out of the vehicle. The check strap is extended beneath a gripping cam on the saddle and is made to act on a rearwardly projecting arm to release the cam by being lifted or moved upwardly. To check up the horse again it is only necessary to pull back on the strap.

KNEE PROTECTOR.-Thomas B. Walker, Honolulu, Hawaii. For the use of cavalrymen and others to protect the rider against rain, snow, etc. this inventor has devised a new article of manufacture to be made of leather, rubber or waterproof cloth. It com prises both a knee and thigh protector, arranged for ready connection with each other and with the trousers legs o boots or leggins. The knee protector is of somewhat tri angular shape, with side flaps at the lower corners and rounded at the top to conform to and bend over the knee

STRING FASTENER.-Charles C. Pine. New York City. For fastening shoes, corsets and othe articles to be laced, this inventor provides a device for holding the string end without tying the string or using springs, jaws, etc., the fastener being more especially de signed for use with flat strings. A body piece adapted to be fastened to the shoe or corset has a narrow slit fo the passage of the string, the slot being arranged in alignment with the back pull of the string, and the latter passes over the body piece and twists on entering the slot. Only the string end has to be passed through the slot to fasten the string in place.

PAPER DOLL. - Edward T. Gibson, Minneapolis, Minn. This invention relates to dolls in which changes of costume can be made by the adjust ment of paper garments, the doll being destitute of arms and shoulders, and preferably destitute of head and neck By means of a locking key the assembled parts of the doll are so firmly held together that the doll may be tossed about without disarranging the parts, and an ex tension of the key serves to support the doll in nearly upright position.

GAME APPARATUS. - Joseph Jessup, Woodbury, N. J. A game to be played in simulation of the game of football is provided by this patent, a folda ble board being used, marked off as a football field while a movable block has the position of the opposing teams indicated thereon, a series of dies indicating the different players, character of play and distances on the field. It is designed that those who have played this game will better appreciate all the points of a good game on the field.

DESIGN FOR WRENCH HEAD.-Walter T. Johnston, Macon, Ga. This head has a rounding and transversely serrated top surface, one projecting end presenting a bifurcation and the opposite projecting end being concaved at the under side.

NOTE .- Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

# SCIENTIFIC AMERICAN BUILDING EDITION

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- 8. A residence in the Colonial style, recently erected at Chester Hill, Mt.Vernon, N. Y. Three perspective elevations and floor plans. A picturesque design. Lewis H. Lucas, architect, New York City.
- 9. Ground plan and perspective view of Holy Trinity

## Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion : about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue

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Minerals sent for examination should be distinctly marked or labeled.

(6598) T. D. B. asks: 1. Will you please tell me the name of inclosed leaves and greatly oblige several parties ? A. Charles W. Dabney, Jr., of the Department of Agriculture, informs ns that the leaf which you inclose is that of the common poison ivy, Rhus radicans. 2. Please give formula and an example of increase of candle power due to increase of amperes in an incandescent lamp. A. An increase in the amperes will in crease the light of an incandescent lamp because both heat and light are determined by the power used by the lamp. Electrical power is measured in watts, which are calculated by multiplying the amperes by the volts. W = CE. (1) A 16 candle power lamp should use about 60 watts, when the pressure is 115 volts. From formula (1) we

obtain (2)  $C = \frac{W}{E}$  hence  $C = \frac{60}{115} = 0.52$  ampere. If in

formula (1) C is made larger, the product CE becomes larger; that is, more power in watts is used and more light is given. This answers the question as asked, but the result cannot be gained in this way. With a given lamp and generator capable of lighting it, no variation

Е in the amperes can be made. Ohm's law is C= R volta

amperes = Dynamos for incandescent lighting ohms

sually have a constant voltage, and the resistance of the lamp may be said to be constant. The voltage of the dynamo only varies as its speed may change, and the resistance of the lamp only changes by decreasing as the filament grows hotter, or increasing as the lamp wears out; so that there is ordinarily a uniform amperage pass ing in a lamp. To increase the light given by an

Gardeners' Chronicle, recommends, as an improvement in the method of using sulphurous acid for preserving the color, that in the case of delicate flowers they might be placed loosely between sheets of vegetable parchment before immersion in the liquid, so as to preserve their natural form.

(6600) J. D. writes: I am figuring on a refrigerating plant, to be operated by the use of com-pressed air, and would beglad if you will state how many cubic feet of alr, atmospheric pressure, at a temperature of 20°, would be required to cool say one galion of water to a temperature of 34°. the water being in a coil of pipe placed in a receiver into which the compressed air is expanded to 1/2 pound above atmospheric pressure. Please advise how many units of heat are contained in one gal lon of water at 70°, also at 34°: also how many units of heat in one cubic foot atmospheric air at 90° and at 20°. A. The difference of 70°-34°=36°×83 pounds of water per gallon equals 300 heat units. The specific heat of air for equal weights with water 18 but 0.237, and as 13 cubic feet of air at 60° equals one pound, then 90°-20° 709 -=5.39×0.237=1.277 heat units per cubic foot from

13c' 90° to 20°. As the mean difference of the water above

320 the air temperatures at its lowest point is 32°, then  $2.46 \times 0.237 = 0.583$  heat unit for each cubic foot of air ex-

pended in cooling, and as 300 heat units are required, 300 =514 cubic feet of free air at 20° to cool one then

0.583 gallon of water from 70° to 34°. See SCIENTIFIC AMERI

CAN SUPPLEMENT, No. 999, on "Cooling by Compressed Air."

č (6601) P. B. V. says: Please give me through Notes and Queries a formula for a black hair Ca dye. A. 1. Black:

Sulphate of iron	
Glycerine	1 oz.
Water	1 nt.

The hair must be thoroughly washed with this, dried and brushed once daily for three days; then the following should be applied on a small tooth comb, but it should not be allowed to touch the skin if the other preparation has done so, as a temporary stain would result. Or 2.

Gallic acid4	grn.
Tannic acid4	44
Water1	2 OZ.

After the first application of formula 1. the bair should be allowed to dry and then be brushed. Subsequently, both formulæ may be used once daily at an interval of an hour or so, until a black color is produced. All preparations of lead and mercury are injurious if used for any length of time: they may, however, be legitimately used where some small portion of hair has from personal idiosyncrasy, lost its color, whch cannot be re-

(6602) F. and M. say: Have you receipt for working over and restoring rancid butter to fresh, sweet flavor ? A. To Convert Rancid Butter .- 1. 100 pounds o butter is mixed with about 90 gallons of hot water, containing 1/2 pound of bicarbonate of soda and 15 pounds of fine granular animal charcoal free from dust, and the mixture is churned together for half an hour or so. The butter is then separated; after standing, warmed aud strained through a linen cloth, then resalted, colored and worked up with one-half its weight of fresh butter. 2. To Sweeten Rancid Butter .- Rancid butter may be restored, or at all events greatly improved, by melting it with some freshly burnt and coarsely powdered animal charcoal (which has been thoroughly freed from dust by sifting) in a water bath, and then straining it through clean flannel. A better and less tronblesome method is to well wash the butter with some good new milk, and next with cold spring water. Butyric acid, on the presence of which rancidity depends, is freely soluble in fresh milk.

#### TO INVENTORS,

IU INVENTURS. An experience of nearly fifty years, and the preparation of more than one bundred thousand applications for pa-tenus at home and abroad, enable us to understand the laws and practice on both continents, and to possess un-equaled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our ex-tensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broad-way, New York.

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