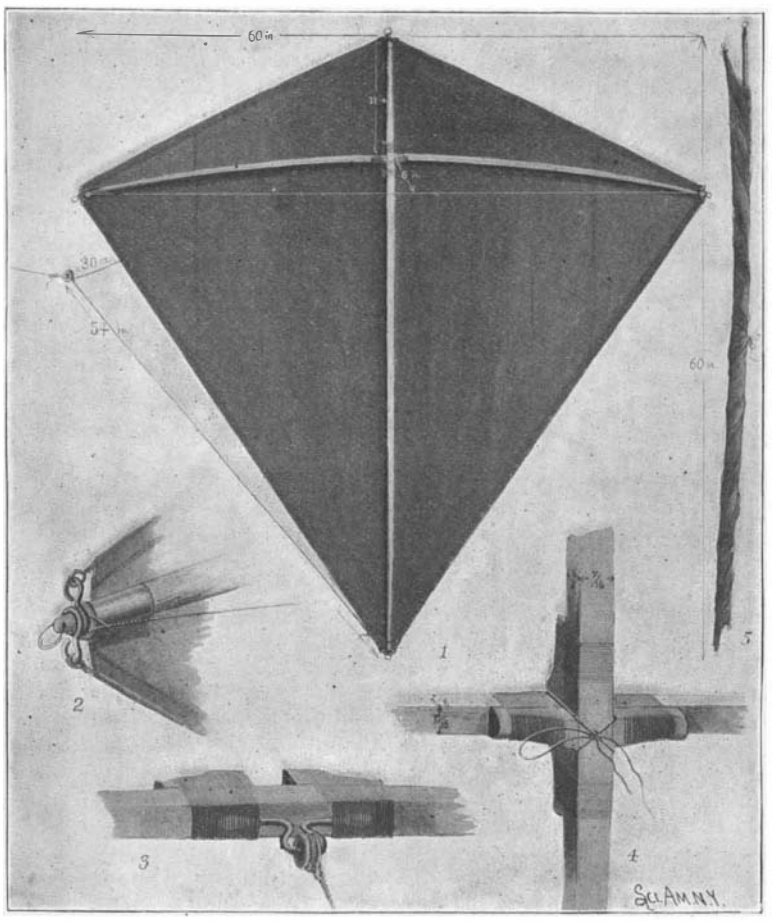
A FOLDING MALAY KITE.

The kite has long ceased to be the plaything of the boy, and experiments on kite construction and flying are now conducted under the patronage of governments and learned societies. The United States Weather Bureau has considered the subject of kites and auxiliary apparatus for the meteorological exploration of the upper air to be important enough to call for the research of specialists, and the results have been embodied in an interesting monograph. Articles upon the subject have been published in many scientific journals and in the proceedings of learned societies. The number of amateur kite fliers grows larger year by year, and some of their achievements in this direction have been notable. Cameras have been sent up and photographs obtained. Meteorological instruments have been elevated to high altitudes, and even telephone wires have been carried by kites and messages have been transmitted by their aid.

Doubtless many of our readers would like to make the modern kite, either for making observations or simply for pleasure. Dr. Claison S. Wardwell, of 35 West Thirty-eighth Street, New York, has placed at our disposal one of the kites which he has made for his own use. It possesses many ingenious expedients, which might perhaps not occur to the amateur kite maker. It is a tailless "Malay" kite of the Eddy type, constructed so that it folds in small compass and is what is known as the five foot size.

Fig. 1 shows the completed kite with the principal dimensions noted on it. Fig. 2 shows the metal cap which is secured to the end of the stick and also the bent wire terminal which secures the cover. Fig. 3 shows the construction of the joint in the cross stick and the attachments for the bridle. Fig. 4 shows the two sticks joined together with waxed braded fish line, and Fig. 5 shows the kite folded.



DR. WARDWELL'S FOLDING MALAY KITE.

The best material for the sticks is straight grain spruce, as this wood has been found to be less liable to bend under strain or to break at the cross stick. Of course, considerable care should be exercised in cutting out pieces which are free from imperfections. The sticks are $\frac{7}{16}$ inch wide and $\frac{3}{8}$ inch thick and 5 feet long. The sticks can be rounded at the edges and scraped smooth. Blocks are glued on to each stick as shown in Fig. 4. On no account should the wood of the stick be scored or cut away at the joint, as this would impair the strength of the joint. The blocks may be secured to the sticks with good carpenter's glue. They should be accurately fitted, so that the joint is a firm one. After gluing, the joint is tightly wrapped with waxed thread and varnished with shellac. The ends of the sticks are provided with No. 32 or No. 38 blank cartridge shells to which a piece of large sized wire is soldered. This wire is afterward drilled to receive the split ring which holds on the bent wire terminal. The stick is shaped at the end to receive the shell, which is secured to it with hot shellac. The sticks are tied together at their juncture with waxed braided fish line, which may be readily untied.

The bridle eyelet, made of hard rubber, is supported by annealed brass wire (No. 13) hammered thin at the ends and bent into shape, as shown in Fig. 3. This is attached to middle of cross stick with waxed thread and varnished. The cross stick is bent to the proper bow ($\frac{1}{10}$ of its length) and secured with No. 22 spring brass wire, loops having been formed at each end to pass over the ends of the sticks, as shown in Fig. 2. Bend No. 13 spring brass wire into the shape shown in Fig. 2 for the terminals and secure them in place with split rings. Now connect the ends of the sticks with No. 1 picture cord, using great care in the measurements, and allowing the perpendicular stick to bow forward slightly. Now remove the brass bow wire from the cross stick. The kite is now ready for the cover, which may be made from tissue or Manila paper, Chinese silk, or best quality of percaline. With the paper cover the paper is fastened on with good mucilage, leaving the cover flat and smooth. The cover opposite the center of the cross stick and the corners should be reinforced with percaline glued on. Take a few stitches at the corners around the wire. Now place on the bow wire and the cover will be found to have an even and sufficient slack. With a silk or percaline cover, place on the bow wire, and having cut off four pieces of No. 1 picture wire, fasten the two short wires to one bent wire terminal, and the two long wires to another terminal. Place the terminals on the ends of the sticks and draw the wires to the proper position and fasten temporarily. Cut out the cover and baste it on the frame evenly, so that it will lie smooth. Allow about ½ inch hem. Unstring the wire and stitch the cover with a sewing machine, leaving openings at all the corners. String the wire to position again through the hem of the cover and attach permanently to the other terminals while in position on the frame, then reinforce all of the corners. Cut ½ inch hole for the bridle eyelet and its holder, opposite the center of the cross stick, and reinforce the opening with a circle of cloth about 3 inches in diameter. Attach the upper string of the bridle, which is 30 inches in length, to the hard rubber eyelet as shown in Fig. 3. The lower string, which is 54 or 56 inches in length, is attached to the split ring or bent wire terminal as shown in Fig. 1, allowing 8 or 10 inches extra to each string for adjustment.

In placing the cover on the frame, first place the two side terminals on the ends of the cross stick, then place the upper terminal in position. Lastly stretch on the lower terminal by bowing the midrib slightly forward, then fasten all the corners with the split rings. The bridle should be provided at the point where the flying string is attached with a hard rubber eyelet similar to the one shown in Fig. 3. In using a cloth cover, it is not necessary to make as much provision for slack.

The weight of a 5 foot kite with sticks $\frac{7}{16} \times \frac{3}{8}$ inch material constructed in this way is as follows:

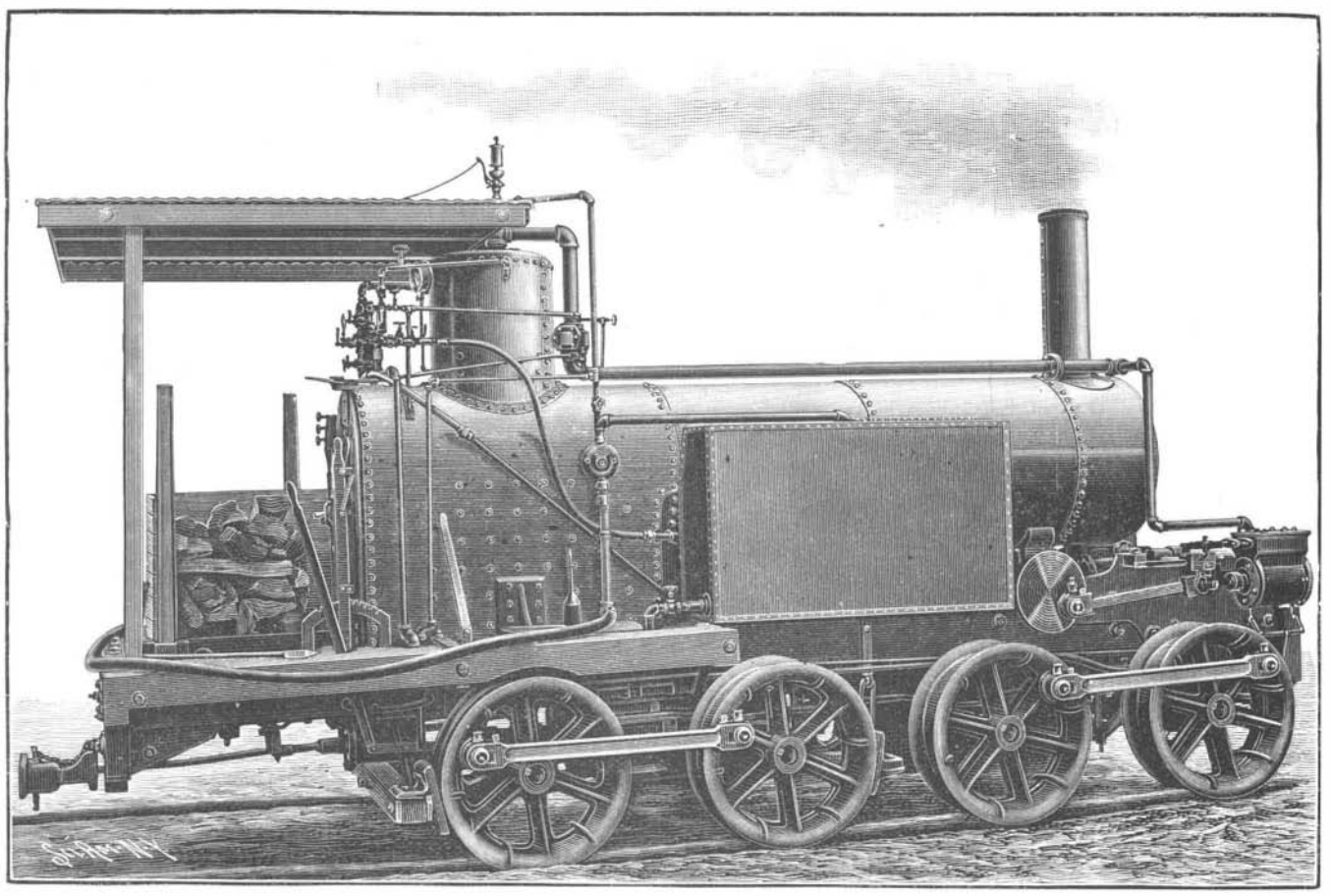
Frame	6 ounces.
Percaline cover with wire edges	4¾ "
Chinese silk cover with wire edges	2½ "
Manila paper cover with wire edges	3½ "

A 6 foot kite with sticks ½ × ⅜ inch will weigh as follows:

Frame	7½ ounces.
Tissue paper cover with cord edges	1¾ "

The manner of flying a kite of this description was shown in the SCIENTIFIC AMERICAN for September 15, 1894. It is possible to send up a number of the kites tandem, as shown in the engraving in that issue.

An American flag is excellent to attach to the kite line in light airs and should be in possession of every kite flier. A flag 5 × 8 feet of tissue paper will weigh 4 ounces. A 6 foot pine spar ⅜ inch in diameter will weigh 1½ ounces. A tissue paper flag 10 × 15 feet weighs 13½ ounces. An 11 foot jointed pine spar ½ inch in diameter and tapered weighs 6 ounces. The flag is maintained in position so that its lower edge is horizontal, the spar being perpendicular to the ground by means of three cords which secure the top, middle and bottom of the staff. These cords are secured to the main line by hard rubber eyelets, the main line passing around them, a piece of thin leather preventing chafing. The guy line passes through the eyelet. The upper guy rope is, therefore, short. The middle one, which may be dispensed with in light winds, is longer, and the bottom guy rope is longest of all. At the star end of the flag a hem is made by gluing thin muslin to it. The light spar is run through this hem and tied at intervals with cord. The flag can, of course, be pasted to the spar, but arranging it so that the spar can be withdrawn is preferable.



LOGGING LOCOMOTIVE FOR WOODEN TRACK.

LOGGING LOCOMOTIVE FOR WOODEN TRACK.

Our publication on August 1 of a cut and description of a logging locomotive, which the designer termed a steam missionary, has brought to our office a photograph of a machine which the builders think is "an improvement on Mr. Stephens' locomotive." It will be seen from the illustration that the locomotive in question is an eight wheeled geared tram engine built especially for logging use. The wheels are 30 inches in diameter, with a double flanged 12 inch face; and they are mounted in sets of four on flexible trucks, so as to allow easy running on very rough roads. All the wheels are used as

drivers. The engines have cylinders 7 inches in diameter by 10 inches stroke, and by means of cut gearing run a countershaft. From this countershaft the front axle of the rear truck is driven by a heavy steel chain; the back axle of the front truck being driven by chains from the back trucks. The sprocket wheels are double flanged, so as to prevent the chain from running off. All the gearing is made of cast steel. Both the front and rear axles of the locomotive, as will be seen from the engraving, are run by means of side connecting rods. The 40 horse power boiler, which is of a special locomotive type, is fed by a small duplex pump. The locomotive is also provided with a steam siphon for drawing water into the tanks. It has been in use for some months on a rough wooden track, hauling from 30,000 to 40,000 feet of logs per day.

The total cost of building the wooden track is from $300 to $400 per mile, according to the class of country on which it runs. Where the ground is rather swampy, it requires several small bridges, but on ordinary level ground the cost does not exceed $300. This machine is so geared as to take ordinary loads at from four to six miles per hour, and if first-class track is furnished, the speed will be considerably greater.

The Curtis Manufacturing Company, of St. Louis, who are the builders, state that this engine, which is run by two men, is doing work which formerly required thirty yoke of oxen and five men.

Mosquitoes and Malaria.

Recent researches show that it is very probable that malaria may be propagated by mosquitoes. Dr. Amigo Bignani brings forward some proofs in support of this theory. His article is translated into English and published in the Lancet, from which we take the following:

"If one admits the inoculation hypothesis, many facts which are difficult to explain by the theory of air conduction would find a simple and satisfactory explanation, and it is easy to demonstrate this. First of all, the fact, which we have already discussed at length, that malaria is not carried by the winds, would be easily understood, knowing as we do how closely these diptera are bound to the soil on which they are hatched, and how adverse they are to allow themselves to be carried away, hiding, when the wind blows, in the ground, among the grass, or under the trees. Also when a sea breeze blows in the afternoon the mosquitoes of the Roman Campagna do not show themselves, and only when the wind has gone down at the setting of the sun do they rise in clouds everywhere and attack animals and men. That the evening and night hours are the most dangerous, on account of the facility with which fever is then taken, would be easily understood by any one who knows the habits of this nocturnal dipter. That malaria only rises to a moderate height would also be equally intelligible, because the inoculating insect always flies near the ground. A satisfactory explanation would also be furnished of the great danger of sleeping in malarial districts, a fact of which the supporters of the air conduction theory have never been able to give more than an artificial explanation. Any one who has experience of malarious districts well knows a number of cases in which the patient attributes the fever that torments him solely to having slept a few hours in a place where several times he had perhaps remained while awake without harm. Three years ago I made with my colleague, Dionisi, various excursions into malarious localities for the purpose of study, and more especially with the object of collecting from the inhabitants the results of their experience—an experience which one finds with difficulty in books. Many precautions which they take against the fever are taken, one would say, to defend them from the sting of insects. They avoid going out at night; they are very careful not to sleep in the open air; they hermetically close the windows—windows with badly fitting shutters, which might impede the ingress of insects, but certainly not of air and of the germs which it might contain. They take great care of their mosquito curtain, making it of very close net, under which they sleep, thoroughly shut in, notwithstanding the great heat.

"It is interesting to remember that Emin Pasha never omitted to take a mosquito net with him on his African journeys, and he attributed to this precaution his not having had fever, the malarial agent in his idea being a corpuscular substance of which he supposed the close net did not permit the passage. Nicolas, in his book on the 'Hygiene of Camps in Marshy Places,' thus expresses himself on this question: 'And the mosquito net, well shut, is indispensable at night. Without attributing to the puncture of mosquitoes any relation whatever with the microbes of the fever, one may be certain that irritation by them produces sleeplessness and predisposes to the fever.' On the estates and farms visited by us in the Campagna, the overseers, who are less frequently attacked by the fever than the workmen, protect themselves with great care from the bites of insects, especially during sleep. On the estate of Porto, near Fiumicino, where a bad type of malaria prevails, and which I visited several times in company with my colleague Dionisi in the height of summer, we obtained the greatest amount of information about the habits of mosquitoes, and the results of the experience of the inhabitants on the way in which the fever is caught. The greater number think that the fever is taken almost always during sleep. A very brief stay sometimes suffices—even one night. But ordinarily, even in districts very subject to malaria, a longer stay is necessary, so that the workmen who go on to the property at the beginning of July for the thrashing commence to get ill as a rule eight or ten days after their arrival. On the other hand, those who go in September for the working of the ground often get ill more quickly—after only two or three days' stay. Many have observed that in autumn, after the rains, the mosquitoes increase and likewise the fevers, and as the season advances they disappear together little by little. Thus, collecting from the inhabitants (who are really much better informed about malaria than some medical men) the results of their experience, the conviction grows upon one that if malaria were inoculated by mosquitoes into man, all the questions which I have put in a preceding paragraph would receive an adequate answer. Malaria behaves itself with regard to man as if the malarial germs were inoculated by mosquitoes."

Exportation of American Machinery.

The machinery export movement in the United States seems to be attaining some prominence. There is no doubt that the American manufacturers of labor-saving machinery and implements are devoting more attention to the possibility of building up and extending an export business with foreign countries than they have done for many years. The time appears to them to be very propitious. The past year or so has seen a large augmentation in the demand from abroad for certain types and classes of machine tools and other manufactured products which have been for some time an American specialty. But the fact must not be left out of mind that the export of such specialties creates a demand in the place of their sale which, in that event, is gradually satisfied on the spot. With a protective barrier hampering her industries, America can never compete on a large scale with the exports of a free trade country.—Industries and Iron.

RECENTLY PATENTED INVENTIONS.

Engineering.

GAS OR OIL ENGINE.—Eugene Fessard, Poissy, France. In this engine the cylinder has a spring-controlled valve periodically actuated by a rod driven from the engine, a click or pawl holding the valve open independently of the movement of the rod, and a governor controlling the position of the pawl according to the speed of the engine. The engine may be worked by petroleum or by gas, in the latter case the breech of the cylinders being provided with chimney and incandescent tubes or an electric arc. The engine is of simple construction, and may be worked in either vertical, horizontal or oblique position, being light and its parts readily accessible, adapting it for a wide variety of uses.

Railway Appliances.

CAR FENDER.—Joseph R. and Joseph A. Jacques, St. Paul, Minn. This fender is made in the form of a segment of a circle, and has a strong frame covered with stretched netting, the side bars of the frame having wheels adapted to travel on the track rails. The curved side bars of the frame have each at the back a hook, adapted to be hooked and secured by set screws in arms adjustably held on a transverse shaft journaled in bearings at the front of the car platform. To this shaft is also secured a rearwardly extending rod bearing a weight to almost counterbalance the weight of the fender, and insure an easy running of its wheels on the track rails. Extending upward from this rod is a bar carrying a foot piece, by pressing on which the motorman may swing up the front end of the fender to a limited extent, to move its wheels from the track rails, as may be desired at crossings, etc.

CAR COUPLING.—David M. Lipps, Harrodsburg, Ky. A coupling of the hook and catch type is provided by this inventor, adapted to couple automatically with an approaching car equipped with a like coupling, and of such construction that cars thus coupled may be readily uncoupled by a trainman from the roof or the side of the car. The drawhead has a chamber in whose lower wall is an apertured incline, in which rocks a shaft carrying two tripping dogs, there being at the side a detent spring adapted to contact with a block on the shaft and hold it to elevate a hook bar pivoted in the drawhead until a hook bar on another coupling enters the drawhead. The device may also be coupled by the ordinary pin and link.

SWITCH.—Edward Q. Norton, Daphne, Ala. An easily operated apparatus is provided by this invention whereby a train on the main line may positively operate the switch points to insure an open main line, whether the train be moving in one direction or the other. An operating rod or bar extending alongside the switch point, and movable toward and from it, has a portion to engage the switch and a portion for engagement by the flange of a locomotive drive wheel or a projecting tripping rod, the operating rod having a spiral surface whereby it is turned gradually and easily, avoiding jars or shocks.

Electrical.

TROLLEY.—Wilbur L. Pepper, Philadelphia, Pa. A twin or dual pole is provided by this invention, to more efficiently support a trolley wheel, which may be made longer than those in common use. The two parts of the pole are made in pivoted sections, the upper sections being pivoted to the trolley wheel by means of yokes and trunnions, and the lower sections pivotally attached to a support on the car, and also connected by a link with a spring-controlled lever, adapted to hold up the sections and press the wheel against the trolley wire. A cord extends from near the upper end of one of the lower sections, to be within convenient reach of the motorman.

Mechanical.

PAPER PULP STRAINER.—John W. Smith, Sandy Hill, N. Y. To strain or screen the pulp, according to this improvement, two independent screening sections are provided, one of which may be placed out of action without affecting the operation of the other. Two screen boxes are provided, with screen plates and diaphragms, and arranged end to end, each being composed of two sections and having the adjacent ends of their lower sections formed by removable cross bars, each box having means for closing the end of its upper section adjacent to the other box, whereby when one box is open the other may be in operation.

LATH FEEDER FOR PAPER DRIERS.—William H. Waldron, New Brunswick, N. J. This is an improvement on a formerly patented invention of the same inventor, the feeder being arranged to insure a positive delivery of a single lath at a time from the feed chute to the carrier chains. Combined with the delivery chute is an oscillating carrier chain adapted to receive the lath, a segmental carrier being mounted to oscillate and formed with a radial slot or notch, to hold the lath normally in place in the delivery chute. The carrier has lath-receiving slots equal in size to the chute outlet, and movable to and from the latter as the carrier is moved on its axis.

CRUSHING APPARATUS.—Ignacio M. de Oca y Melian, New York City. To crush ores and pound similar material, according to this improvement, a cam-carrying shaft is mounted in a frame, the cams engaging levers fulcrumed on the frame and connected with two vertically movable stamps, each of which carries a mortar. A cord connected with each lever is adapted to hold it out of engagement with the cam, to suspend the operation of either stamp as may be desired.

Agricultural.

REAPER AND MOWER CUTTER BAR.—Moses Jarvis, Leota, Miss. According to this improvement, the knives may be conveniently and quickly taken from or replaced in the cutter bar without removing the latter from the machine, and each knife is provided with independent locking devices. The cutter bar has knife seats with undercut end walls, beyond which extend buttons pivoted on the cutter bar, the knives having shanks shaped to enter the seats, and the shanks having recesses to receive the ends of the buttons extending within the seats, the buttons thus forming latches to lock the knives upon the bar.

Miscellaneous.

PHOTOGRAPHIC SHUTTER.—Daniel P. O'Leary and Samuel B. Kull, New York City. Two shutter plates or slides, according to this invention, are arranged to secure the lens, and have apertures normally out of coincidence, one of the plates being adapted for movement independent of the other to bring the apertures in line for the passage of light through the lens. A catch holds the other plate or slide with its aperture in line with the lens, and there are means to disengage the catch by the return movement of the first plate, so that the plate held is released.

MUSIC LEAF TURNER.—Thomas A. Farrell, Chicago, Ill. This is a simple and inexpensive device, the body of which comprises a rack adapted to rest on a music stand, or the rack ordinarily used on pianos and similar instruments, there being journaled in the rack a turning shaft to which is pivoted an angular turning arm and there being also a spring-controlled holding arm having rocking movement on the rack and connected with the turning shaft. With this improvement the leaves may be turned with great facility and without danger of tearing.

LOCK.—Patrick J. Leonard and William Head, New York City. A lock especially adapted for use on milk cans has been devised by these inventors, the lock comprising two parts, one adapted to be inserted in the other and provided with tongues. A bolt having a conical thread screws in the inner part of the lock and expands the tongues against the inside of the outer part of the lock to hold the parts against separation. The can has an outwardly extended lip on the neck of the body portion, a tubular lock section being expanded in an opening in the neck and a hollow section attached to the cover being adapted to enter the tubular section. The lock may also be advantageously employed for various other purposes.

SKIRT SUPPORTER.—George Kierski, New York City. To support a comparatively heavy skirt without attaching it to the waist band, this inventor has designed a supporter consisting of a single strip of resilient metal bent to form two clasp and side members, one of the members having an opening at its free end, while the other member may be pressed apart by the thumb and finger and made to readily engage a portion of the dress material, the body of the device being adapted to readily slide along a belt, by which the device and skirt are held up.

CURTAIN SUPPORT.—De Kalb Turbeville, Roanoke, Ala. A one piece bracket, which may be readily put up and taken down, according to this invention, has end arms for the shade roller and seats for the curtain pole, the cornice having catches engaging on the arms. The construction permits the convenient removal and ready replacing of the curtain and pole, and in case the shades are too wide for the windows, the bracket may be conveniently put up to project beyond the casing.

ARTIFICIAL LIMB.—John Nevquist, Coburn, Pa. This invention relates particularly to artificial limbs for amputations below the knee, and provides for connecting the leg irons with the foot by a peculiar joint, the ankle portions being formed of a metal cylinder riveted to the leg irons, a wooden filling being secured in the cylinder, and elastic blocks socketed in the filling and the foot on front and rear sides of the joint.

THERMOCAUTER.—Friedrich Drumm, New York City. According to this improvement, gas from the generator is utilized for externally heating the cauterizing tool when starting the apparatus and for supplying the internal burner of the tool with the gas necessary to keep it at the desired temperature during the operation. An attenuated tube forms the terminal of the supply pipe and extends into the hollow of the point, a return pipe provided with perforations and connected with the hollow of the point surrounding the supply pipe, while a casing secured to the burner has a rear open end. An auxiliary burner for heating the point is arranged to be swung into and out of operative position.

DENTAL TOOL.—Flavel A. Rudolph, Carmi, Ill. This is a tool more especially designed for use in a dental lathe, to dress down rubber or metal plates, the invention covering a particular construction of expansible rubber head and details of the expanding mechanism. On a shaft is held a clamp of two sections which may be moved relatively to each other, there being held between the sections a head of rubber or other expansible material, and the head having a concave periphery which becomes cylindrical when the head is expanded. During the expansion of the rubber head its marginal portion is also forced around the edges of the clamp sections.

SPECTACLE CASE.—James H. Caruss, Stamford, Conn. In this case keepers or guards are made to project inward from opposite sides, to extend over the spectacle frame and to hold the spectacles in position in the body of the case, permitting of opening and closing the hinged cover without interfering with any part of the spectacle frame. The keepers hold the spectacles without injuring or bending the frame, and there is no danger of their dropping out accidentally when the case is opened.

CLARIFYING SACCHARINE SOLUTIONS.—Leon F. Haubtman, New Orleans, La. This inventor has heretofore obtained several patents on evaporating apparatus, of which this forms in a measure a continuation, the invention affording means by which saccharine solutions may be rapidly clarified without contact with atmospheric air. A series of connected heating vessels is employed through which the solution to be clarified is forced in one direction while the heating medium, as steam, is forced into the vessels in the opposite direction, there being also vessels in which the temperature of the hot solutions is reduced by a cold solution flowing through the vessels in its course to the clarifying vessels.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co. for 10 cents each. Please send name of the patentee, title of invention, and date of this paper.