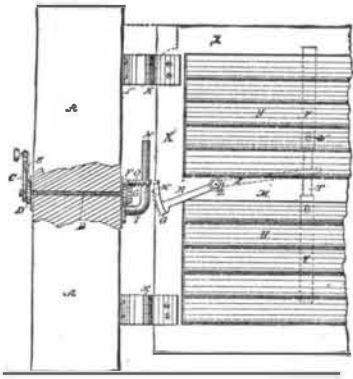


RECENT INVENTIONS.

Novel Window Blind Operator.

The engraving shows a new window blind operator, recently patented by Mr. Bela G. Merrill, of Geneva Lake, Wis. This apparatus is arranged for opening and closing the window blinds by means of a crank, C, attached to the inside of the window jamb. The slats of the blinds are opened and closed by the same mechanism without altering



its adjustment, and by the same crank used to open and close the blinds. By turning the crank so as to close the blind, and by continuing the motion of the crank afterward, the toothed arc, Q, will be raised, lifting the segmental wheel, O, out of gear with the bevel pinion, G, allowing the shaft, B, to be turned so as

to open and close the blind slats. By turning the crank in the reverse direction the toothed arc, Q, will be thrown down out of gear, and the segmental wheel, O, will descend into gear, with the pinion, G, again ready for opening the blind. With this device the window blind can be opened and closed without opening the window, and it may be locked securely in any desired position, and by an ingenious connection between the upper and lower slat rods the upper portion of the slats may be opened while the lower slats are closed.

Improved Dog Cart.

The engraving shows an improvement in the class of vehicles known as "dog-carts," the object being to prevent the motion of the animal from affecting the vibratory or rocking movement of the vehicle body or box.

The dog-cart has its body supported by transverse crank-shafts provided in or pivoted to the supporting springs, and which box has one or more spiral or other springs, attached to the front of the box and to the shafts, whereby the box will be rocked or vibrated independently of the movements of the animal. In the dog carts of ordinary construction,



the movements of the vehicle-box are governed by the movements of the horse, and these movements are very unpleasant for the occupant of the vehicle, which is jolted and shaken very irregularly. It will be seen that in this improved dog-cart the box is not supported directly by

the springs, but the crank-shafts are interposed between the springs and the box, and give the box a rocking or vibrating movement forward and backward, and the irregular movement of the animal is counteracted by the springs and the crank-shafts. This invention has been patented by Mr. Edward Bowman, of Santa Cruz, Cal.

New Hand Corn Planter.

The engraving shows an improved hand corn planter recently patented by Messrs. F. B. Preston and W. H. Stapleton. This implement is simple in construction and easily operated. It plants corn in regulated quantities and is positive in its action. In using the planter the operator carries the machine with one hand by the handle at the top and grasps one of the other handles with the other hand ready to operate the seed-dropping slide at the proper time. At each place for a hill the shoe at the bottom is forced into the soil, and the seed-dropping slide is forced downward, pressing back a hinged plate in the shoe and allowing the seed in the space in the shoe to drop into the soil. The planter is then raised and carried forward to the place for the next hill, and at the same time the seed-dropping slide is raised by one of the lower handles to allow the plate in the shoe to close and the seed in the passage leading from the seed box to drop through into the space in the shoe ready to be discharged at the next downward movement of the seed-dropping slide. The seed box is hinged so that the seed-dropping slide may be readily withdrawn when necessary. Further particulars may be obtained by addressing Mr. William H. Stapleton, of Fayette, Mo.



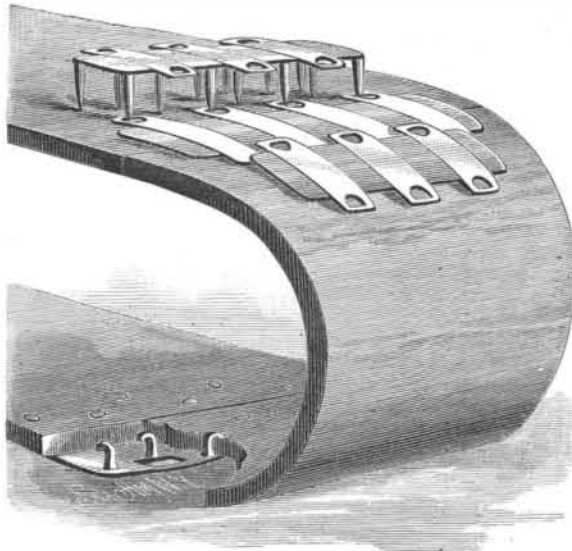
New Belt Fastener.

The accompanying engraving shows a strong, simple, and easily applied belt fastener. The fastener consists of a plate of malleable iron or other metal with clinching points

on one side that are adapted to be driven through the adjoining ends of the belt, and with several slots or passages near its side edges.

The clinching points shown at the bottom of the cut are in double rows and arranged in zigzag or "hit-and-miss" order, and are so formed that when driven through the ends of the belt upon an anvil, they will turn and clinch in different directions.

In case a fastening of unusual strength is required two or more plates may be used with some of the points of the side plates passing through the slots of the center plate, as illustrated at the upper side of the figure. But for ordinary



NEW BELT FASTENER.

belts only one fastening plate is intended for making the connection of sufficient strength.

These fastening plates, besides being strong and easily applied, require the use of no other tool than a hammer to adjust them, and they possess the further advantage of holding the parts of the belt parallel, and do not, it is claimed, interfere with the required flexibility of the belt, either when used singly or when two or more of them are used in making the connection, and the points clinching as they do in different directions give them a firm hold on the belt.

Further particulars may be obtained by addressing the Giant Belt Fastener Company, No. 189 Duane street, New York city.

Comparative Economy and Durability.

In a recent discussion touching the relative economy of building certain country bridges before the Society of Civil Engineers, the president, Mr. Ashbel Welch, gave the following useful formula. He said:

The question often arises whether a cheaper bridge that will last a shorter time is more economical than a more costly one that will last a longer time. The same question may arise respecting many other things.

To find the comparative economy of two things of different cost and durability, that will answer the same purpose equally while they last, the following formulæ will be found convenient:

Let C be the cost and assumed real value of one of them, T the time it will last, α the compound interest on one dollar for that time, at whatever rate money is worth to the party using the thing or costs that party, and L the loss of the thing when done with, which may or may not be equal to C; let R be the real value for the purpose of the other thing, C' its cost, T' its duration, α' the compound interest for that time, and L' the loss on it; and let V be the value of the thing for that purpose that would last for ever if all circumstances remained constant.

$$\text{Then } V = C + \frac{L}{\alpha}$$

$$R = \frac{\alpha' V}{1 + \alpha'} \text{ that is } R = \left(C + \frac{L}{\alpha} \right) \alpha' \div (1 + \alpha')$$

The difference between R and C' is the advantage or the disadvantage of the thing whose cost is C'.

Suppose a bridge that will last seven years costs \$8,000, and the loss at the end is just the cost, and money costs the parties interested 7 per cent, what would be the equivalent value of a bridge that would last five years, and one that would last for ever? $8,000 + \frac{8,000}{0.62} = 20,900$, the value for that place of the bridge that would last for ever, and $(0.41 \times 20,900) \div (1 + 0.41) = 6,077$, the value of one that would last five years.

More London Fossils.

Mr. Rowland Ward sends to the London Times a list of the fossils recently discovered at Charing Cross, in the heart of London, when the deep excavations were made for Messrs. Drummond's banking house. The specimens are more than 100 in number. They include bones of the cave lion, tusks and bones of the mammoth, tusks and bones of extinct elephants, remains of extinct Irish deer, remains of red deer, remains of a species allied to the fallow deer, remains of rhinoceros, remains of extinct oxen from the pleistocene gravels, bones of the horse, the sheep, and the shorthorn from recent deposits.

The Geological Survey.

Major Powell, Director of the National Survey, reports that a great part of the past year's work has been in the preparation of statistics relative to the mining industries of the United States. At the beginning of the fiscal year it was resolved to curtail the field work so as to give more attention to the study of the large mass of undeveloped matter which had accumulated. This work consisted in the identification, classification, and description of fossils; the chemical and microscopic examination of rocks, minerals, and ores; the construction of geologic sections; the preparation of charts, diagrams, and other illustrations and the preparation of reports on the various subjects which had occupied the attention of the scientific men of the survey. Experiments were made under the management of the former director, Mr. Clarence King, on the various phenomena connected with rock formation. An examination (chiefly in the laboratory) has been made of the structural geology of the Eureka mining district of Colorado, of the volcanic rocks of the Great Basin, and of Mounts Shasta, Hood, and Rainier.

Another department of the work has been the study of certain lake basins in Utah, Nevada, and California. These lakes are now mostly extinct, Great Salt Lake being one of the few exceptions, and their history, which is now being studied, includes a study of the quaternary climate, which leads in turn to a study of the climate of the arid portion of the United States. Another field of investigation has been the study of glacial formations extending from the Atlantic coast to the middle portion of the great plains in northern latitudes. This investigation also is a research relating to quaternary climate and to the character and origin of the present topographic features of the area involved. Investigations have also been conducted relating to the economic geology of the Ten Mile district, Summit county, Colorado, and of the basaltic mesas at Golden, which will be extended to cover the entire Denver coal basin. Much time has been spent in the preparation of a report on the Leadville district. In Nevada, the Eureka district has been carefully surveyed, and the report has been prepared on the Comstock lode and the Washoe district.

The director says that all of the investigations in economic geology will have a practical value in determining the characteristics of ore deposits, and will advance mining industries by pointing out the best methods of systematic development.

Early in the fiscal year geographical work was commenced in New Mexico and Arizona, preliminary to a geological examination of the country.

Scientific Work on the Jeannette.

In his testimony before the Jeannette Board of Inquiry, at Washington, Lieutenant Danenhower said that during the first year in the ice meteorological observations were taken hourly by specially detailed officers. The instruments used were the barometer, the wet and dry bulb thermometer, the maximum and minimum thermometer, the anemometer, and the black bulb thermometer in a vacuum. Observations were also made upon the state of the clouds and their movements, the direction of the wind, and the general character of the weather and the condition of the ice. The astronomical observations were those of the sun, moon, and stars by artificial horizon for latitude, longitude, and time; and lunar observations and eclipses of Jupiter's satellites for chronometer errors. Soundings were made and the temperature of the sea water ascertained, both at the surface and at various depths, by a Millar-Caselle thermometer. Specimens of the water were examined and its specific gravity determined. The dredge was hauled for specimens of the bottom and of the animal life existing there, and these, with other specimens, were turned over to the naturalist and taxidermist. Bears, seals, and birds were carefully examined, their stomachs especially, to gain all possible knowledge of their habits and of the food obtained by them in the Arctic regions. The soundings were made with an ordinary line, and specimens from the bottom were brought up in a sandcup. A hole was always kept open through the ice for that purpose.

Catalogue of Scientific Periodicals.

Dr. H. C. Bolton, of Trinity College, Hartford, Conn., is preparing for the press his "Catalogue of Scientific Periodicals," which will appear in the octavo series of the Smithsonian Institution. The catalogue is intended to embrace independent journals of pure and applied science, published in all countries from 1665 to 1880.

It does not include the transactions of learned societies, these being found in the admirable "Catalogue of Scientific Serials," by Mr. S. H. Scudder; but it does embrace every branch of applied science, including engineering, architecture, chemical technology, geography, ethnology, agriculture, horticulture, telegraphy, meteorology, etc. More than twenty languages are represented in the work. Printing has begun, and it is hoped that the work will be completed before the close of next year.

Saw Teeth Tipped with Iridium.

Mr. John Holland, whose discoveries and improvements in the working of iridium were noticed not long ago, has now made a circular saw with teeth tipped with that hard and refractory metal. The saw is 12 inches in diameter and is to be used for sawing hard woods.