers are chains formed of U-shaped links, at the intervening joints having their free ends looped over short gas pipe or other tubular sections, with flanged ends to hold them in place. For raising and lowering the shelves by hand, either direct pressure may be employed or the hand lever, G, to which is pivoted a spring arm, carrying at either end reverse pawls, F, adapted to engage the links of the chain. For operating the shelving by foot, a tread, C, is connected with spring pawls, A and B, engaging with internal circular pawls on either end of the bottom carrier shaft, either pawl to be thrown into engagement with its respective ratchet for raising or lowering the shelves by pressing the tread to the right or left, when the shelves are either raised or lowered, as desired, by working the tread vertically. The working of the tread also operates a lever, D, to move a counterbalance weight, E, which normally acts on a pin to prevent all movement of the shelving when the shelves have been arranged in the desired position. In applying this improvement to small or medium sized bookcases, the latter will ordinarily have a transverse partition, or "false back," between the front and rear, to render the front shelves alone visible.



COMFORT'S MOVABLE SHELVING.

Anti-Vaccination.

The success of the anti-vaccinationists is aptly shown by the results in Zurich, Switzerland, where, for a number of years, until 1883, a compulsory vaccination law obtained, and small-pox was wholly prevented—not a single case occurred in 1882. This result was seized upon in the following year by the anti-vaccinationists, and used against the necessity for any such law, and it seems they had sufficient influence to cause its repeal. The death returns for that year (1883) showed that for every 1,000 deaths 2 were caused by small-pox; in 1884, there were 3; in 1885, 17; and in the first quarter of 1886, 85.

AN IMPROVED GAS PIPE WRENCH.

A simple and very powerful wrench, specially adapted for gas pipes, and designed to fit all sizes of pipes, is illustrated herewith, and has been patented by Mr. John M. Haynes, of Maxwell, Cal. It consists of a lever, on one end of which is fulcrumed a griping jaw having a segmental toothed edge, a chain being secured by one end to the lever, and adapted to be hooked by one of its links between the inwardly curved prongs or hooks on the free end of the griping jaw. The chain is usually drawn as taut as possible before being hooked by its link, and thus a pipe of any ordinary size can readily be operated upon, as the chain is hooked in position according to the respective sizes of pipe.

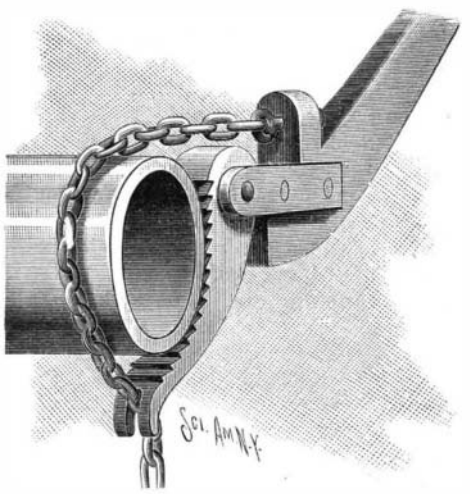
AN IMPROVED FARM AND ROAD WAGON.

A vehicle gear which is especially designed to facilitate building a low-down wagon on high wheels, and in which the line of draught will be directly from the center of the wheel, is illustrated herewith, and has been patented by Mr. Edward A. Gardiner, of Mullica Hill, N. J. On the under side of each straight axle is held a downwardly extending truss, by means of hangers supported by the axle, the outer ends of each truss being connected together by a strengthening rod. In the middle of the truss on the forward axle is a recess for the reach held on the axle by the usual king bolt, and on the top of the axle is the bolster with the usual standard on each end. The several parts are preferably made of wrought iron and cast steel, principally the latter, and are so arranged below the axle that the wagon bed can be placed from six to eight inches lower than in the usual style of wagon with as large a wheel, while by this system of truss bracing the axle is not liable to spring.

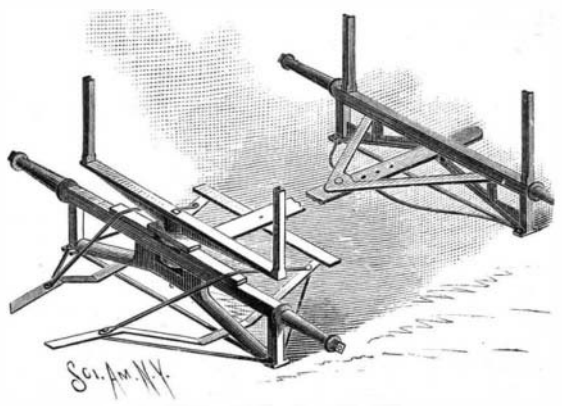
TWENTY-FIVE TON CRANE.

We illustrate a Goliath crane designed for raising concrete blocks, weighing 25 tons, and intended to be employed in the construction of harbor works in one of the Grecian islands. The framework is entirely of wrought iron. The main struts are of the box girder type, and support double girders crossing the top and carrying the chain sheaves. The whole structure is well tied and trussed with cross girders, struts, and gusset plates. The cradles are of box girder form with recesses left for the traveling wheels.

The load is raised by a double sheave snatch block, the chain passing over sheaves fitted on the top cross girders, and being coiled on a spirally grooved barrel. The gearing is double purchase, with a factor of safety of about 10 to 1. A powerful brake is fitted which controls the full load at any point of lowering. Massive cast iron side frames are fitted to planed wrought iron joists machined to fit the main framework. These frames carry the whole of the gearing, chain barrel, etc., and allow the machinery to work with a minimum of friction. Hand lifting gear is applied to work with the other gearing, so that four men can raise the full load. A ratchet and pawl is fitted to this gear to prevent the load running back, and the brake is also made available for lowering by hand when required.



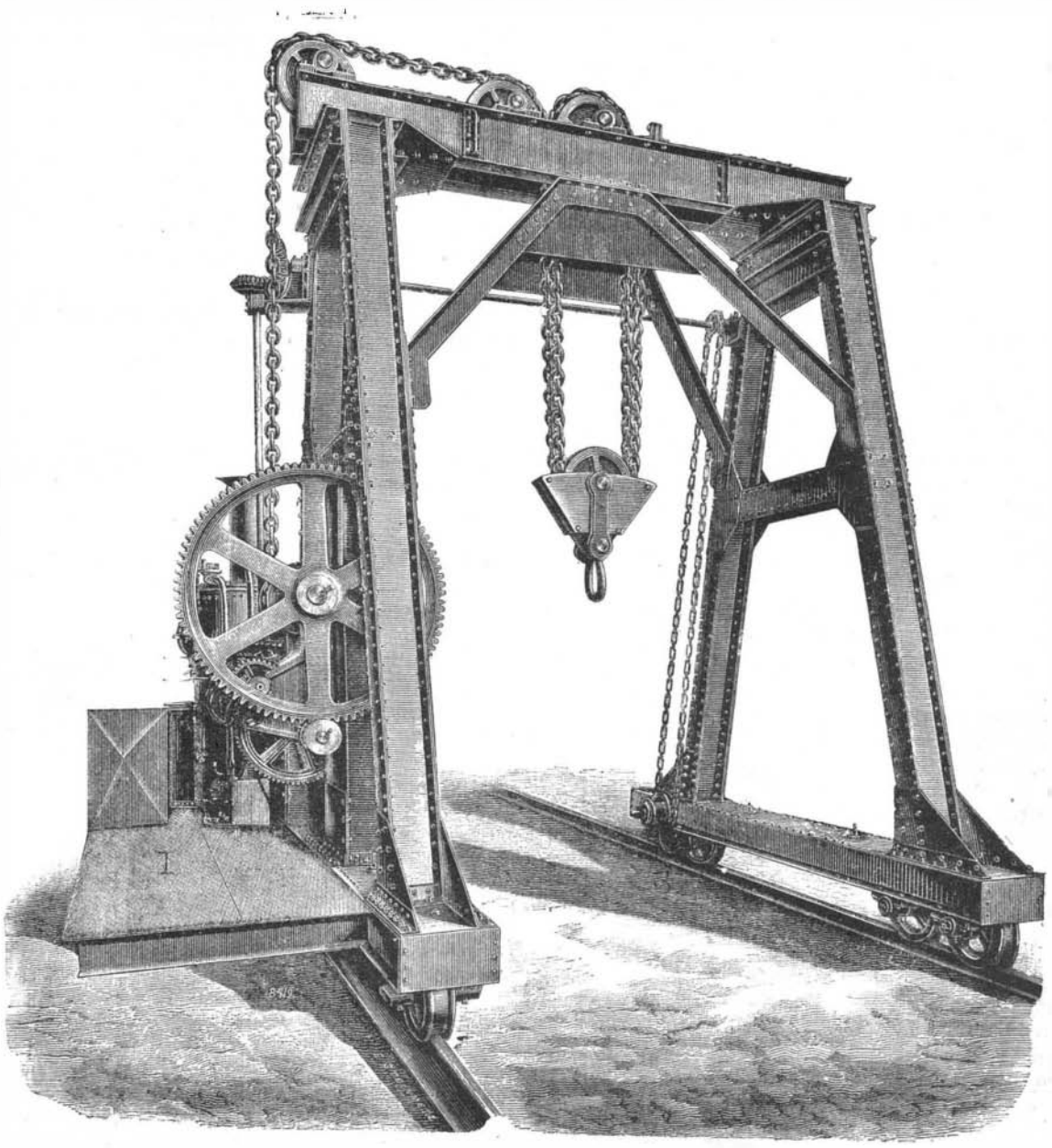
HAYNES' WRENCH.



GARDINER'S VEHICLE GEAR.

The traveling gear is driven from the crankshaft of the engines by bevel wheels and cross shafts, connected by steel pitch chain to gearing, which is fitted to the cradles. A clutch for working this gearing is fitted on the crankshaft, and clutches are also fitted to the lower part of the gearing to allow of the crane being moved by hand, handles being also provided for this purpose. The traveling wheels are in pairs, four pairs in all. One pair in each cradle are ordinary flanged wheels, without gearing, the pair at the opposite end of each cradle being geared and driven by pinions actuated by the steel pitch chain driving chain wheels fitted to the pinion shafts.

The driving and lifting power consists of a pair of vertical engines of ample size, arranged on an independent planed and machine-fitted wrought iron framework, in order that any strains, due to working or bad roads, shall not affect the working parts of the engines. The engines are fitted with an improved form of reversing motion, which has for some time been adopted by the constructor of this crane for all kinds of crane engines, in order to lessen the number of working parts and to obviate the unsatisfactory results obtained by using link motion for small engines. The lever for this motion, together with all the other levers for the crane, are brought to one spot to enable the attendant, without any change of position, to have the whole of the levers, as well as the brake, under complete control. A spacious



TWENTY-FIVE TON GOLIATH CRANE.