Patent Department

Influence of Invention on Industry.

Sir William Bailey, a prominent English scientific writer, recently delivered a lecture before the Manchester Literary and Philosophical Society on the topographical distribution of men of genius in Great Britain. He stated that the county of Lancashire had produced a large number of inventors, who, during the last hundred years, had exerted a great influence on the prosperity of that country, and, indeed, had done more to change the face of the world by their mechanical contrivances than any other combination of inventors.

Sir William Bailey's statement is doubtless true to a certain extent; and it is to be deplored that, notwithstanding the universal good these Lancashire men wrought, all, with two exceptions, were subjected to ill-treatment at the hands of the communities they directly benefited, and died in poor circumstances.

It is interesting to note that in the first half of the seventeenth century Torricelli invented the barometer for indicating the pressure of the atmosphere, and in a few years the Marquis of Worcester and Savary followed their illustrious leader by introducing their experimental engines. After this nothing of importance took place until 1712, when Newcomen invented his simple vacuum or atmospheric engine, which did useful work for a hundred years before James Watt's double-acting engine, with the conical pendulum or governor balls for controlling it, became popular.

In 1700 England was not superior, nor even equal, to the manufacturers on the Continent. A small trade was done in iron, but all bar iron was imported. About this time the Dutch loom was introduced into Lancashire. Paper making had been introduced by foreigners in the reign of Henry VIII., and a few mills existed in the time of Elizabeth, but the best paper, used in the printing of books, came from France. From Holland came improved windmills and the waterwheel, while Dutch engineers were engaged in erecting pumps and providing water supplies, and the Norfolk Broads and the famous Bedford Level were also finished under Dutch management in the reign of Charles II. The goldsmiths of Bristol, York, and London did some good work; but in metal-work and in textile fabrics England was much inferior to foreign countries, both in design and manufacture. Soon after the commencement of the eighteenth century, Manchester and Liverpool increased rapidly in importance, and Manchester in 1720 obtained a bill for making the river Irwell navigable to the Mersey and to the sea. The increased facilities thus afforded gave a great impetus to the industrial prosperity of England.

A great demand for textile goods for export caused those engaged in the trade to desire means of increasing the production, and the fly shuttle, an invention that doubled or trebled the output of the weaver, came from Kay, of Bury, in 1733. Many other machines were invented by the unfortunate Kay, who was much ill-used by those whom he had benefited, and was obliged to leave Bury to save his life. He died in poverty and obscurity in France, the place of his burial being unknown. This new system of weaving quickly exhausted all the productions of the spinsters, for the new looms could use more weft and warp in a day than the spinsters could produce in a week. Inventors were thus naturally led to consider how to increase the production of the spinning wheel, the result being the invention of the spinning jenny. A careful consideration of the claims of James Hargreaves, of Blackburn, and Thomas Hayes, of Leigh, tends to prove that they invented the jenny simultaneously and independently. Between 1766 and 1769 Hayes produced one with six spindles, and, about the same time, Hargreaves made one with twelve spindles. The next important invention was that of Samuel Crompton, of Bolton. It was still found impossible to meet the demand created by the new loom, and, in the year 1775, Crompton invented the spinning mule. At this time, most of the fine yarns were imported from India, but by the year 1805 England began to export yarns to that country. Crompton was in great fear at one time because of the enmity of workmen, and in 1811 the government made him a grant of $25,000. At the commencement of the nineteenth century, many men were applying themselves to the driving of Kay's loom and Crompton's mule by steam power, but it was reserved to two Stockport manufacturers, Radcliffe and Horrocks, to invent the first practical steam loom, in 1805. This produced a famine in yarn which continued until 1834, when the self-acting mule was invented by Richard Roberts. It is now used extensively all over the world, and it is one of the inventions that have placed Lancashire manufacturers in the front rank. Roberts was one of the greatest mechanical inventors of the nineteenth century. Although he never went to school, he was an accomplished mathematician and draughtsman, and would never permit experimental work to proceed until high-class detailed drawings were prepared. Among his many devices may be mentioned the slide lathe, the metal planing machine, the pentagraph automatic drilling machine, and the Jacquard punching machine. Although the men of Manchester agreed to allow him $5,000 a year if he would come to live in that city, he died in poor circumstances in London, and was buried in Kensal Green Cemetery.

William Sturgeon, the inventor of the electric magnet, was born near Lancaster. He enlisted in the army, and while undergoing his training he began to study thunderstorms, lightning, and electricity, and in 1825 presented to the Society of Arts his first soft iron electro-magnet, for which he was awarded a premium of $150 and a silver medal. He started the Annals of Electricity, to which all the foremost inventors of the age contributed. His life, however, was one perpetual struggle with adversity, and, in 1850, the Bishop of Manchester and the Literary and Philosophical Society of Manchester petitioned the government on his behalf, obtaining for him a grant of $1,000 and an annuity of $250, which, unfortunately, he only lived to enjoy a few months.

Great improvement in the quality of manufactured iron was effected by the invention of the puddling furnace by Henry Cort, of Lancaster, in 1784. Its object was to remove the impurities of English iron, and its success was immediate and remarkable. Cort also made rolling mills with grooved rollers, and his inventions gave a great impetus to the production of iron, which rose in two years from 90,000 tons to 5,000,000 tons per annum. He died poor and neglected. Among other prominent inventors the name of James Joule, who was born in Salford, may be mentioned. In addition to discovering the mechanical equivalent of heat, he was the first to invent electric welding, and his investigations in electricity generally have been considered of considerable scientific value. The patent lever watch was not invented in France, as has been asserted, but by Litherland, of Warrington, in 1791. The name of John Ramsbottom is well known in connection with railway engineering. He invented the double safety valve, the method of feeding moving locomotive tenders with water, made many improvements in looms, and designed the condenser lubricator for engines. His most important invention was the "weft-fork" for steam looms, which was the means of greatly increasing the productive power of the weaver.

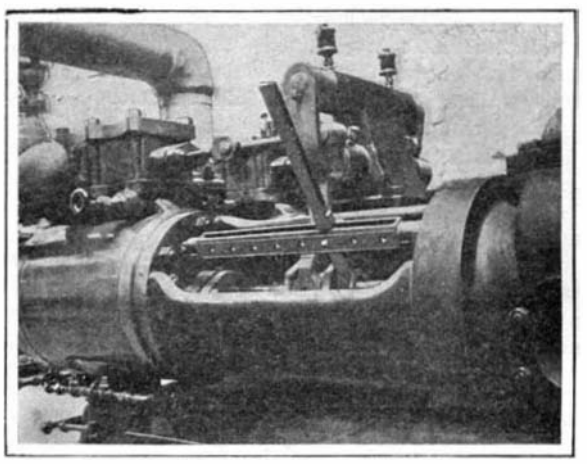
A Fire Shield.

A Southern inventor has made improvements in a fire shield, which if it can be dropped or moved into position at the proper or critical moment will be a decided practical gain in fireproof construction for use as a barrier in proscenium arch openings of theaters. The shield is embraced by and vertically movable in trough-shaped guides, and is provided with any suitable suspension device. It comprises two skeleton frames, each preferably consisting of a number of metal bars or strips, which intersect at right angles, the meeting and crossing portions being rigidly connected by stove bolts. By this construction a large number of panels are formed, each closed by a pane of mica, the panes being clamped between the two curtain frames. On the breaking out of a conflagration, it is only necessary to place the shield into position, when between the stage and the auditorium a transparent mica obstacle is interposed. This permits the firemen and attendants to intelligently direct their work to prevent the spread of flames or to extinguish them. The transmission of light through the mica illuminates the theater in case the usual lights are put out of use, and provides ample means for actors or audience to see their way to safety. The shield is rigid in every part, and where it has been moved into place to close the arch opening, no amount of heat short of that which is sufficient to melt or fuse the steel framework can operate to effect the most minute passageway for the escape of flames, gases, hot air, or any products of combustion. In this particular it is an improvement over asbestos curtains, that are blown away at the sides or edges from the stage opening by the force of heated drafts common to theater fires. At the lower edge of the shield is attached a tubular rib, compactly filled with a packing composed of powdered mica and asbestos. It affords great rigidity to the sheld, and effectually resists the action of the hot air and flame, which seek to gain egress underneath the shield. The shield may be made also in the manner of a pair of sliding doors, which may be arranged to slide from opposite sides of the stage.

James L. Branson, the inventor of the knitting machine which bears his name, was found dead in the stable attached to his residence at Doylestown, Pa., some weeks ago, having been killed in some manner by a horse. His knitting machine was invented during the civil war, and it is said to have yielded him a profit of $60,000 in three months.

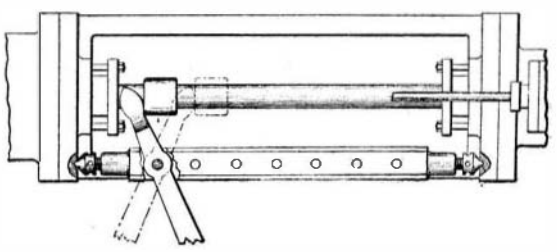
DEVICE FOR MOVING PUMP PISTON RODS.

A very useful device has recently been invented for moving or adjusting a pump piston rod while setting



DEVICE FOR MOVING PUMP PISTON RODS.

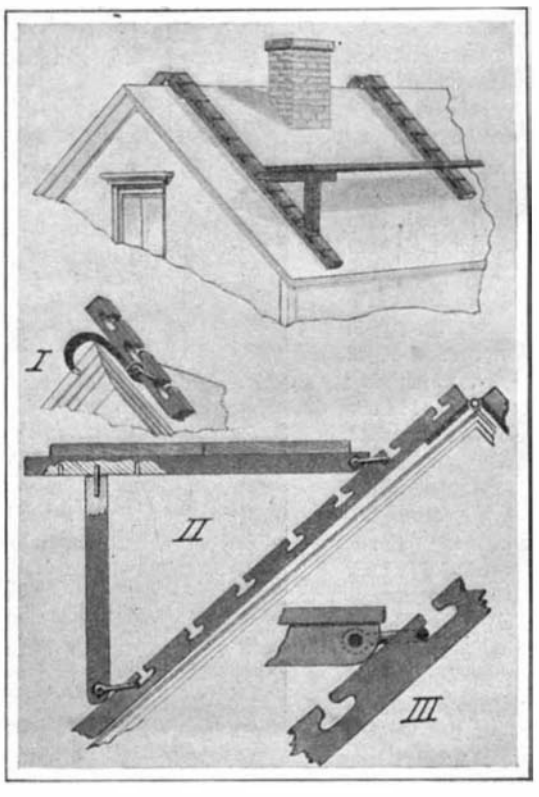
the valve therefor. The device will enable an engineer to place the pump piston rods at any desired position, to facilitate the packing of the stuffing boxes when it is necessary to remove the gland or follower, or in order to set the pump valves when the piston must be moved to a central position. The device comprises a longitudinally slotted fulcrum bar, the opposite members of which are perforated to receive a fulcrum pin on which the operating lever is mounted to swing. This lever is provided with spaced or forked members, adapted to receive the piston rod and engage the driving block thereon. The piston rod, as is usual, connects with the plunger in the piston cylinder, and with the piston in the steam cylinder. Adjusting bolts are threaded into the ends of the fulcrum bar, and their pointed heads engage depressions in the cylinder heads. The position of the lever with relation to the fulcrum bar may be changed by simply removing the fulcrum pin, and passing the latter through another pair of perforations. When not in use the lever may be removed and placed alongside of the bar, thus taking up but very little room. The inventor of this device is Mr. Hans Linke, 312 West 123d Street, New York, N. Y.



DETAILS OF THE PISTON ROD MOVING DEVICE.

IMPROVED SCAFFOLDING.

A novel form of scaffolding has recently been invented, which is particularly adapted for use on roofs of buildings. It will be found very convenient when repairing chimneys or doing other work on a roof, as it may be easily handled or placed in position, and when not in use it can be compactly folded for storage or transportation. The scaffolding comprises a pair of bars, each consisting of two sections which are



IMPROVED SCAFFOLDING.

hinged together. In use the bars are passed over the ridge of the roof, with the sections resting against opposite sides, as shown by Fig. II. in the accompanying engraving. The sections, it will be noticed, are provided with under-cut or T-shaped notches, which are adapted for engaging links or loops used in supporting brackets. The upper or horizontal member of each bracket consists of a bar with perforations in its under side, and the vertical member of the bracket carries a pin at its upper end, which is adapted to engage one or other of these perforations, according to the pitch of the roof. The method of linking the bracket bars to the notched bars is clearly illustrated in Fig. III. When the brackets are in position, a scaffolding plank is supported on them. In some instances it may be necessary to use the bars at their full length on one side of a roof; that is, to reach from the peak of the roof to the gutter. In such a case hooks are used, which are connected to the bar by a loop, and these hooks are adapted to engage the peak of the roof, as indicated in Fig. I. As the notches in the bars are of T-form, it is obvious that the bars may be used either end up. Mr. John Emberson, 43 North Lexington Avenue, White Plains, N. Y., is the inventor of this improved scaffolding.

AN IMPROVED NON-SKIDDING TIRE.

Motorists all know that the greater percentage of automobile accidents are due to side slipping or

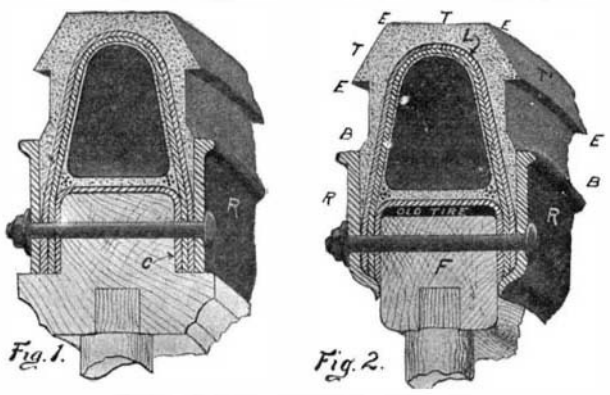
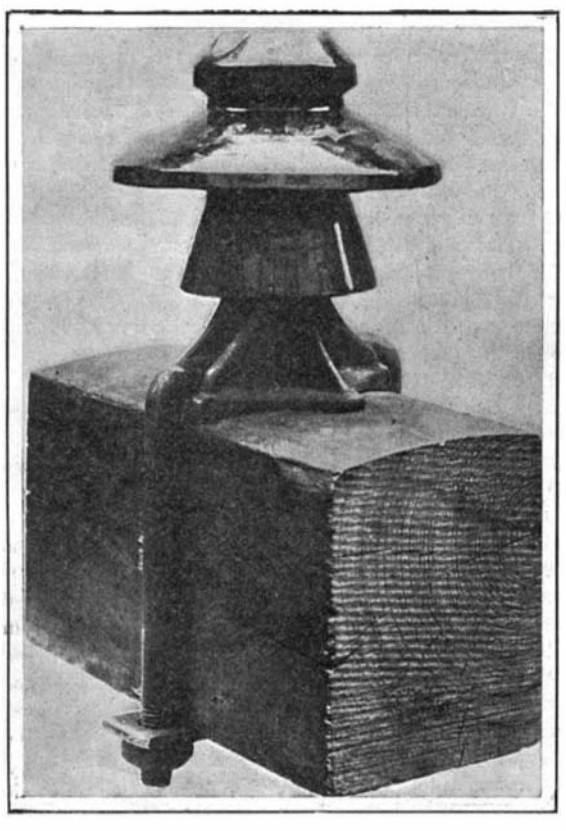


Fig. 1. Fig. 2.

AN IMPROVED NON-SKIDDING TIRE.

skidding. It is to eliminate as far as possible this dangerous feature that the tire herewith illustrated is designed. The tire depends for its action on the fact that a square-edged piece of rubber cannot be made to slip on a smooth or wet surface. Fig. 2 shows a tire as fitted to an ordinary wagon wheel, it being necessary only to bore a few holes through the felloe for the bolts which serve to hold the rings. The illustration shows the original iron tire still in place, which allows of using the vehicle with or without rubber tires as desired. This type of tire is particularly adaptable to ambulances, undertakers' wagons, and delivery vehicles. The surface *T* represents the normal tread surface. Upon rounding a curve the tendency would be to bring the secondary tread surface *T'* in contact with the roadbed. This interposes the edge *E*, which under ordinary conditions is calculated to prevent skidding. Should the speed be unusually great, or the curve very short, there is still a secondary edge *E'* to be called into play. The foundation layers of supporting fabric are designated by *L*. They serve to resist the force exerted at *E* when said edge is brought into commission. The rubber buttresses reinforce the walls and protect the tube from the rings. The tire is bolted to the felloe *F* by means of metal rings *R*. These rings also give support to the walls of the tire. In Fig. 1 the tire is shown as adapted to a specially-designed rim for automobile use. A metal cap *C* may be fitted over the felloe, so as to permit riding home on the rim without injury to the same in the event of serious accident to the tire. The positive mode of attaching the tires is an important feature of the invention. Owing to the unusually heavy construction about the air space, the tire is less liable to be punctured. The flat tread is an ideal one, because it presents a maximum friction surface for the roadbed. As a matter of fact, the so-called round tread is really flattened out as it bears the weight of the car, and this constant bending soon tells on the tire. The improved tire may be as easily repaired in case of puncture as other types; for the rings may be removed without jacking up the axle. Dr. John K. Broderick, of 805 North Main Street, St. Louis, Mo., is the inventor of this improved tire.



A NEW INSULATOR PIN.

A NEW INSULATOR PIN.

In the description of the transmission line and third-rail system of the Long Island Railroad published in our issue of June 9, mention was made of a new type of iron insulator pin employed. This pin, which is a radical departure from previous practice in pin design, is the invention of Mr. W. N. Smith, of Westinghouse, Church, Kerr & Co., who has applied for a patent on the device. The new pin combines several important advantages, as follows: It does away with the necessity of boring holes in the crossarms, thereby conserving the whole strength of the arm and lengthening its life; the metal composing it is distributed in the most effective manner possible, as its cross section is greatest next to the arm where the greatest resistance to bending is required; and finally, the shrinkage of the arm can more effectively be taken care of by the U-bolt and strap than by any of the other forms of pin fastening in common use, as there is no tendency to distort the bolt, and consequently, there is no possibility of the pin standing crooked upon the arm after the shrinkage has been taken up. Furthermore, it is practically indestructible, and instead of being one of the weakest factors in line construction, this pin is expected to be the strongest.

More than 8,000 of the pins, as originally designed and shown in the accompanying illustration, were used in the transmission line construction of the Long Island Railroad, carrying 250,000 circular mil cables in spans averaging 150 feet in length, and no failures have yet been reported after over a year of service. A dozen or more standard sizes of the improved design are being worked up to fit several sizes of crossarms and pole tops, and to carry insulators of varying sizes up to the highest voltages in practical use. The pins will be made of either cast or malleable iron to suit different conditions, and will it is believed fill a long-felt want for a pin which combines at a reasonable cost the maximum of strength and durability both in itself and in the crossarm to which it is fastened. While it is designed particularly for use with wooden crossarms, it can readily be adapted to steel crossarms, and to such special fixtures as are often necessary in heavy transmission line construction. On account of its superior mechanical design, it will also without doubt find a place in heavy catenary trolley construction, which is now being actively developed for the electrification of railways by the single-phase system.

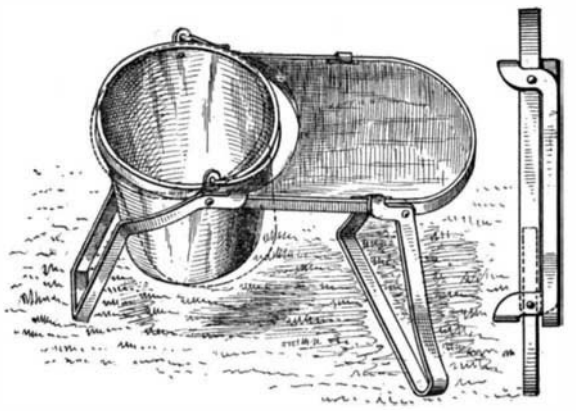
A New Trolley Car Headlight.

Ora E. Mitchell, the conductor of a Los Angeles street car, has devised a very successful headlight for trolley cars, which is under entire control of the motorman. There has been a demand for a light of this kind for use on suburban lines and those which have many curves. The headlight of the ordinary type, which is rigidly fixed to the dashboard, projects its light off at an angle when rounding a curve, and the track in front of the car is without any illumination whatever. The light invented by Mr. Mitchell is mounted in such a manner that it may easily swing from one side to the other, and is controlled by pneumatic pressure. The means of control is under the motorman's foot, and by a mere pressure of the toe he can direct the beam just where it is desired. The apparatus has been given a severe test in practice, and has been found to be a great improvement on the old form of light. This headlight will be adapted for use on automobiles as well as street cars.

A great improvement has been recently made in the machinery for making seamless hosiery. Under the old system, the rib or upper portion of the hosiery was made on one machine, the circular leg work on another, and finished on a third, but by the new machine the work is performed from start to finish in one operation. The new machine begins on the rib work, and automatically changes to the circular leg portion, then it makes the heel, foot, and toe, and starts on another piece without any intermission.

ODDITIES IN INVENTION.

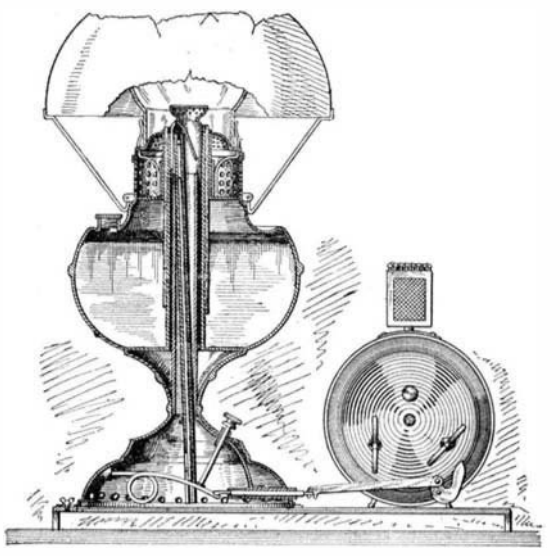
FOLDABLE MILKING STOOL AND PAIL HOLDER.—A very convenient device for the farm has recently been invented by a resident of Iowa. It consists of a milking stool which can be folded when not in use, and a pail holder attached to the stool, which can be adjusted to suit the convenience of the user. The frame for the



FOLDING MILKING STOOL AND SEAT HOLDER.

pail consists of a spring clasp, which permits the pail to be inclined toward the cow, if desired, or moved to an upright position to prevent spilling the milk. The pail is held in the position at which it is set by the frictional contact of the clasp.

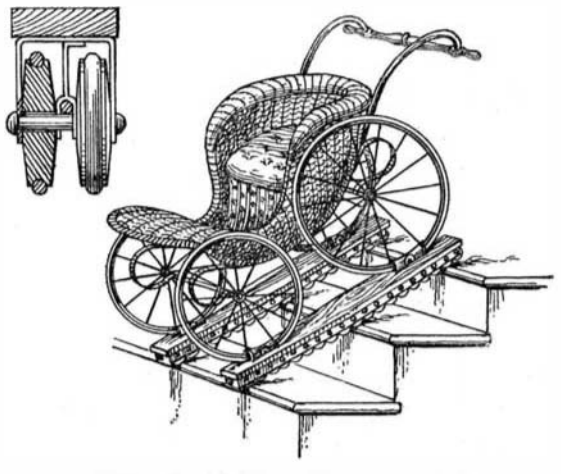
TIME-CONTROLLED LAMP.—A resident of Georgia has invented a combined lamp and alarm clock, which is so arranged that the lamp will be automatically lighted when the alarm goes off. The lamp is of the center-draft type, and in the central sleeve is a tube which carries a plunger with a match in its upper end. The plunger rests on a strong spring, which is held under tension by a trigger connected with the alarm mech-



TIME-CONTROLLED LAMP.

anism. When the alarm is sounded the trigger is sprung, and the match is forced up against the wick of the lamp. In its course the match is ignited by friction, and the lamp is thus lighted. The value of this device when the alarm is set for some hour of the night or early morning will be appreciated. It is often desirable in the sickroom that the attendant be awakened to administer medicine at certain hours of the night without disturbing the patient. In such case the bell of the alarm may be muffled, and the trained attendant can then depend on the sudden flash of light to awaken him at the proper hour.

ROLLER BRIDGE FOR PERAMBULATORS.—The long-felt need of something to assist in moving baby carriages



ROLLER BRIDGE FOR PERAMBULATORS.

up and down stairs or steps has at last been met by the roller bridge which we illustrate herewith. As the name implies, the device consists of two bars