NEW INVENTIONS.

A sugar skimmer and cooler has been patented by Mr. Augustus B. Lanier, of Oliver, Ga., which is not only effective, but simple and inexpensive, and admits of being easily cleaned and fitted to ordinary concentrating boilers for cane juice. The device consists of a lower perforated section having the form of an inverted funnel, and provided with a central collar, an outside rim, and inclosed concentric rings, and an upper section having an outside raised flange, legs to support it on the lower section, a downwardly-projecting perforated cone, and a guide rim on the under side of the latter.

Messrs. John E. Clement and John A. Enos, of Peabody, Mass., have patented a machine for whitening leather. The invention consists in a machine for planing off the surface of leather, usually termed "whitening leather," which embraces several important features, including a rocking hub for carrying the rotating cutter head, and whereby the cutter is made to act in a level plane; a feed bed having an elastic support to hold the work up to the cutters by spring pressure, and which is carried by a slide operated by a toggle joint mechanism to admit of the bed being adjusted squarely and bodily as required; a compact arrangement of mechanism for vibrating the rocking hub, and for rotating the cutter head carried by the latter, and a series of straight cutters within the cutter head, constructed to avoid that lateral thrust of the leather, which is incidental to the usual spiral blade cutter. The machine is light and portable, and is said to do its work both rapidly and perfectly.

Mr. Nicholas Scholl, of Chillicothe, Ohio, has patented a bosom board, which secures a perfect stretch and taut but elastic hold of the bosom of a shirt. The invention consists in an ironing board provided at its upper end with a head formed of a wire frame having downward projecting ends, from which spiral springs pass to near the outer ends of the board, the collar band of the shirt resting against these springs, when the bosom is stretched and held in position by means of a spring clamp formed of a transverse strip having a longitudinal tongue fitting in a groove in the end of the board, which strip is held to the end of the board by spiral springs.

An improved lubricating device for supplying oil to a bearing intermittently, has been patented by Mr. George C. Herrich, of Auckland, New Zealand. This device consists of an oil cup provided with a tubular plug at its base for entry within the bearing to be lubricated, a stem or rod fitted loosely and longitudinally through the tubular plug, and a piston or puppet valve fast on the stem or rod and fitted to play freely within a chamber above the plug. The motion and vibration of the machinery, or irregularities on the shaft acting upon the lower end of the stem, cause the piston or puppet valve to rise and fall, and thereby allow the oil to flow intermittently from the cup around the piston and stem and down through the bore of the plug to the bearing.

Mr. Charles E. Robinson, of Charlotte, N. C., has patented an improved process and furnace for volatilizing and oxidizing ores, especially such as contain a large proportion of gold and silver. The invention consists in subjecting ore, when in a pulverized or comminuted state, to the action of a fire blast, and driving or producing a continuous circulation through a continuous passage until the desired effect has been produced. It also consists in a combination with an ore-reducing chamber and furnace chamber, of an ore-conducting pipe, and a steam, air, or gas-injecting pipe, arranged in such relation with each other that the steam or gas jet or current produces an induced fire blast and creates and maintains a circulation of the pulverized ore through a continuous passage. By these improvements a complete and thorough volatilization and oxidation of the baser elements and preparation of the same for elimination from the more valuable metals are effected with the least expenditure of fuel and labor, and the largest yield of valuable metals is obtained at minimum cost.

Mr. Simon P. Harbaugh, of Cumberland, Md., has patented a very simple but efficient hand-power press for baling hay, cotton, wool, rags, etc. The power is applied by bearing down on a hand lever carrying hooked dogs which engage with ratchet wheels fast upon a shaft that has its bearings in the sides of the press. Upon this shaft are pinions which mesh with racks carried by a frame that is fitted to slide up and down within grooves and slots in the end boards of the press body and upward extensions thereof. To this rack frame the follower is connected by hinged bars. Applied to the ratchets are pawls for retaining the follower in position while the operating lever is being raised to further compress the material or to tie the bale. These pawls are formed with fingers which rest upon the hooked dogs, whereby, when the lever is raised and the dogs come in contact with the lifting studs, both the dogs and pawls are disengaged from the ratchets, and the follower is free to be quickly readjusted.

Mr. Carl G. Buttkereit, of Des Moines, Iowa, has patented certain improvements in bell pianos. This invention consists in a combination with the bells, arranged one within another, of rods for supporting the bells, bent to be about parallel with the inside of the latter; also in a combination with these devices, of a rod secured to the bell frame at one side of the bells and serving to carry the several bent rods which support the bells, likewise means for holding and adjusting the bent rods to their places. The invention also comprises a spring wire provided with a cushion head against which the rod of the hammer strikes when moving toward the bell, to soften the sound and prevent clattering of the hammer on the bell, a damper adjustable in or on the damper lever relatively to the bell, and a laterally sliding damper apron frame.

An improvement in sash cord or chain fasteners, which has for its object the fastening of a sash cord or chain to the sash so that it can be readily attached or detached without removing the parting strip or stop bead, has been patented by Messrs. Thomas P. Dunne and Paul Rath, of New York city. The invention consists in a flanged and ribbed sleeve, through which the lower end of the sash cord is passed, the strands of the cord being separated and turned down on the outside of these ribs, and held thereon by a screw cap, which is passed over these ribs and is screwed into the lower end of an angular inclined aperture passing from the outer edge to the inner surface of the side rail of the sash, through which angular aperture the cord passes. If a sash chain is to be held, the short sleeve is provided at its inner end with two prongs, between which the chain is passed.

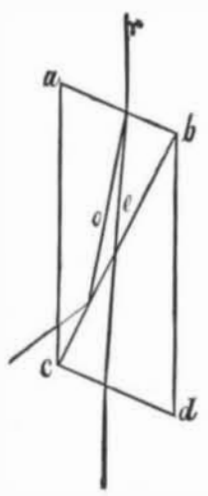
Mr. Joel Davis Hall, of Kingston, Ga., has patented an improved machine for sharpening cotton gin saws, in which the saw to be sharpened is carried by a shaft, and intermittently fed or rotated one tooth at a time by a helically constructed rotating feeder, to expose the several teeth of the saw in succession to the action of the sharpening file. The sharpening device is a rotating file mounted upon a nearly vertical shaft, which is carried by an intermittently sliding frame that has its movements timed to correspond with the revolution of the feeder and thereby caused to put the file into and out of contact with the saw as required.

An improved animal poke has been patented by Mr. Lorenzo Stow, of Rome, Tenn. The poke is composed of two rigid, looped, or slotted side pieces suspended from a headstall and designed to rest against the jaws of the animal. A horizontal bent or double bar engages and slides on the side pieces, and has a smooth or rounded end to come in contact with the animal's throat.

The Nature, Formation, and Uses of the Nicol Prism.

Previous to the time when the late Mr. Nicol, of Edinburgh, discovered those principles in Iceland spar which led to his admirable invention of the prism bearing his name, the phenomena of polarized light had received but a limited degree of attention, while its application to the microscope might be considered as comparatively unknown. It is of all the apparatus employed in the polarization of light that which possesses the greatest popularity, and is, consequently, in most extensive use; and this position it will retain until some crystal possessing the properties of tourmaline, but of larger dimensions and free from its objectionable color, shall have been discovered.

The nature of the Nicol prism will be comprehended from the following: When any object, such as a piece of printed matter, is viewed through a rhomb of Iceland spar, or calcite—a crystallized form of carbonate of lime, also known as calc spar—such object is seen in duplicate, owing to the double refractive powers possessed by this crystal. Physicists have designated these rays respectively the ordinary and the extraordinary; and when either of them is got rid of that which remains is distinguished as polarized. Mr. Nicol's ideas relative to having this separation made of the two rays culminated in his cutting asunder, by means of a fine saw, a rhomb of spar at the line *b c* in the cut, and rejoining the two pieces by Canada balsam.



Into a rhomb of spar, *a, b, c, d,* a ray, *r,* from any object enters, and in virtue of the double refraction alluded to becomes split up into *o,* the ordinary, and *e,* the extraordinary ray. Both these rays encounter the oblique film of Canada balsam, *b c,* the extraordinary ray passing through without hinderance. Not so, however, is this the case with the other ray, which falls at such an acute angle upon the balsam—which has a refractive index intermediate between that of the spar for the ordinary and extraordinary rays, and thus, acting for the former the part of a totally reflecting mirror, sends it away to one side, where it is absorbed by the black surroundings of the mounted prism, leaving only the extraordinary ray to emerge at the end, which it does as a polarized ray of light.

Two prisms of the kind described form a polariscope. The object to be examined is illuminated by light transmitted through one of them, thus designated the "polarizer," while it is viewed, with or without the aid of a magnifying glass, by the other, which is then termed the "analyzer."

A Nicol prism forms an agreeable and often useful pocket companion when one is boating, fishing, or enjoying a walk in the country, and this quite apart from what scientists may term its more elevated uses. The glitter of the bright sunshine causes a sheen or glare to be reflected from the surface of the water which is quite fatal to the carrying out of the desire to peer down in the depths and examine into the beauties of the submarine world. The "Nicol" is applied to the eye as an eyeglass, or mounted in duplicate as a small opera glass, and, presto! the glare and reflection from the surface are annihilated, and the water is imbued with a crystalline transparence. We are aware of one instance in which the body of a drowned man was thus discovered reposing "at a few fathoms deep;" and the majority of scientists know what is meant by the "fisherman's spectacles," which are composed of a pair of Nicol prisms, and by which the user is enabled to see how and to what extent the denizens of the water disport themselves.

The artist or meteorologist sees a faint indication of a cloud in the northern sky, and from curiosity or in the interests of science desires to know something concerning it. He applies to his eye a Nicol prism, and the faint and almost invisible vaporous form stands revealed in all its detail, an exquisite mass of white upon an almost black ground. Nature, especially arborescent nature, presents to its artistic devotee a different appearance when illuminated by a glaring sunshine from what it does when lighted by the clouds of an overcast sky. The Nicol prism converts the former into the latter, removes the reflected sheen from the leaves, and shows their surfaces in their native green color, freed from glitter or glare. "I am satisfied," remarked to the writer the Rev. J. B. Reade, F.R.S., and at that time President of the Royal Microscopic Society of England, "that if photographers were to adjust a Nicol prism in front of their camera lenses much finer effects could be obtained in many cases from the depolarizing of the light reflected from the heads and faces of their sitters." The hint thus given was taken and very fully carried out, so far as regards its application to foliage, with the most surprising and gratifying results.

A visitor to a picture gallery is frequently annoyed by the reflection of the light from the surface of the painting on the canvas, by which he is prohibited from seeing the details of the artist's work unless by shifting his position in an otherwise disadvantageous manner. In the majority of instances the employment of a Nicol prism, by destroying all the false or reflected light, permits of the painting being plainly seen. By placing such a prism in the eyepiece of a telescope, both the luminous intensity and the heat of the solar rays are diminished. As a means of qualitative, or, perhaps more exactly, of discriminative chemical analysis, a pair of prisms when used with the microscope often yield most satisfactory results. The adulteration of nitrate of silver has been discovered from the examination of a crushed sample too small for analysis by chemical tests. Samples of such salts as the iodide and bromide of cadmium have been instantly "located," although these did not exceed half a grain each in weight. Here may be remarked a fact not found in any of the text books of science, that by an aqueous solution of cadmium bromide may be produced the most striking and beautiful crystallizations capable of being obtained for microscopic examination by polarized light. By skillful determination of the heat at which the slide is maintained during the few moments of crystallization, the semblance of vegetation and flowers of the most variegated forms and intense colors may be obtained.

The late Le Neve Foster, Secretary of the Society of Arts, London, has related an application of polarized light which is at least suggestive. A keen amateur photographer, he had practiced this art through the media of dry plates, in the final preparation of which gallic acid played an important part, this acid being of course in solution. On one occasion an exceptional spottiness characterized all his plates, which greatly puzzled himself and his friends to account for. At length a gentleman connected with photographic journalism, and better acquainted than he with the methods of conducting researches into the by-paths of photographic failure, discovered by the aid of the polariscope that the surface of the plate was covered with microscopic particles of gallic acid. Further investigation revealed the cause, which was this: that this acid being more freely soluble in warm than in cold water, a saturated and filtered solution at 80° would at a lower temperature hold in *suspension,* not *solution,* innumerable tiny particles of the acid, which, when applied to the sensitive film in that form, caused the spots complained of. On the more commonly recognized applications of polarized light by the Nicol prism, such as the examination of crystalline minerals, it is not intended now to speak.

Fires in New Jersey Swamps.

The fires which burned in the great Jersey swamps all summer raged until October. Looking across the meadows from the Bergen hills one could see no evidences of fire except the blackened surface and an almost imperceptible blue haze. Yet the fires were there, deep down, seldom developing flames, but steadily burning among the roots and other vegetable matter below the surface. In the daytime, especially when the air was clear and dry, the light blue smoke that rose from the meadows was scarcely perceptible, but at night, when the atmosphere was heavy with moisture, the smoke was held down, and it became thick and spread over the neighboring land, making even the gas jets indistinct and travel out of town troublesome. The Pennsylvania Railroad men said that when a dense fog blew up from the sea it was impossible to see a locomotive headlight a block away. These men say that they experienced more trouble from the fires in Bear Swamp, not far from Princeton, where the marsh was on fire eight or ten feet below the surface.

Proposed Electrical Exhibition in London.

An effort is being made to secure the holding of an International Electrical Exhibition in Crystal Palace, London, in December next. The prospects are said to be good, many of the exhibitors at Paris having agreed to contribute.