The Precious Metals of the Land of Midian.

On the eastern coast of the Gulf of Akaba runs the ancient land of Midian, and for long years past that country has been supposed to teem with mineral wealth. The Khedive, whose viceregal rule extends to Midian, had long a desire to put rumor to the test, and asked Captain Burton to make a visit of inspection. The party, which included a secretary and an able mining engineer, M. George Marie, left Suez on the 21st of March last, and proceeded by way of Moilah to Eynounah Bay, at the entrance of the Wady, or Valley of Eynounah, on the eastern side of the Gulf. These wadies are curious. The coast is divided from the interior by a range of granite and porphyry mountains running about parallel with the sea; but water has worn its way as usual, and these gorges, each with its mountain torrent, occur at frequent intervals. They are barren, rocky places, with no possibility of much culture, and yet they all bear signs of abundant population in times gone by.

Large towns, built not of mud, as Arab towns so often are, but of solid masonry such as the Romans always used, roads cut in the rock, aqueducts five miles long, remains of massive fortresses, artificial lakes—all these signs of wealth and numbers are reported by Captain Burton. According to him the reason of it all is not far to seek. The rock is full of mineral wealth. Gold and silver they found, and the former seems to exist in quantity sufficient to repay the labor of acquisition. Quartz and chlorites occur with gold in them just as they are found in the gold districts of South America. The party tested both the rock by crushing and the sands of the stream by sifting, and each with good result. Tin and antimony they also discovered, and they had evidence of the existence of turquoise mines. Each ruined town had its mining works; dams for washing the sand and crushed rock were frequently seen; scoriæ lie about near ancient furnaces; in short, the traces are numerous of a busy mining population in a country which seems to be full of mineral wealth. From Makna, or Mugna, the capital of the land of Midian, up to Akaba at the head of the Gulf, Captain Burton reports the country as auriferous, and he believes the district southwards as far as Gebel Hassani—a mountain well known to geographers—to possess the same character. He even goes so far as to say that he has brought back to life an ancient California.—*London Times.*

Dogwood.

There are eight species of dogwood in North America, but only one is entitled by its size to be classed with the forest trees. It is the most interesting, too, for the value of its wood, the properties of its bark, and the beauty of its flowers. It is generally known by the name of dogwood, and in Connecticut it is also called boxwood. The dogwood is first seen in Massachusetts, between the 42d and 43d degrees of latitude, and in proceeding southward it is met with uninterruptedly throughout the Eastern and Western States, to the banks of the Mississippi. Over this vast extent of country it is one of the most common trees, and abounds particularly in New Jersey, Pennsylvania, and Virginia, wherever the soil is most gravelly, and somewhat uneven; further south, in the Carolinas, Georgia, and Florida, it is found only on the borders of swamps, and never in the pine barrens, where the soil is too dry and sandy to sustain its vegetation. In the most fertile districts of Kentucky and west Tennessee, it does not appear in the forests except when the soil is gravelly and of a middling quality. The dogwood sometimes reaches 30 or 35 feet in height, and 9 or 10 inches in diameter, but it does not generally exceed the height of 18 or 20 feet, and the diameter of 4 or 5 inches. The trunk is strong, and covered with a blackish bark, chapped into many small portions, which are often in the shape of squares, more or less exact. The branches are proportionately less numerous than on other trees, and are regularly disposed, generally in the form of crosses. The wood is hard, compact, heavy, and fine-grained, and is susceptible of a brilliant polish. The sap is perfectly white, and the heart is of a chocolate color. The tree is not large enough for works which require pieces of considerable volume. It is used for the handles of light tools, such as mallets, small vises, etc. In the country some farmers select it for harrow teeth, for the hames of horses' collars, and also for lining the runners of sledges; but, to whatever purpose it is applied, being liable to split, it should never be wrought until it has been perfectly seasoned. The shoots, when three or four years old, are found proper for the light hoops of small portable casks. It will also make good cogs for mill wheels, and its divergent branches are taken for the yokes which are put upon the necks of swine to prevent their breaking into cultivated inclosures. Such are the profitable uses of this tree, which also affords excellent firewood.

To MAKE cementing putty for gas or water pipes, take red and white lead, equal parts, and mix with boiled oil.

MACHINE FOR FORGING SCREW THREADS.

We illustrate from the *Engineer* a machine manufactured by Bouchacourt & Delille, of Fourchambault, Niévre, France, and used by them for forging screw threads on rods and screws, a specimen of the latter of which is illustrated in

Fig. 2.

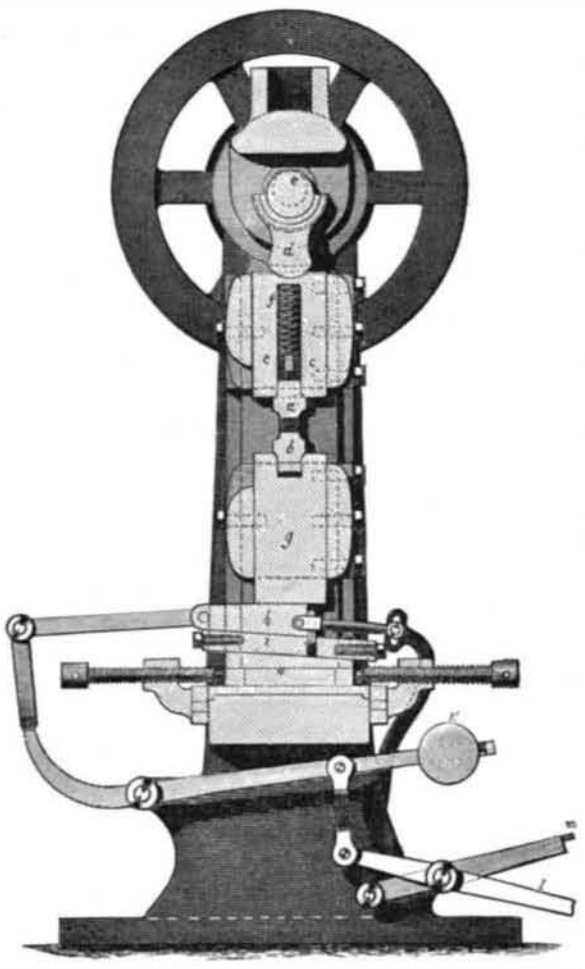
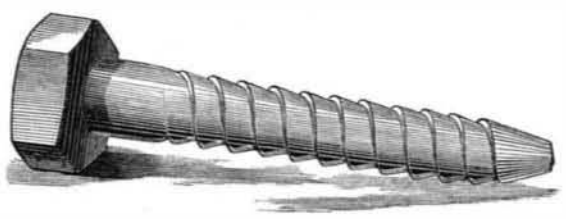
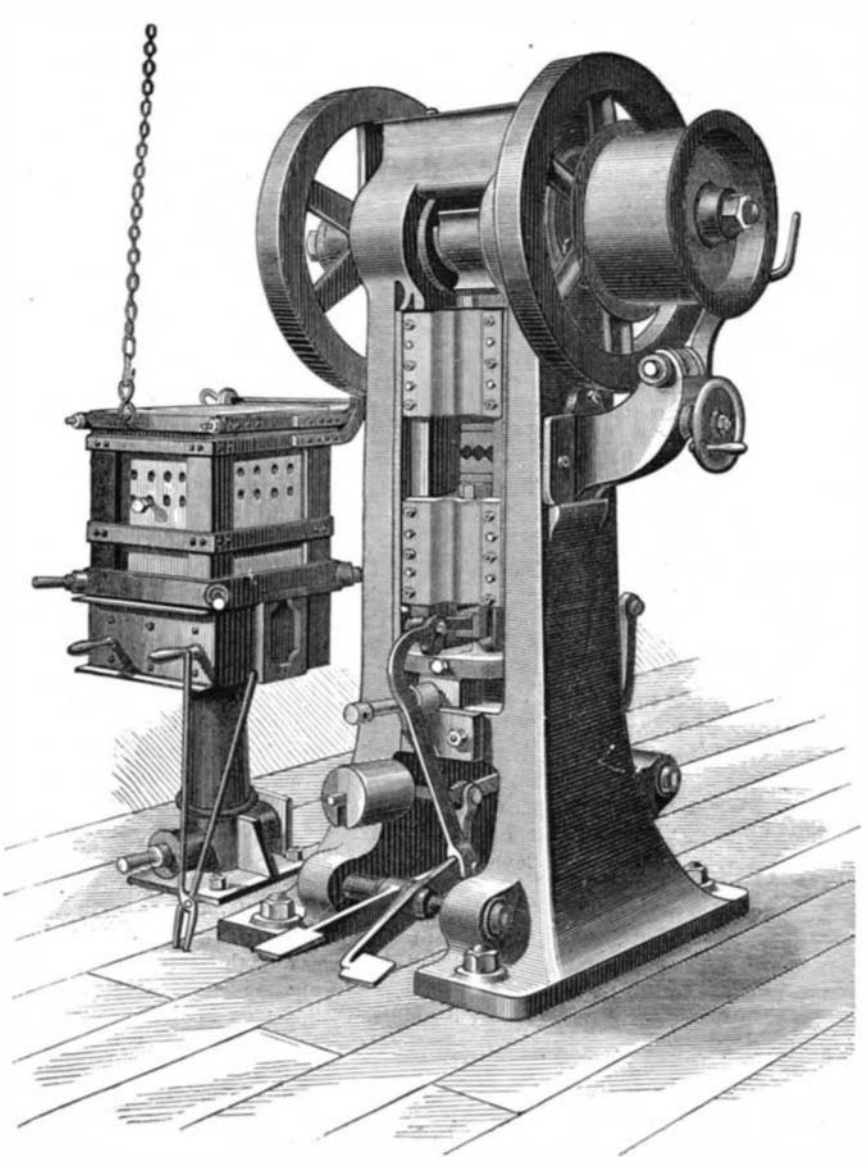


Fig. 3. As forgings, the threads are beautifully clean, and for the general work of coach screws much stronger than the cut threads. A perspective view of the machine is given in Fig. 1, and a vertical section of it is shown in Fig. 2. In the latter figure, *a b* are the screw dies. The rod or bolt to be threaded is placed upon the lower die, *b*, and fed forward whilst screwing it. The upper die is mounted on a slide, *c*, which is actuated in the downward direction by an eccentric, *e*, on the main shaft and the toggle bar, *d*, the upward motion being obtained by an internal spiral spring, *f*. The lower die, *b*, is carried in a slide, *g*, and is adjusted at the proper distance from the upper die by means of wedge, *h*, and the inclined plate, *i*, beneath the slide, *g*. The wedge, *h*, is operated by a pedal, *l*, and secured in its highest position by a bolt, *j*, received in a mortise made in the plate, *i*, the bolt being operated by a pedal, *m*. In order to release the wedge and return it to its lowest position, the bolt is raised by pressing down the pedal, *m*, whereby the wedge is free to be returned by the counterweights, *k*, in connection with pedal, *l*; slide *g*, carrying the lower die, then descends by its own gravity and so separates the two dies sufficiently

Fig. 3.



to allow of the removal of the screw bolt or rod therefrom. To compensate for the wear of the dies, and admit of their adjustment, another wedge, *o*, with screw adjustment, is disposed below the inclined plate, *i*. It is not, of course, pretended that there is anything new in forging screw threads, but the machine here described gives an idea of the best machinery now in use in France for that work.



MACHINE FOR FORGING SCREW THREADS.—Fig. 1.

Mechanism of Chemical Reactions.

M. Berthelot has observed some novel facts regarding the direct oxidation of haloid salts and of the sulphurous and arsenious acids. The haloid salts, if slightly moistened, absorb ozone at the common temperature—a fact well known as regards iodide of potassium, which yields iodate of potassa and a little free iodine. It is the same with the chloride of potassium, which produces chlorate, and with the bromide, which yields bromate, though both in small quantity. The absorption of ordinary oxygen by iodide of potassium disengages the heat, say + 44·1 for IO_6K, and a *fortiori* the absorption of ozone. On the contrary, the conversion of chloride of potassium into chlorate by ordinary oxygen absorbs — 11·0, and that of bromide into bromate — 11·1. The superior energy residing in the ozone, + 29·6 for O_6, a quantity greater than 11·0, is consumed by the direct synthesis of the chlorate and the bromate of potassa. In the case of sulphurous acid we find that the production of anhydrous sulphuric acid liberates—

$$SO_2+O=SO_3 \ldots +17{\cdot}2.$$

But this reaction, by means of dry bodies, does not take place at common temperatures, and even if the two gases are kept in contact at 100° for forty-eight hours, we have still no indication of combination. But if water is added the reaction is gradually effected, and the dissolved sulphurous acid is converted into sulphuric acid. This corresponds to a liberation of heat double that of the former—SO_2 dissolved $+HO+O=SO_3HO$ dissolved +32·2. Even in the cold, when dry sulphur and oxygen (or rather ozone) combine under the influence of the electric effluve, a certain quantity of anhydrous sulphuric acid is also produced.

A Wooden Observatory Dome.

The authorities of the College of New Jersey, at Princeton, in that State, have decided to substitute a wooden dome for the present iron structure upon their astronomical observatory, because of the confusion of magnetic currents occasioned by that material. It was agreed that a boat-builder would be the best person to make it, as it is to be composed of lap-work; and Mr. James Beetle, a veteran boat-builder of New Bedford, Mass., has already begun upon the model. The dome is to revolve on iron balls, operated by machinery whose motion is regulated by a clock-work attachment. It will be constructed of oak, maple, chestnut, and cedar, copper fastened, and divided into equal sections by fourteen chestnut ribs, rising from the base at intervals of about four feet, and meeting at the top. The outside will be covered with cedar clapboards, showing four inches and lapping seven eighths of an inch. The dome will be eighteen feet in diameter; the base, to a height of ten and five eighths inches, is perpendicular.

A Novel American Export.

It is said that Jabez W. Abbott, employing mason of Passaic, has received orders from R. Neill & Sons, builders of Manchester, England, to send between 200 and 300 skilled carpenters and joiners to Liverpool. Every man must have a complete kit of tools. Steady work is to be guaranteed to good men. Wages are at the rate of $8\frac{1}{2}d.$ an hour; fifty-one hours a week is the working time. Of 150 masons who went over last year, only six have returned to this country. A new detachment lately sailed from New York.

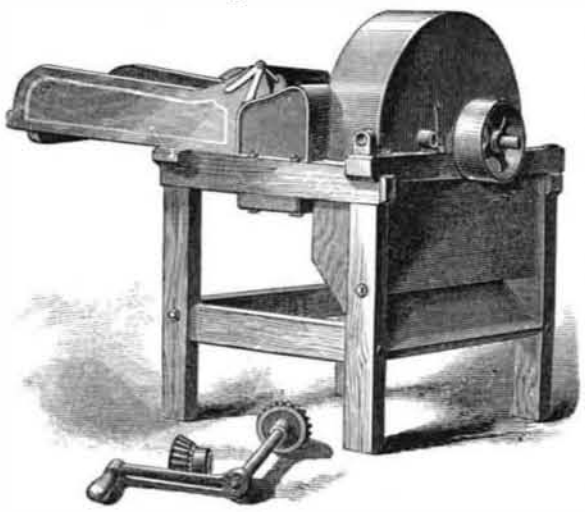
The Use of Balloons in Warfare.

The *Pall Mall Gazette* says: "It appears from the report of the result of a series of experiments to determine the utility of balloons for reconnoitering purposes recently carried on in Germany, and extending over a considerable length of time, that after repeated trials a balloon was constructed that could be packed in a comparatively small space and carriedabout without being damaged or rendered in any way unfit for immediate use. A second difficulty arose in providing a portable apparatus capable of supplying a sufficient quantity of gas for the inflation of the balloon whenever and wherever it might be required to use this latter. But this impediment was likewise overcome, and an apparatus was designed which could generate in from two to two and a half hours enough hydrogen to raise a balloon carrying three persons. Unfortunately, however, there has been found to be yet another obstacle in the way of using balloons for reconnoitering purposes for which no remedy can as yet be devised. From the height to which the balloons must ascend, useful observations can only be made by the aid of telescopes. The balloons must, however, necessarily be 'captive,' that is, they must be confined by a rope and prevented from drifting away, perhaps only to fall into the hands of the enemy; and it is found that when there is the slightest current of air such a captive balloon begins to rotate about its vertical axis, and this so rapidly as to prevent observations being made with the necessary accuracy and detail. Consequently the conclusion has been arrived at that captive balloons cannot at present be used for reconnoitering purposes, and that, therefore, the employment of balloons in war must be limited to carrying dispatches and information." Perhaps, however, some Yankee inventor can discover a practical method of preventing the rotation.

IMPROVED FODDER CUTTER.

The accompanying engravings give views of an improved fodder cutter, designed to reduce to a more palatable condi-

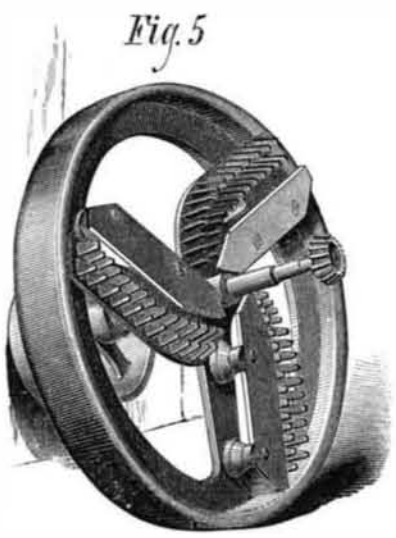
Fig. 1



tion the coarse food for stock usually found upon a farm. It is also claimed to meet the requirements of paper manufacturers, egg packers, and others, who have occasion to use finely cut material for their purpose.

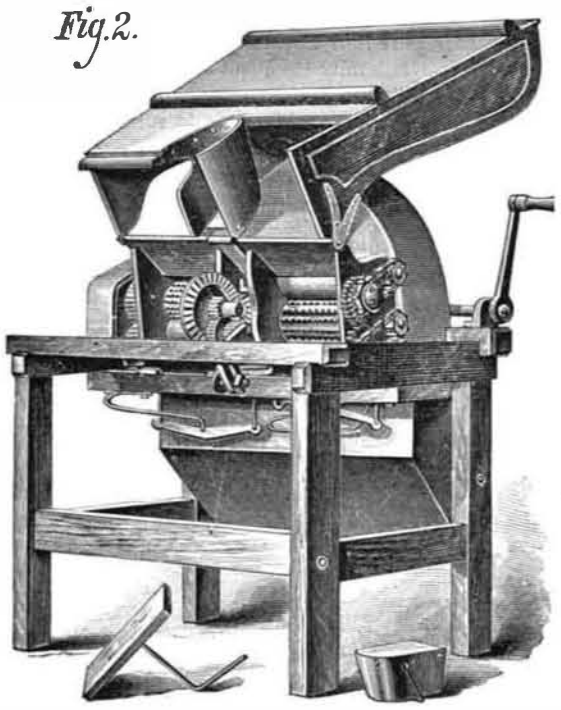
In Fig. 1 is shown a view of the machine arranged with a pulley on the main shaft to receive motion from a belt. The machinery is enclosed to prevent accident or the material to be cut from coming in contact with the working parts. The circular cover over the fly wheel is independent of the frame and can be readily removed for the purpose of sharp-

Fig. 5



ening the knives, etc. This style of machine has two feed boxes and two sets of feed rolls, both feeding to one set of knives. In Fig. 2 is given a view of the machinery and the arrangement for folding up the feed boxes for the purpose of oiling and changing the length of cut. The boxes are hinged to the top girder plates and can be folded over the machine and rested on the circular cover over the fly wheel. This can be done while the machine is in motion. The two sets of feed rollers are driven independent of each other by means of an endless chain. This arrangement gives the feed rolls perfect freedom in adjusting themselves to the varying thickness of the material that passes between them. Tension springs are so made and arranged as to give the required pressure to the feed rolls regardless of their ever

Fig. 2.



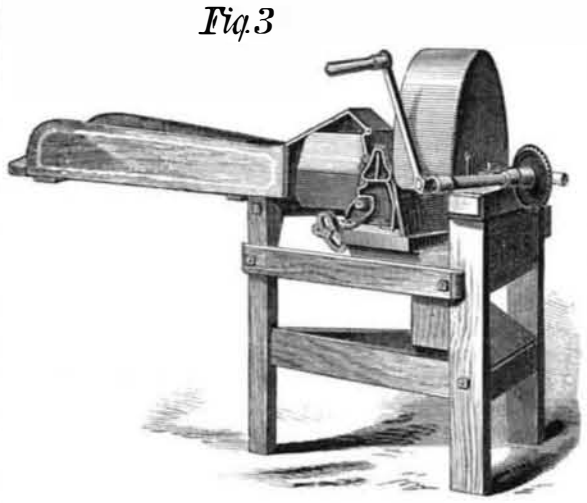
changing position. These springs press on the center at cross beams on which are hinged iron rods passing upwards and attached to the bearings of the feed rolls. A bevel wheel is attached to the fly wheel shaft which through intermediate wheels gives motion to a wheel placed on a small shaft extending from side to side of the frame. On each end of this shaft is placed a spur and sprocket wheel, which communicates motion to the feed rolls by means of the endless chains. For the purpose of changing the length of cut a spur wheel is placed on the hub of the bevel wheel and a second spur wheel engaging into it is made interchangeable, and can be changed *vice versa*, being of different diameters. Should it be desired to make more than two different length of cuts, additional wheels are added. The stationary shear or throat plates are made adjustable by means of set screws, and are provided with inclines on each end to prevent them from slipping on the edge of the knives. They are also provided with a guard on the inner end for the purpose of guiding the knives and preventing them fromstriking on the shears. Attached to the shears is a scraper that extends to the feed rolls and prevents the material from crowding in between the rolls and the stationary shears.

Fig. 3 represents the machine constructed with one set of feed rolls and one feed box. This style of machine embraces the same feature as Fig. 1 with the exception of cutting only on one side of the fly wheel shaft. It is arranged with a set of bevel gears and a crank to operate it by hand power. The end of the main shaft outside of the bevel gear is artach a second hand crank in case it is desired to have two operators.

Fig. 4 represents the same style of machine arranged with pulley to receive a belt for the purpose of driving it by steam or other power. A hand crank and bevel gear can be readily attached by detaching the pulley, when it is arranged as shown in Fig. 3.

In Fig. 5 is given a view of the fly wheel and the main shaft. Upon this shaft is mounted the driving pulley and

Fig. 3



small bevel pinion that gives motion to the feed gear. On this wheel is also mounted the whole cutting apparatus. The knives, three in number, are placed on adjustable supports which are provided with inclines and arranged to revolve on similar inclines on the spokes of the wheel. By a partial revolution of these inclines the knives can be adjusted to a position nearer to or from the shear plates. Two strong bolts pass through each knife as well as the supports and the spokes of the fly wheel. By this means the knives are firmly secured in their proper position. Preceding the cutting knives are arranged, on curved bars, a series of small steel blades set closely together, so as to split and crush corn stalks, ears of corn, and all coarse material into small portions. The blades operate at a right angle or nearly so with the cutting knives which are arranged in a curved line from the center of the fly wheel.

These machines are manufactured in various styles and sizes from a small hand power cutter to a large power machine requiring steam or other power to drive it.

For further particulars relative to the sale of rights, territory, or the sale of machines, address the manufacturers, Joseph Dick & Bro., Lock Box 33, Canton, O.

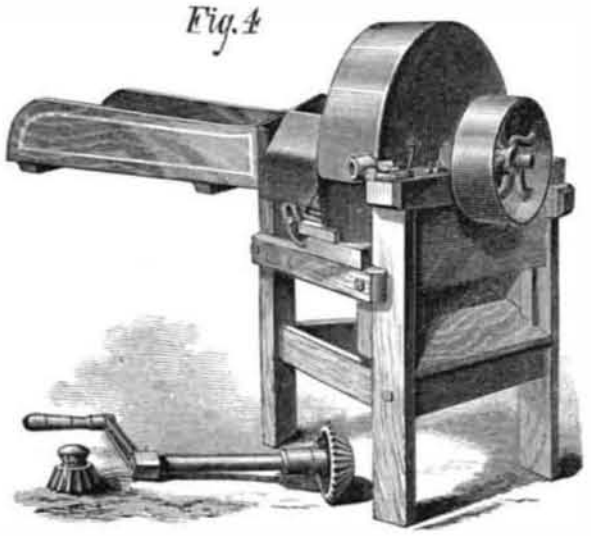
Foreign Textile Improvements.

Certain modifications are announced as made in the Swiss needle embroidery machinery, by M. L. Marliere, for embroidering of furniture stuffs, and new applications of gold and silver work. There is no change in the main parts of the machine, but the number of needles and cards is largely increased. Each of the new machines measures 4·50 meters by 3·50, and has 450 nippers, or 650 when they hold and let go the needles by mechanical pressure on the nippers, which arrive in the opposite direction at the back of the material underhand and then seize them again by means of a to-and-fro movement which the attendant gives to the carriages.

M. L. Neveu has introduced a new method of weaving galloons, etc., with thick wefts. He so arranges his loom that two shuttles pass at the same moment from the opposite sides of the loom, each carrying half as many threads as are required for the weft, which thus become thoroughly united, and produces tissues of the same thickness as by the ordinary process.

A French engineer has introduced the covering of weaver's reeds with nickel by electro-plating to preserve them from oxidation; the leaves may be acted upon before mounting,

Fig. 4



but the inventor recommends the coating of the complete reed.

Another inventor has produced imitations of Utrecht velvet in flax, hemp, and jute.

Sacks without seams are being made by Mr. Cerfornt in ordinary looms, we are told, with two warps, one above the other, and a single shuttle which passes through both warps; but we are not told how this is managed without complication. The sack is finished by weaving the two warps together.

An improved loom is reported, the invention of M. Gulcher, for three or five shuttles as required, the principal features being a new arrangement for withdrawing the brake ever during the changing of the boxes, rendering the operation simple and safe,and improved movement of the jacquard.

A teazel machine called "velvet pile engine," invented by M. Fecken, is said to produce a remarkably downy pile; its peculiarities are described as working with rolling instead of fixed teazels, and mounted on oblique spindles, some in one direction and some in the opposite, which are described as gliding and rolling over the surface of the cloth without tearing the wool, and producing a pile finer than can possibly be got up by any other method.

The application of the continuous principle to metallic dividing engines is thus summed up by M. Nockin, the inventor. "The apparatus consists: 1. Of a dividing cylinder, into which penetrate the saws, and which cylinders are covered with leather or other material; 2. Endless metallic card bands working in grooves of the cylinders; 3. Circular saws assisting in the division; 4. A circular brush; 5. Disks which detach the material from the cylinders; and 6. Drawing cylinders."

A Novelty in Competition.

The Ayr (Eng.) Town Council, in the competition for the new town hall, intend to give a premium of £25 to each architect whose design is rejected, while the accepted design is paid for in the usual way. It is barely possible that this may prove a somewhat costly competition for the town of Ayr.

MESSRS. KOHLER & SILBERZOHN, Sheboygan, Wis., are the manufacturers of the improved feed cutter illustrated in our last issue. Parties desiring information will address them as above.