

IMPROVED FINISHING PRESS.

The engraving represents an improved machine for finishing textile fabrics, invented by Mr. Houston. In machines of this kind the goods are generally passed between drums heated by steam, and are, besides being exposed to pressure and heat, subjected to a longitudinal strain in passing from one set of drums to the other. Besides that the heat to which the different portions are exposed is not equally divided, some parts being overheated and sometimes burnt, while others are not even completely dried. These disadvantages Mr. Houston claims to have overcome in his machine.

There are two large drums, A and B, through which steam circulates. P and R are toothed wheels firmly connected with the drums. They are acted upon by cam wheels, o and p, respectively, on the shaft, n. Both cam wheels may be withdrawn and replaced again in position by means of the sliding collars, M and N. H and I are friction pulleys. The shaft, n, is turned by an endless screw and toothed wheel, receiving their motion from a belt and pulley. The collars, M and N, and the cam wheels, o and p, turn the drums in opposite directions; one cam wheel only works at a time, the drum not acted upon by the cam wheel being carried along by the friction pulley. Thus the operator is enabled to change the motion of the drum as often as necessary. From the drum, A, to the drum, B, a long sheet or band of copper or steel extends, and alternately winds and unwinds round both drums, carrying the goods along. The fabric is unrolled from a cylinder, T, moved solely by the tension of the goods as they are rolled on the cylinder, B. The copper band is heated on the cylinder, A, and catches in descending the sheet of cotton, linen, etc., and rolls up along with the same on the cylinder, B. Thus the entire surface of the goods comes in contact with the heated metal, and is equally exposed to the pressure exerted by the concentric sheets of copper. The goods are in no way strained, but subjected to heat and pressure only, and all folds are effectually removed.

Very little attendance is necessary; one man can attend to several machines.—*Musée de l'Industrie.*

MILLING MACHINE.

We give a perspective view of a handy type of self-acting universal milling machine constructed by Messrs. Greenwood and Batley, of Leeds. As will be seen from our engraving, which we take from *Engineering*, the machine has a deep bed supported on two short standards, and having cast in one piece with it the upright which carries the milling headstock. This headstock has a vertical traverse of about 10 inches, and it is provided with a self-acting downward feed. On the milling spindle is a gun metal spur wheel, into which a wrought iron pinion gears, this pinion being on the same shaft as a belt pulley. The milling saddle also carries a pair of idle pulleys, and the driving belt passes round these and the pulley on the pinion shaft, in the manner shown by our illustration, the milling headstock being thus free to be moved up or down without interfering with the driving gear.

The milling saddle, which has a self-acting feed and stop motion, and the horizontal traverse of which is about two feet, moves on a slide formed on the side of the deep bed of the machine. On the saddle is mounted an accurate dividing motion, with thirteen rows of holes gearing up to 144 divisions. The dividing motion carries on its top a four jawed chuck taking in articles up to three inches in diameter, and also sufficing to hold a vice or other mountings. The machine is altogether a very handy one, suitable for a variety of work. We may add that one of these machines was exhibited by the makers at the Paris Exhibition last year.

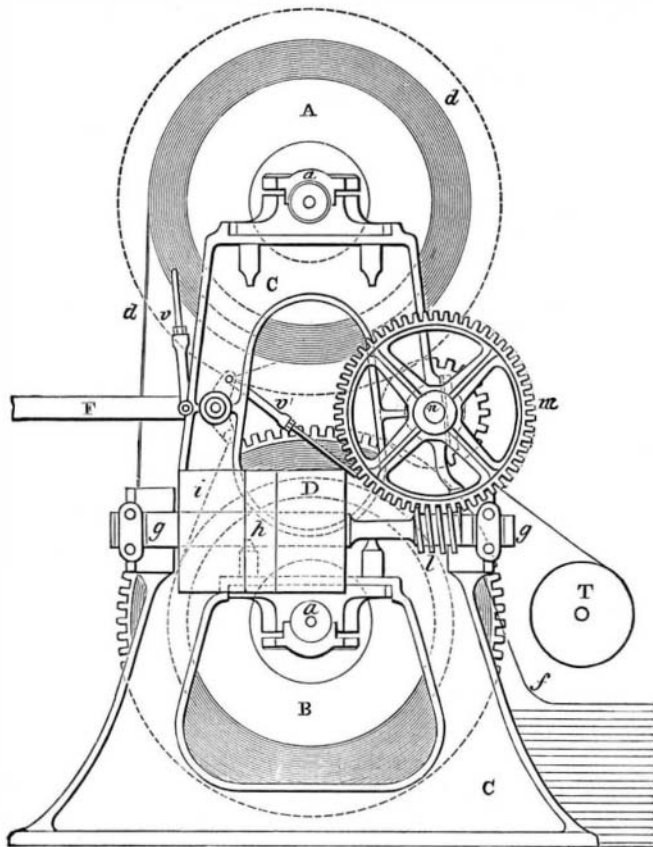
Morocco.

Philadelphia stands at the head of the morocco trade of the United States. The amount of this kind of leather made by the thirty-two firms engaged in the business is placed at \$4,000,000 annually. During the busy season 1,080 dozen goat skins are daily turned into morocco; this would require at the rate of 4,000,000 skins a year.

The trade has gone through the financial crisis and recovered therefrom, notwithstanding the heavy losses. The sales for the season now over are ahead of those for the same period last year, and have been fairly satisfactory. The demand for brush kid has been heavier during the past season than was ever before known in the history of the morocco trade. The skins used are Tampico, Cape, Curaçao, and South American, known as soft stock, and Patnas, Madras, and Cawnpore Madras, classed as hard stock. These terms are applied to the condition of the skin in the hair and before tanned. Of late years the European skins have been largely worked into

cheaper moroccos. Brush and glazed kids, bright and dull pebbles, maroons, and straight grains, both black and in fancy colors, are the designations by which most of the moroccos made are known.

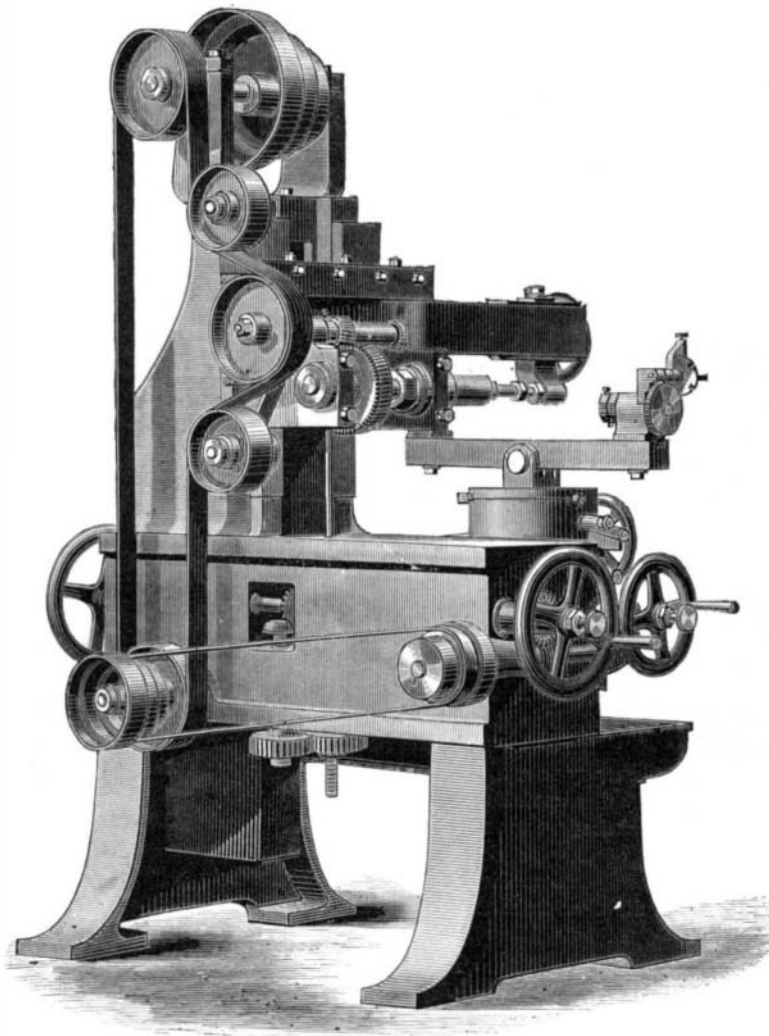
The tanning is done in the old way, and by what is known as the "bag" process, in which the skins are first sewed by hand or machine and the sumac and sumac liquor forced inside. The open tan process, by which system the skins are hung in the liquor, is being gradually adopted. Machinery is largely employed in the tanning and



THE HOUSTON ROTARY FINISHING PRESS.

finishing of moroccos, excepting on the finer grades, in which the work is still largely done by hand. With the general introduction of steam the drying of skins is greatly facilitated, and there is no such enforced dependence upon the eccentricities of the weather as was the case years ago.—*Shoe and Leather Reporter.*

CEMENT FOR COATING ACID TROUGHS.—Melt together 1 part pitch, 1 part resin, and 1 part plaster of Paris (perfectly dry).



UNIVERSAL MILLING MACHINE.

A New Wind Engine.

Mr. W. Thomson, Professor of Mechanical Engineering in the Iowa College of Agriculture, describes, in the *College Quarterly*, a new windmill, which has been recently constructed and put in use at the above institution.

From the following description any mechanic can construct a windmill on the Professor's plan, and according to his testimony it is an entire success.

Previous to the fall of 1878, the water was forced to the several departments of the college by a No. 7 Knowles pump, running on an average of four and one half hours each day. The height to which the water has to be raised in the main building is 106 feet 7 inches—the amount required here being about 6,000 gallons in twenty-four hours; the other departments require about 2,000 gallons in the same time, which has to be raised to an average height of about fifty feet. The cost by this system (coal delivered at the well for \$3.20 per ton, and firemen's wages being 61 cents per day), averaged about \$45 per month.

It is evident that a wind engine would do this work cheaper than steam, since, in raising water, there is no objection to a variable motion. From a study of the various kinds, and their construction as to efficiency and durability, says Professor Thomson, it was evident that the greatest efficiency of the acting cylinder of wind was not reached by the mills in use at the present time. We therefore concluded to construct one that would fulfill this condition as nearly as possible. Knowing the amount of work to be done, and allowing for friction in the pipe, and for waste and leakage at the different points along the line from which water is drawn, and assuming the velocity of the wind to be fourteen feet per second, and that the efficiency would not be less than thirty-three per cent of the acting cylinder of wind, it was shown by calculation that a wheel eighteen feet in diameter would do the work and furnish an ample supply as long as the above velocity was maintained. During the fall and winter this wheel was made and set in position ready for the work in the spring. The construction is as follows: The arms are eight in number, made of wood and bolted to a spider which is keyed to the crank shaft. The pieces to which the vanes are fastened are circular arcs of iron, and are fastened to the arms by being bent at the ends radially and toward the center; bolts passing through these ends and the arms, thus fastening them securely together. There

are sixty-four vanes, seven feet long, four and one half inches wide at the center end, eleven inches at the tips, and arc fastened to the circular arcs by clips which are riveted to the vanes and bolted to the circular arcs. The vanes are made of iron for the following reason: In order to get from the wind the greatest amount of work, they should be curved or twisted from the center to the tips, the amount of twist depending upon the length. They are also made slightly concave on the face, in order to cause the stream of air to leave the vane at as near a right angle as possible to the direction

that it has when it first strikes it, and this curvature can be more readily given to iron than to wooden vanes. By making the clips of the proper length the desired amount of twist was given to them, the angle at the center being about 45° and at the tips 25° to the plane of rotation. That this form of vane is instrumental in taking from the wind the greater part of its living force, is evident from the fact that back of the wheel, even when a high wind prevails, there is but little motion in the air discernible. In order to make the wheel strong and rigid, it is trussed by half inch rods in front and back of the arms. The shaft is two and one-eighth inches in diameter, and has a crank forged on it with bearings on both sides of the crank. These bearings are on a large hollow cylinder, through which the connecting rod passes to the pump rod, which is made of one inch iron pipe and answers well, as it can be readily connected and disconnected when desired.

The pressure on the pump due to the height is 48 lb. per square inch; this is shown by calculation and also by a pressure gauge at the surface of the water in the spring. This gives a pressure on the crank of 336 lb., the diameter of the pump barrel being 3 inches and stroke 6 inches; the force of the wind at the assumed velocity and efficiency would be 560 lb., and the corresponding velocity of rotation is about twenty revolutions per minute; amount of water raised, twenty barrels per hour. The amount of water raised is much more than these figures would indicate. It is also evident from the performance of the wheel that a less velocity than that assumed will run it, and it is often remarked that that mill will run without wind.

If only one half of the above result was obtained, it would still pay to run the mill in connection with the steam pump; but since the first of March, the amount required has been furnished by the mill with the exception

of a few hours' run with the steam pump. The amount saved over the old system is not less than \$35 per month.

The problem of economy so far, then, has been solved and that of efficiency practically demonstrated.

Moss on Grass Lawns.

It is generally thought that a damp, undrained bottom is the cause of moss on grass lawns, but by some it is regarded as proceeding in a great measure from poverty of the soil, for where grass grows freely this parasite is rarely if ever found. To effect a riddance of this pest there is nothing equal to fresh-slaked lime and wood ashes mixed—so writes a correspondent in *Land and Water*—which, he states, not only kill it and cause it to shrivel up, but have a most beneficial result on the lawn by stimulating the natural herbage. Where this is really poor and needs assistance I would strongly recommend the use of both the above named, together with the addition of soot and finely sifted soil, which mixture is far better than guano, nitrate of soda, or other patent manures, that force too much growth for a time, only to be succeeded by increased exhaustion soon after. The first proceeding, however, to cure a mossy grass path should be to scarify it well over with an iron toothed rake, followed by a good sweeping after with partly used-up brooms, which will make way for seeds to be sown, and these should be worked in by using the rake as before. This done, the soil mentioned and the ingredients with it will then come in for affording an additional covering, under which it will germinate, and, once through, make rapid progress.

Etna in Eruption.

At the beginning of the current month great anxiety prevailed with regard to the rapid increase in the volume of lava pouring out of the craters of Mount Etna. Craters had formed on two slopes, and a double eruption was in progress. On the night of May 28 a number of brilliant balls of fire were thrown to a great height and burst aloft like rockets, emitting a fiery shower.

Later, fresh craters opened, endangering Bianca Villa, Randazzo, and Castiglione. Clouds of ashes overhung Piedmont, which was in almost total darkness. The Aci Reale and Catania Road was blocked and considerable damage had been done.

By the 2d of June a considerable portion of the bed of the Alcantara River had been covered by the lava. The damage to agriculture was already very serious. The inhabitants had been forced to abandon the village of Majo. Many large and valuable estates had been destroyed. The four main craters continued to pour forth streams of lava, while many of the smaller ones had become inactive. The stream of lava which had interrupted the road at Passa Pescaro was half a mile wide and a hundred feet deep.

IMPROVED WINDOW CORNICE.

Any one who has had occasion to change his residence knows too well that what will do for one house will not answer for another. The furniture, carpets, and fixtures need remodeling to adapt them to their new situation. Not the least among annoyances is the variation in the width of windows, necessitating a change of shades and curtains and also of cornices, the latter being usually fully as expensive as either of the other items, and incapable of being adapted to a window narrower or wider than it was originally designed for.

To obviate these difficulties as well as to enable makers and dealers in window cornices to fit any kind of window without making a cornice especially for it, Mr. James W. Campbell, of No. 9 Baxter street, New York city, has devised the extension cornice shown in the accompanying engraving.

It consists of two thin mouldings, fitted one over the other, and arranged to slide and thereby lengthen or shorten the cornice to adapt it to any window. The vertical pieces or trusses are attached one to the inner end of each sliding piece, and they are split at their upper ends, and provided with a clamping screw, by means of which the parts may be fixed after they are properly adjusted. The trusses are lined with felt or flannel, as shown in Fig. 3, to prevent marring the face of the mouldings. Fig. 1 shows the cornice closed together. In Fig. 2 it is represented as extended.

These cornices are not restricted to any particular style of moulding or finish, and their form is always symmetrical. Further information may be obtained from the patentee, whose address is given above.

THE MEXICAN EXHIBITION IN DOUBT.—The work of preparation for the proposed Mexican Exhibition has been stopped, and it is believed that the Mexican Cabinet has determined to abandon the enterprise for lack of means.

NEW COMBINATION TOOL FOR MERCHANTS.

The accompanying illustration will scarcely need explanation, as the merits and usefulness of the article will readily be seen by those who have frequently to pack or open boxes or packages of merchandise. The tool combines in very simple form a hammer pincers, and wrench. When it is used as a nail extractor a driver, which is not shown in the engraving, is used for forcing the jaws into the wood.

This tool seems to combine the advantages of the more costly implements for a similar purpose. It was recently

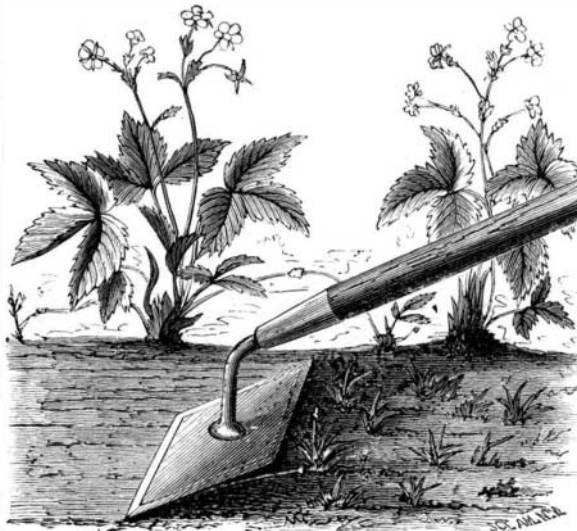


SMITH'S COMBINATION TOOL.

patented, and is being manufactured by Messrs. W. K. Smith & Co., of Kirksville, Mo.

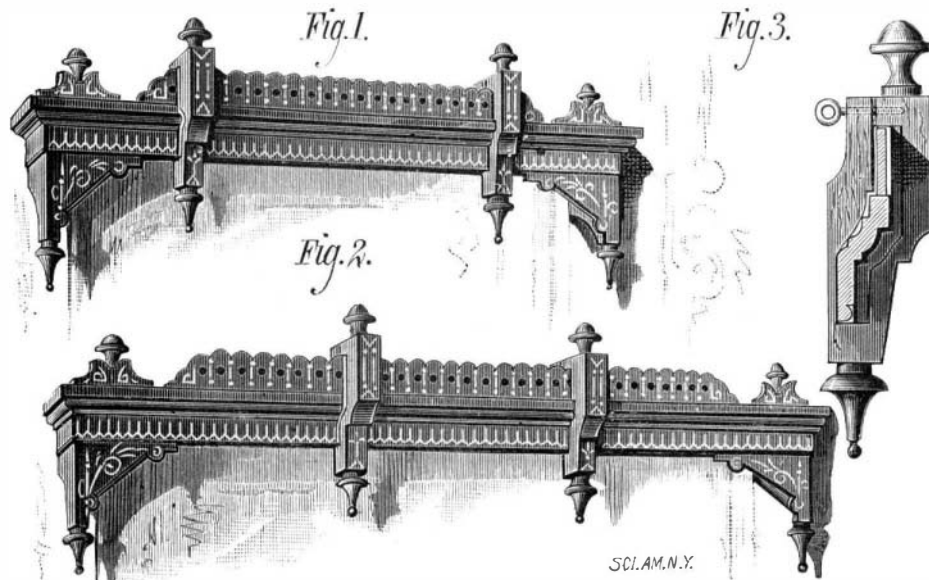
A NEW SCUFFLE HOE.

The improved implement shown in the accompanying engraving is designed to take the place of the ordinary hoe in various gardening operations, but it is more especially adapted to such work as the cultivation of the strawberry and other similar plants, and to weeding onions, etc.



MUNSON'S SCUFFLE HOE.

The implement has been used for a number of years by the inventor in his own market garden, where he has proved to his own satisfaction that the men who use it can accomplish three times the work possible with an ordinary hoe. It may be used as a subsoiler, as it will readily break up the soil to a depth of five inches without great exertion on the part of the user, and it is stated that it is not at all difficult to make, in ordinary soil, strokes of five feet. It answers an



CAMPBELL'S IMPROVED WINDOW CORNICE.

excellent purpose in weeding onions and other plants growing in drills or rows, as it completely uproots the weeds and renders unnecessary any work with the hands. As a strawberry hoe it may be pushed around and under the vines without injuring them, and by inverting the blade it forms an efficient runner cutter, and it may also be used to set runners to root.

The great advantages possessed by this implement over others of its class are that it may be used without bending the back, and much less force is required to work it.

The general appearance of the scuffle hoe is shown in the engraving. The blade is diamond-shaped, and is curved, having its convex surface uppermost. The edges are beveled or sharpened, and the curved shank which receives the handle is secured to the center of the blade.

This invention was recently patented by Mr. T. V. Munson, of Denison, Texas, from whom further information may be obtained.

ENGINEERING INVENTIONS.

Messrs. Philo A. and Ira S. Knapp, of Danbury, Conn., have invented an improved cut-off for steam engines in which the valve is arranged so that it will close the live steam port at one third, half, or two thirds of the stroke, while the exhaust port remains open to the end of the stroke.

An improved railroad gate has been patented by Messrs. Henry Hahn and Anderson L. Gaston, of Gainesville, Texas. It is intended to fill up the gaps in fences crossing the railway track. It is lowered by the pass-

ing trains from either side, and is raised as soon as the train has passed over it.

Mr. Henry Ruse, of Baltimore, Md., has patented an improvement in railway ties. In a track formed with these ties two permanent clamping lugs of any one tie project in the same direction, but are arranged upon opposite sides of the rail from the permanent lugs of the next tie. The inventor also provides a peculiar locking device, by which important advantages are secured.

An improved car coupling has been patented by Mr. Geo. W. Cushing, of Sedalia, Mo. The object of this invention is to furnish a more efficient and durable substitute for the plate springs and other devices that are now used on that class of draw hooks that require side pressure to retain them in position.

Color Blindness.

That the prevalence of color blindness among railway employes, and the consequent danger, were not overrated by us in our early articles on this subject, continues to receive abundant confirmation. Dr. Keyser, of Philadelphia, according to the *Railway Review*, has examined the eyes of the train hands of three Philadelphia railways, and finds that three and one half per cent are color blind. These cannot discern the difference between colors; and in addition there are eight and one half per cent who can distinguish colors, but cannot distinguish shades of the same color apart. There are thus twelve per cent who have not that quickness and accuracy of perception of colors which should be considered absolutely necessary in the railway service, as long as signaling is done by means of colored lights. It is fair to presume that general investigation would show about the same results.

A Great Russian Telescope Projected.

At a meeting of the Naval Institute in Washington, May 29, Professor Newcomb stated that he has received letters from Otto Struve, Director of the Pulkowa Observatory, announcing that the Russian Government has voted 250,000 rubles for the construction of the largest telescope that can be advantageously made, including the building in which to mount it. The object glass is intended to be between thirty inches and three feet in diameter, if the glass makers find it practicable to cast a disk of this size of the necessary evenness and purity.

It has not yet been decided who shall undertake the most difficult part of the work, the grinding of the glass; and before deciding it Struve intends to visit this country in order to examine the Washington and other great telescopes made by Alvan Clark & Sons. He will probably arrive here for this purpose some time during the summer. Should his examination prove satisfactory he will be ready to open negotiations with the Clarks for the work if he is sure it will be done enough better to warrant the risk of sending the glass twice across the Atlantic.

Molecular Oscillations.

M. Raoul Pictet, of Geneva, one of the two chemists who not long ago were so brilliantly successful in liquefying hydrogen, has recently been engaged in researches which deal with some of the most delicate problems in molecular physics. He has endeavored to determine the length of the molecular oscillations of a body subjected to the action of heat. No explanation is given as to the method of calculation employed, but M. Pictet arrives at the remarkable result that the product of the length of molecular oscillation by the temperature of fusion is constant in all solid substances. He adds that the higher the