## A SUBSTITUTE FOR THE CRANK.

The engraving shows a device recently patented by Mr. Samuel W. Hanson, of West Union, West Virginia, intended to replace the crank in steam engines and other machinery where the crank is now used. On the end of the shaft, in the place usually occupied by the crank, there is a heart cam, B, across the face of which, and at right angles with the shaft, a bar, A, slides in suitable guides. The bar carries a lever, C , whose pivot is parallel to the main shaft and in the same horizontal plane. This lever has at each end a friction roller which rolls on the periphery of the heart cam, and from one side of the lever projects an arm which is connected
by a rod, $D$, with a pin working in a slot in bar, A. A slide, by a rod, D, with a pin working in a slot in bar, A. A slide, E , on the bar, A , is provided with two pins projecting downward on opjesite sides of the pin connected with the rod, D. The slide, E, is connected with a hand
which it may be moved lengthwise on the bar, A. which it may be moved lengthwise on the bar, A.
The bar, A, is connected with the piston rod of a steam cylinder or any other prime motor either directly or by means of a lever. The bar being reciprocated exerts a pressure on the periphery of the cam though the medium of the lever, C, and its rollers. It will be noticed that one end of the lever, C , is below the center line of the bar, A , while the other end is above. This arrangement insures the rotation of the cam in one direction, and to reverse the motion of the cam all that is required is to reverse the position of the lever, C, by moving the slide, E.
The inventor claims that the cam has no dead points, that the power and motion are equal throughout the stroke, and that for this reason a flywheel is unnecessary. He also states that he gains a great deal of power over the crank, that it will run either very slowly or with any desired velocity, that it is capable of withstanding jars or shocks it is likely to receive, and is not liable to get out of repair. Further information in relation to the invention may ba obtaincal by addressing the inventor as above.

## Tobacco Smoke Products.

MM. Le Bon and Notl presented, the other day, in the French Academy, three flasks containing the following products extracted from tobacco smoke: 1. Prussic acid; 2. An alkaloid of agreeable odor, but dangerous to breathe and as poisonous as nicotine; 3. Aromatic principles still unde termined, but contributing, with the alkaloid mentioned, to give tobacco smoke its perfume. The alkaloid in question is thought to be identical with a compound-collidine-the existence of which has been observed in distillation of various organic substances, but whose physiological and toxical properties have been overlooked.

## IMPROVED BOOK-RACK.

A novel book-rack which can be reidily changed into a book-rest is shown in the engraving. It is designed more particularly for application to church pews, but there are numerous other uses to which it may be applied with ad vantage.
Fig. 1 is a perspective view showing the device when used as a book-rack, and Fig. 2 is a vertical transverse section showing the device in use as a book. rest. The front of the rack is piv oted at the ends so that it may be readily arranged either as a bookrack or book-rest.

On the inner surfaces of each end piece there is a latgh which is adapted to hold thefront of the rack securely in either of its positions. Ordinarily the front of the rack is in the position shown in Fig. 1 but it may be instantly changed to serve as a book-rest by raising the latches at the ends and turning the front of the rack on its pivots and bringing the latches against the upper edge of the front piece. The ends of the movable piece are The ends of the movable piece are
rendered noiseless by rubber washrendered noiseless by rubber wash-
ers. The rack is neatly made in ers. The rack is neatly made in suitable designs and of suitable wood to match its surround
ings, and it is readily secured in its place by ings, and it is readily secured in its place by two ornamental screws. It may be made in different lengths and widths to suit the different uses to which it is applied.
Further information in regard to this invention may be ob tained by addressing the patentee, Mr. James Murphy, of San Antonio, Texas.

New York City as a Summer Resort.
Compared with other cities which furnish tables of mor tality, New York may claim a condition of public health betier than the average. In the latest published returns for June the weekly statement for New York represents an annual death rate of 23.5 per 1,000 inhabitants. But in Concord, N. H., it was 26 ; in New Bediord, Mass., 347 ; Marblehead, Mass., 27.8; Sing Sing, N. Y , $62 \cdot 6$; Plaintield, N. J., 26; Wilmington, Del., 26 6; Baltimore, Md., 257 ; Cincinnati, Ohio, 24.7. These are localities generally deemed healthy
and would probably resent the insinuation that a residence there is less conducive to longevity than one in New York But here are the best and freshest figures we have at hand and they tend to confirm that impression. Going well South we come upon statistics exhibiting even a more favorabl contrast for New York. The death rate of the District of Columbia for the period mentioned was $29 \cdot 4$; Norfolk, Va. $29 \cdot 4$; Charleston, S. C., 32; Savannah, Ga., 31.4; Avgusta, Ga., 29; Selma, Ala., 442 ; New Orleans, La., $37 \cdot 2$; Browns ville, Texas, $28 \cdot 4$; Nashville, Tenn., $39 \cdot 4$; Clarksville, Tenn. 43.4. A heated term in those cities, such as is scourging the Northern and Eastern States at the present time, would mbably raise these percentages. New York need not fear challenge comparison with foreign cities. She is the which we have the crowded centers of population from which we have the tabulated returns, except London. The
British metropolis reported a death rate of 18.5 . But in Berlin it was $26 \cdot 6$; Hamburg, 25.4; Vienna, 25.8; Buda-
Pesth, $41 \cdot 1$; Copenhagen, 25.8; Stockholm, $35 \cdot 9$; Geneva, Berlin it was $26 \cdot 6$; Hamburg, $25 \cdot 4$; Vienna, $25 \cdot 8$; Buda-
Pesth, $41 \cdot 1$; Copenhagen, 25.8; Stockholm, $35 \cdot 9$; Geneva,

## MISCELLANEOUS INVENTIONS.

Mr. Mark L. Mount, of Pearsall's, N. Y., has patented an mproved matched hook, made of two parts, one of which carries a square stemmed pivoted button and locking prings, the other part being slotted to pass the head of he button.
A simple and convenient machine for cutting potatoe and other vegetables into uniform slices and strips has been patented by Mr. Jessup Whitebead, of Leadville, Col.

An improved adjustable attachment for carriages, which urnishes a good support for baggage, has been patented by Emma J. Osborne, of Anderson Court House, S. C. The invention consists in a frame or platform pivoted at its outer end between two arms, the inner ends of which are pivoted between two arms connected by a transverse rod and having the upper ends curved so as to form hooks, by eans of which they are hooked on to the spring bar of the vehicle.
Mr. Daniel F. Hallahan, of Philadelphia, Pa., has patented a machine for trimming and burnishing the edges of soles of boots and shoes. It consists of two spiders of equal diameters and having an equal number of arms that are fixed upon a shank or shaft between two circular disks or guides, which guides are of slightly greater diameters than the spiders, together with the cutters or bur nishers that the spiders carry on the ends of their arms; and it further consists of tangential cutters or burnishers (the cut ters and burnishers being interchangeable) adjustably fixed upon the ends of the spi der arms by means of screws that pass through slots in said arms, the spiders be ing so arranged that the cutters or bur nishers on the one fit into or opposite the interspaces between the cutters or bur ishers upon the other, and so that while one of the spiders remains fixed the other

25; Amsterdam, 28.5; Rotterdam, 29•8; Cadiz, $32 \cdot 9$; Havana $43 \cdot 5$; Shanghai (the foreign settlement), $104 \cdot 4$; and Kobe (Japan), $34 \cdot 9$. In Liverpool the rate was $23 \cdot 4$, closely approximating that of New York, and in the other large English towns it was but slightly less. These figures are fairly taken from the official data, and their accuracy cannot be impeached. They make out New York, if not exactly a grand sanitarium, yet a place where one's .chances of health are good enough to warrant the selection of this city as a reasonably safe resort for the summer months-in fact, a good watering place. So it is regarded by the thousands of Cubans and South Americans who come here to pass the hot weather. For this comparatively salubrious state of things we have to thank our natural environments of ocean and rivers, owing little to the city authorities. If they would keep the streets clean and suppress some of the still flourishing nuisances so prejudicial to the public health, they could reduce the death rate still further and make New York incontestably the healthiest of the great cities of the world. New York Journal of Commerce.

## Measuring the Velocity of $L^{\prime}$ ght.

Professor Newcomb ds engaged at Fort Whipple experimenting with the velocity of light. The distinctive feature of his method is a four-sided revolving mirror erected upon of his method is a four-sided revolving mirror erected upon
iron pillars. The mirror revolves at from one hundred and


MURPHY'S BOOK-RACK AND BOOK-REST
fifty to two hundred and fifty revolutions a second. The light reflected from an ordinary mirror outside is forced through a tube which strikes the revolving mirror and is reflected across the Potomac River, a distance of two miles, where it strikes a mirror on Observatory Hill. It is reflected back again, and the point upon which it strikes is noted by a telescope attached to a graduated scale. By this means the exact time is easily secured, and arrangements are being made by which the velocity can be noted at much greater distance. The new station will be near the Government In sane Asylum.-Washington Star.

Dangers of Elevated Railways.--In this city recently, on the Metropolitan Road, a locomotive and an empty pas senger car were, by some stupidity of the train men backed off the track and fell into the street twenty feet below. brakemen eso
may be approached or withdrawn from it, whereby the de vice may be adjusted and applied to soles of any tbickness. An improvement in extension settee tables has been pat nted by Mr. Morgan Gossett, of Russellville, Ohio. The invention consists of a table having stationary legs and movable leg and a pivoted extension top that can be hori zontally or vertically adjusted, as may be desired, by a novel arrangement of devices, while between the legs seat are arranged.
A car for transporting live stock by railway has been pa tented by Mr. Francis Rieber, of Callicoon Depot, N. Y. It consists in novel details of construction and arrangement of stalls, feed racks, water troughs, hay lofts, and water tanks, and devices connected therewith, whereby provision is made for securing the comfort and preserving the health of the animals occupying the car.
Messrs. Jacob A. Swinehart and Lafayette Jourdan, of Rushville, Ohio, have patented an improved drag sawing machine, which consists of a beam or bench supported at the rear by legs and in front by a guide block, which rests on the log to be cut. Two levers are pivoted in and ex tended downward through mortises in the beam, and are connected at their lower ends by a pitman, and to the for ward one of these levers is pivoted the saw shank, the saw extending forward and through a cut in the guide block. The curative properties of an electric current may b adapted to the treatment of differ ent diseases by taking advantage of its different qualities as developed under varying conditions. The cur rent may have great intensity and little quantity, or it may have grea quantity and little intensity. It may be continuous or intermittent or it may be made to alternate, so that electrical impulses of differen name will rapidly succeed each other. There are two methods of generating electrical currents for curative purposes-one by chemical means, as in the various forms of battery, the other by the direct con version of mechanical energy into electrical energy, as in the magneto electric machine. Magneto-electric machines have not generally been considered as efficient for curative purposes as batteries, on account of the difficulty experienced in constructing a ma chine capable of yielding the different qualities of curren required for the treatment of different subjects. Mr. Thomas W. Livingston, of Ainsworth, Iowa, has invented a magneto electric machine capable of yielding currents varying in their character, so that its range of application will be wider than that of batteries, while it is more compact, more man ageable, more easily adjusted, and operated by either skille or unskilled persons.

Very promising results are obtained with the eight-inch chambered rifle, converted from the old-fashioned ten-inch smooth bore, in the tests at Sandy Hook. The new gun bears a charge of 55 pounds of powder, carries a shot weighing 180 pounds, and penetrates 10 inches of iron at 1,000 yards. Originally, as a smonth bore, it was firel with 16 pounds of powder and carried a shot weighing 120 pounds.

