

EXPANSION-JOINT.—R. E. VAIL, Mount Vernon, Ohio. Mr. Vail's invention refers to pipe-lines; and his object is the provision of an improved expansion-joint arranged to allow free expansion and contraction of the pipe-line without danger of leakage and to allow of readily coupling the adjacent ends of a broken line together.

GARDEN IMPLEMENT.—R. TWOHIG, Sallina, Kan. In this patent the invention has particular application to means for securing pitchforks, hoes, rakes, and similar tools to their handles. The particular object is to provide means for securing the tools to the handle in such manner that there will be no possibility of the parts separating accidentally, thereby obviating the loss of time and liability to injury.

POCKET-BALL-BEARING DOOR AND HANGER THEREFOR.—J. K. THOMA, Cooperstown, N. Y. The purpose here is particularly to provide a top and bottom ball-bearing for sliding cases doors and a ball-bearing for the upper portion of hanging doors, such as barn or car doors, and to so confine the balls that their travel on the door will be limited, while their traveling engagement with either the overhead or the lower track will be unobstructed.

ORGAN-PEDAL.—E. M. HUGHES, Ashland, Ky. Definitely stated, this invention relates to pedal-keys for pipe-organs. The object is to provide a pedal or key which will work permanently and absolutely without noise. The pedal-keys for organs and other instruments work free from friction and obviate noise and lost motion common with similar pedals.

WHISK-BROOM.—H. L. HARRIS, New York, N. Y. The invention is an improvement to brooms, being in the nature of a rubbing attachment for use in removing spots and the like from garments. On the handle of the broom a pad of absorbent material is secured. The pad includes a core and wrapper, both made of felt, cloth, canvas, or like suitable fabric. In use the pad may be saturated with benzine or other cleaning materials. By combining the pad with the broom a convenient form of handle for the broom is provided.

UMBRELLA.—O. L. FOGLE, Columbus, Ohio. The object in this case is to furnish details of construction for the frame and stick, convenient to manipulate for folding or expansion of the umbrella, adapt the frame and stick for cheap manufacture, and enable the close folding of parts of the frame, so as to reduce the same, forming a short, compact package, which will be readily packed in a trunk, valise, or other receptacle.

AWNING-HOOK.—D. W. CARR, New York, N. Y. The invention relates to hooks especially designed for attachment to awnings, whereby to hang the awning and permit it to be taken down in a more convenient and expeditious manner than ordinarily and at the same time when attached to a support to insure its remaining so under ordinary conditions of weather until purposely released, the hooks, however, being also adapted for hanging curtains and garments on fixed hooks, eyes, rods, or bars.

PARCEL-FASTENER.—B. COHN, New York, N. Y. In this instance the object is to provide a new and improved parcel-fastener arranged to securely tie the wrapper of a box or like receptacle in position without the use of strings and the like and to give the parcel a fine and neat appearance. The device can be easily applied and cheaply manufactured.

HOLDER FOR MINERS' LAMP.—J. A. BROWN, Pocahontas, Va. In this patent the invention has for its object the provision of novel, simple, and reliable means for detachably securing a miner's lamp upon the cap worn by the miner, so that the lamp will remain in place until designedly removed, in spite of any accidental displacement therefrom.

COMBINED BODY-BRACE AND TRUSS.—S. R. SHEPARD, Louisville, Ky. One of the principal objects of the invention is to provide means adapted to be readily applied to the body for strengthening and supporting the back and spine and also the chest and shoulders, as well as to provide means whereby the abdominal region may be held in position with comfort and ease. The device is simple, and not likely to get out of order. It will not interfere with the free action of joints, muscles, or any other part of the body, and overcomes all tendencies toward abnormal stooping or bending.

PROCESS OF HARVESTING AND CURING TOBACCO.—J. B. UNDERWOOD, Fayetteville, N. C. This invention has for its object a quick method of curing and preparing tobacco for manufacturing and of improving the color and stem of the leaf. It is put in operation by the use of a V-shaped knife attached to a pistol-grip handle. The blade severs the leaf portion from the stem, leaving it attached to the stalk while the leaf is cured or dried out and freed from the stem at a much lower temperature and in shorter time, with more perfect color and without danger of sap coloring after curing. Expensive stemming is done away with and the taste and value of the product improved.

FOLDABLE PAPER BOX.—M. HIRSCH, Newark, N. J. The present invention relates to improvements in paper boxes; and the object of the inventor is to provide an improved box, the blank of which is cut from a single piece of paper stock and is adapted for assemblage into a complete article without the use of mucklagnous material.

COMBINED BUTTON AND TIE-HOLDER.—E. STEMPPEL, Buffalo, N. Y. The object of this invention, relating to garment fasteners, is to provide an improved combination button and tie-holder arranged to securely hold a scarf, necktie, or other similar neckwear in place to prevent sidewise movement or creeping of the neckwear and to give a dressy appearance to the wearer.

Designs.

DESIGN FOR A GLOVE.—F. SCHMIDT, New York, N. Y. The ornamental design in this glove consists of two bands of herring-bone of triple stitching on the back of the glove not quite parallel and coming together to a V-shaped point at the bottom. Between the two outer bands, equidistant a middle band is stitched. It makes no connection with the other bands. The design is open at the top.

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

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READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**
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Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

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American inventions negotiated in Europe, Felix Hamburger, Equitable Building, Berlin, Germany.

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Inquiry No. 4976. For manufacturers of machines for punching teeth in hacksaws.

Edmonds-Metzel Mfg. Co., Chicago. Contract manufacturers of hardware specialties, dies, stampings, etc.

Inquiry No. 4977. For a machine for extracting fiber from sisal or hennequen plants.

Machinery designed and constructed. Gear cutting. The Garvin Machine Co., 149 Varick, cor. Spring Sts., N. Y.

Inquiry No. 4978. For makers of castings for a 4-cycle engine.

Small parts of machinery made accurately and promptly. Send sketch or sample. Albert Carlton, Camden, Mich.

Inquiry No. 4979. For the makers of the "Swartz" burner, or one to give a high candle power in a small space.

PATENT FOR SALE.—Recently patented antivibration bicycle handle bar. Novel, simple, cheap. J. H. Dunsford, Winnipeg, Man.

Inquiry No. 4980. For machinery for extracting fiber from maguey plants.

Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway New York. Free on application

Inquiry No. 4981. For machinery for making oil of peppermint.

We manufacture anything in metal. Patented articles, metal stamping, dies, screw mach. work, etc., Metal Novelty Works, 43 Canal Street, Chicago.

Inquiry No. 4982. For a successful stump puller.

The largest manufacturer in the world of merry-go-rounds, shooting galleries and hand organs. For prices and terms write to C. W. Parker, Abilene, Kan.

Inquiry No. 4983. For the makers of the "Star" paper weight.

Empire Brass Works, 106 E. 103rd Street, New York, N. Y., have exceptional facilities for manufacturing any article requiring machine shop and plating room.

Inquiry No. 4984. For hard rubber, glass or porcelain bars for battery use; to be rectangular in shape of special dimensions.

The celebrated "Hornsey-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Refrigerating Machine Company, Foot of East 138th Street, New York.

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Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 4986. For makers of machines for making pressed, blown and plate glass.

Wanted—Revolutionary Documents, Autograph Letters, Journals, Prints, Washington Portraits, Early American Illustrated Magazines, Early Patents signed by Presidents of the United States. Valentine's Manuals of the early 40's. Correspondence solicited. Address C. A. M., Box 75, New York.

Inquiry No. 4987. For a machine for grinding pea flour and a soap mold or presser.

Inquiry No. 4988. For makers of paper board 4 feet wide and from 8 to 14 feet long.

Inquiry No. 4989. For firms handling the button and shell mountings.

Inquiry No. 4990. For machinery for making celluloid or horn combs.

Inquiry No. 4991. For a pneumatic saw lately invented in the Northwest, wanted, address of patentee or manufacturer.

Inquiry No. 4992. For makers of entire machinery used in making sulphur matches, including splitting and preparing of stock.



HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(9271) W. C. R. asks: Will you please tell me in your query column whether the following problem can be solved by plane geometry, and if so, how? Through the middle point (O, Fig. 2) of a chord draw two chords AD and BC. Connect AC and BD. Prove OR = OS. A. The problem may be solved as follows:

In Fig. 1, A D and B C any two chords cutting in O. M N any secant cutting A C in R, B C in P, A D in Q, and B D in S. $\angle C = \angle D$. $\triangle C R G$ similar $\triangle S H D$, $\triangle R G P$ similar $\triangle O P L$, $\triangle Q H S$ similar $\triangle O L Q$.

$$\frac{CR}{Z} = \frac{SD}{X} \quad \frac{RP}{Z} = \frac{OP}{Y} \quad \frac{QS}{X} = \frac{QO}{Y}$$

Eliminate X, Y, Z from these equations:
 $CR \cdot QS \cdot OP = SD \cdot QO \cdot RP$

Similarly, $RQ \cdot SB \cdot OP = AR \cdot PS \cdot OQ$

$$\text{Divide } CR \cdot AR \cdot RQ \cdot RP \\ SD \cdot SB = PS \cdot SQ$$

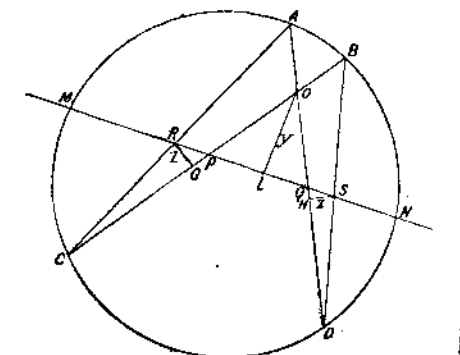


Fig. 1.

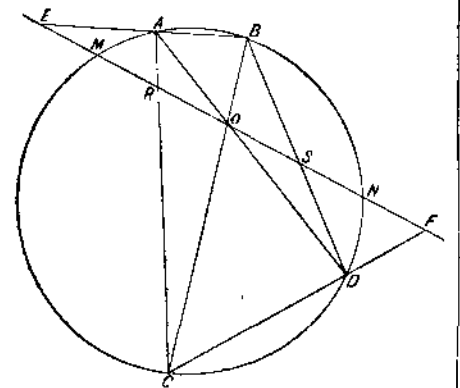


Fig. 2.

$CR \cdot AR = MR \cdot RN$ products of segments of CD . $SB = MS \cdot SN$ chords of a circle. Substitute:

$$a) \frac{MR \cdot RN}{MS \cdot SN} = \frac{RP \cdot RQ}{PS \cdot SQ}$$

Fig. 2 is a special case of Fig. 1. MN is bisected by O. P and Q vanish in O. $RP = RQ = RO$, $SP = SQ = SO$, $MO = NO$, to prove $RO = OS$.

Equation a) becomes

$$\frac{MR \cdot RN}{MS \cdot SN} = \frac{RO^2}{SO^2} = \frac{(MO - RO)(NO + RO)}{(MO + SO)(NO - SO)}$$

$$\frac{(MO - RO)(MO + RO)}{(MO + SO)(MO - SO)} = \frac{(MO^2 - RO^2)(MO^2 - SO^2)}{(MO^2 - RO^2)(MO^2 - SO^2)}$$

$$\frac{RO^2}{SO^2} = \frac{MO^2}{SO^2}$$

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half-tones, etc., may be treated and projected on the screen? That is, make a paper sufficiently transparent for projection purposes. Where can I purchase an attachment to throw soap-bubble films, etc., on the screen? I wish to project the vibrations of the human voice. A traveling lecturer partly told me of an experiment to show what he called the formation of the clouds and cyclones, etc. As near as he could remember they used sulphuric acid, and potassium bichromate, iron filings, and two other things that he could not remember. From this indefinite statement can you suggest the nature of this experiment or refer me to some work where I can find it described? As near as I could gather from his description it was to be projected with a stereopticon. A. The best and cheapest way to get a microscopic and vertical attachment for a stereopticon is to have the people who made the stereopticon furnish you with it. Makers usually have a complete outfit for their instruments. To get one made at a distance would result in a misfit, to a certainty. Failing in getting one from the makers you can have the attachments made by a machinist in your neighborhood, and fitted to the instrument. You can obtain good cuts of these instruments from the books on projection: Wright's "Light," price \$2.00; Wright's "Optical Projection," price \$2.25; Dolbear's "Art of Projection," price \$2.00; Mayer's "Light," price \$1.50. All these are excellent and you can profitably get them all. They contain nearly all that one requires to learn to do good work with the lantern and descriptions of all the best experiments. These, with G. M. Hopkins's work, will equip you for service. Many optical illusions are described in "Experimental Science," which you have. "Magic," by A. A. Hopkins, contains many tricks which are of the nature of optical illusions; price \$2.50. No opaque attachment for the lantern is on the market so far as we know. Any mechanic can make one from the description in Dolbear's "Art of Projection," or from Hopkins's "Experimental Science," Vol. II, page 249; it presents no difficulty. Kodak films are not adapted for optical projection. A positive on glass should be made. For this, full directions are given in Hopkins's "Experimental Science," Vol. I, page 319. Special lantern slide plates can be bought for making them. Pictures from books cannot be made transparent enough to project in a lantern. They should be copied by photography, first making a negative and then a positive on glass as with any other subject. The method of projecting soap films is shown by a cut in Wright's "Optical Projection," page 326. The only apparatus required is a ring of wire 2 to 4 inches in diameter and a soap-bubble mixture which is described in all the books we have mentioned. The method of projecting clouds on the screen by chemical action is given in Dolbear's "Art of Projection." It is done by unequal chemical action forming absorbent layers in the cell.

(9273) J. P. R. says: In order to settle an argument would you please answer the following question in your "Notes and Queries" column: Is it safe to burn coke under a boiler, particularly an upright? A. Where the grates are properly arranged, coke makes the most admirable boiler fuel.

(9274) E. S. P. says: Please reply in "Notes and Queries": 1. Is the Texas boll weevil a flying beetle at any stage of its development? A. The cotton-boll weevil exists in four stages, namely, egg, larva, pupa, and adult. In the adult stage the insect has wings and is capable of flying to some extent. 2. If not, why cannot it be reduced by substituting upon infested fields other crops than cotton, thus depriving it of food and breeding place, or by letting the ground lie fallow? A. In view of the fact noted above that the weevil can fly, it is impossible to eradicate it by allowing land to lie fallow. Nevertheless, the powers of flight of the insect are so limited that many Texas cotton planters find it of great advantage to rotate their cotton with other crops. 3. If it is winged, why has it not been spread by winds, etc., more rapidly? Does it go from field to field? A. As a matter of fact, the weevil is spread to a considerable extent by the wind. The new territory invaded each year, under normal conditions, is about sixty miles. There is no doubt, however, that exceptional conditions, like the storms preceding the Galveston cyclone of September 8, 1900, have caused a great deal more than this normal spread. 4. If it simply crawls, does it gain access to the boll from the ground by climbing the stalk, and can it pass from one plant to another on their branches? A. The insect reaches the fruit of the plant, either boll or square, almost altogether by flying from one plant to another. 5. Will it attack in preference plants at some certain stage of growth, thus avoiding adjacent plants, either older or younger in growth? A. As during the growing season the cotton plant has all stages of the fruit upon it, it cannot be said that the weevil has any preference as far as the stages of the growth of the plant are concerned. 6. At what stage of growth is the plant most attractive? A. This question is partially answered under No. 5. There is no preference of the weevil for any particular stage of the plant, but there is a preference for the stage of development of the fruit. They prefer the forms or squares (immature bolls), and will always work upon them to the exclusion of the bolls as long as the supply is sufficient.—F. H. Chittenden, Acting Entomologist, U. S. Department of Agriculture, Washington, D. C.