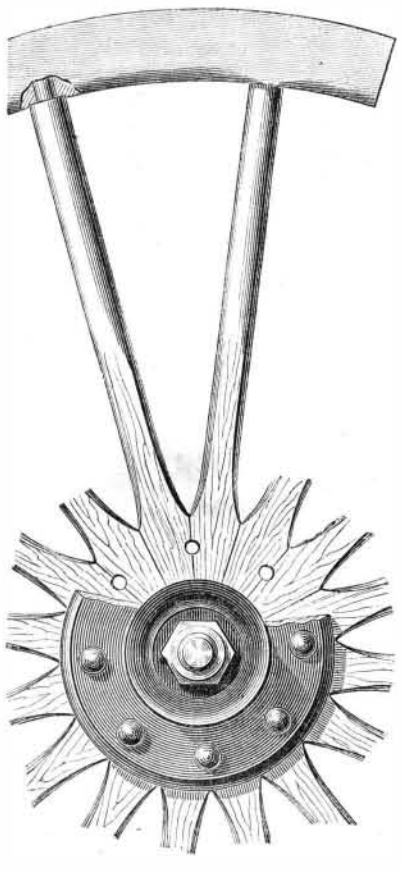
## SPRING STEPS FOR STAIRWAYS.

This device is the invention of N. Adkins, of Danbury Conn. It is designed to lessen the fatigue of ascending and descending stairways. It consists of hinged steps, having coiled or rubber springs placed on the under side of the front edge, or tension springs attached to the front corners of the

steps, and extending back to the next step, both methods of attachment being shown in the annexed engraving.

## ARCHIBALD'S IMPROVED SPOKED WHEEL.

Our readers will remember an illustration and description of a novel and, in some respects, unique machine for putting together spoked wheels, published on page 151, Vol. XXII. of this journal. The accompanying engraving illustrates the wheels made by the same inventor and manufacturer, for which, we think, he justly claims superiority in design, strength, and facility in manufacture. The spokes and rim are made of the best quality of hickory, and are forced together by the powerful compressing apparatus above alluded to, so firmly that subsequent shrinkage cannot loosen any of the parts. The spokes have their ends, which enter between the flanges of the hub, made in the form of truncated wedges, and each of them has formed in it a semicircular cutting, which, when the spokes are placed together in the wheel, as shown, form a bolt hole to receive one of the bolts which pass through the flanged plates of the hub. They thus act as an arch of solid wood, so firmly clamped together as to give great strength at the part of the wheel receiving the



greatest lateral strain; and the wood being left uncut at the perimeter of the flanges, has a larger sectional area than is found in many other forms of spoked wheels.

In all good wheels the axle boxes should be true with, and so firmly secured to, the hub, as to obviate all danger of displacement. The spokes should be so firm in the hub that neither wear, weight, nor draft will cause them to work toward the center and loosen the tire, and so that the absorption of moisture shall not dish or cramp them. The spokes should be of the greatest size possible, consistent with comely appearance at their juncture with the hub. The spokes should be as many as can be inserted, consistently with the fulfilment of other essentials, to give proper support to the rim, and to permit the fellies to be made as short as possible in order to avoid cross-grained work at their ends or "chins." The spokes should be made to fit the felloes in the most perfect manner, without checking or splitting, which cannot be done as perfectly by driving on the felloes, as by compression. Each joint of the wheel should be brought together with such force that no subsequent pressure can force it further, and so that the wheel acts as one homogeneous whole, all strains being distributed to all parts of the wheel, rather than concentrated upon single parts, as is the case when everything is not held firmly in its place.

These requisites are undoubtedly secured in the wheel under consideration, which has been used in the most trying climates, and under the most trying circumstances, and has shown itself capable of great endurance.

Address, for further information, E. A. Archibald, Methuen, Mass. [See advertisement on another page.]

## A Novel Water-Pipe Protector.

The unwelcome visit of the plumber to stop the too liberal water supply in our houses has been an incident of unpleasantly frequent occurrence during the late severe frosts. The *Building News* describes an arrangement in England for the prevention of this domestic nuisance. Certain valves and cocks are connected with the pipes, which, that they may be *self-acting*, are weighted in such a manner that when left to themselves and unsupported, they immediately shut off the supply of water and empty the pipes. They are prevented from doing this in ordinary weather by being suspended from a small tube of glass containing water, and specially manufactured for the purpose. As soon as a sharp frost occurs it attacks the glass tube, the water within which, quickly becoming frozen, expands and bursts the tube. The weighted valves and cocks, thus losing their support, immediately fall, shut off the water supply, and empty the pipes. The frost thus becomes the active protecting power of the pipes, instead of, as heretofore, being the cause of injury to them. The apparatus cannot fail, it allows water to be easily obtained from the pipes during the continuance of the frost; and when the thaw comes, the trifling cost of the renewal of the glass tube again effectually guards against the enemy.

## IMPROVEMENT IN ENVELOPES.

The annexed engravings represent an improved envelope for which the designer has just obtained a patent. It is well known that, as the ordinary letter envelope is made, it is impossible to open it instantly and neatly, without the aid of a knife or other implement; and frequently the envelope is torn to pieces and its inclosure mutilated before the missive can be extracted. The "Improved Envelope" is intended to overcome this difficulty.

*Fig. 1*

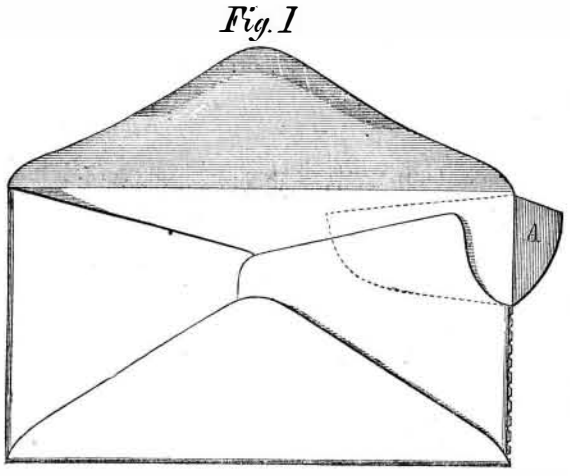
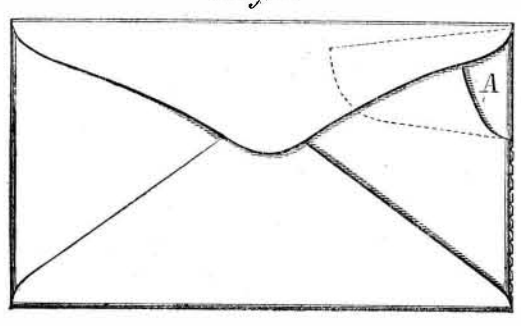



*Fig. 2*




When the envelope is sealed the lapel, A (shown in perspective, Fig. 1, its true form and position when closed being shown in dotted outline, Fig. 2), is inside; and when thus closed, the missive is as effectually shut out from view and reach as in the ordinary envelope, the double thickness of A rendering it impossible to withdraw it. The thumb or finger is inserted at A, thrust quickly down the perforated side (shown in the engraving), and the missive is withdrawn without disfiguring the envelope, which can be used as a wrapper in which to preserve the letter.

The envelope was patented, through the Scientific American Patent Agency, March 14, 1871, by Edward S. Ellis, Trenton, N. J., to whom all communications regarding it may be addressed.

BORAX.—Every day brings us accounts of new discoveries of minerals in the West, the last of which is an enormous deposit of borax in Nevada Territory. The great increase in the use of this invaluable product gives value to the discovery, for the amount of the mineral is such that a very small portion of it would be sufficient for the assayers and druggists, to whom chiefly its consumption was lately limited. Our report says that it is found, over a district of 150 square miles, in large quantities to the acre. A New York firm has made arrangements for working it, having sent some agents out to provide the necessary appliances; and we hear that an English expedition is coming out in the spring of this year for similar purposes.

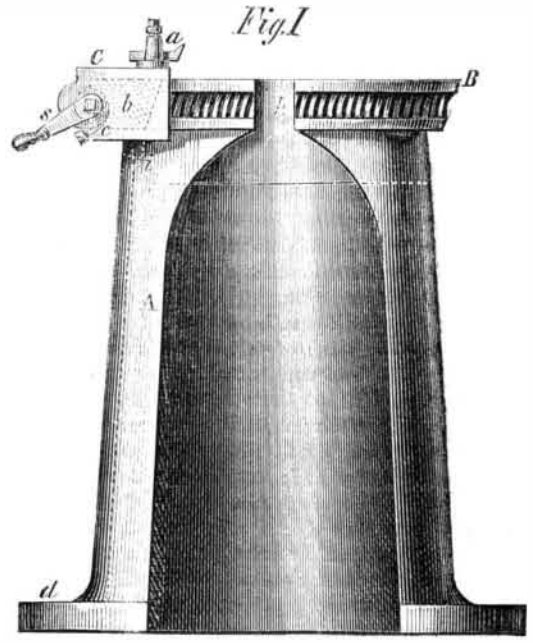
# Correspondence.

*The Editors are not responsible for the opinions expressed by their Correspondents.*

## Turning Plunger for Cylindrical Ring.

MESSRS. EDITORS:—I herewith enclose drawings of a tool, to turn a plunger to fit a segment of a cylindrical ring. In Fig. 1, *A* is a cylindrical or hollow tool post, made of wrought

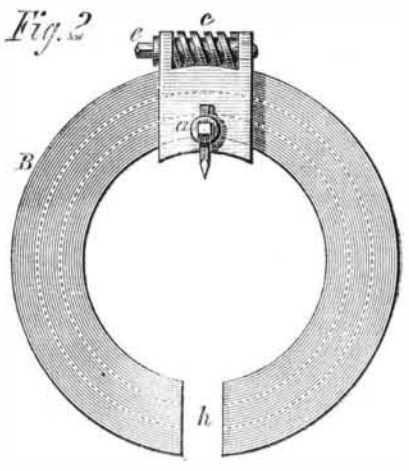
*Fig. 1*




pipe, or cast iron. It has a flange, *d*, at its base, to secure it in place upon the saddle block of an engine lathe. Upon this hollow post, at its upper end, is secured an annular ring B, by a flange, *i*, that passes down into the pipe, A. Both the inner and outer sides of this ring are beveled or cut tapering toward the pipe or post, A, as seen at *b*, Fig. 1, a section of the ring being shown.

This ring, B, has a tool block mounted upon it, as seen in Figs. 1 and 2. The side of the tool block, C, that bears against the inner surface of the ring, B, is curved to fit it exactly. Two flanges or ears project from the outside of said block, which support a worm shaft. This worm or screw meshes into a female worm cut upon the outside of the ring, B. A set screw, *c*, takes up the lost motion. The ring, B, is cut apart at *h*; this opening should be large enough to permit the tool block, C, to be placed in position; it is too small as shown in sketch. An opening considerably larger than

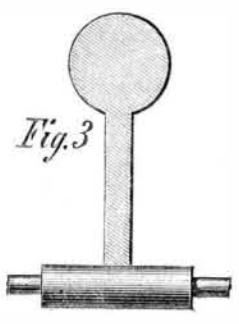
*Fig. 2*




the one in the ring is cut in the side of the tool post, A, as seen in Fig. 1.

Fig. 3 shows a section of the plunger to be turned; it is fastened to a flange plate, or arm that connects it to a central shaft. It is evident that the distance, from the center of the plunger to the center of its carrying shaft, must be the same as the radius of the segment of the cylindrical ring the plunger is desired to fit. Operation as follows: Place the centered shaft of the plunger in the centers of an engine lathe; fasten the tool post, A, upon the saddle block of the lathe, a proper distance from its centers, with the open side opposite the plunger. Adjust the saddle block by its screw, so that the tool, *a*, in tool block, C, will conform to the surface of the plunger, when revolved around it, by operating the worm shaft with the socket crank, *s*, (this handle is made removable to clear the ring, B). The lathe is set in motion, and at every revolution the tool, *a*, is fed until the plunger is turned up to the size of the bore of the cylindrical ring. The flange can be cut off, if desired, after the plunger is fitted.

*Fig. 3*



It may be mentioned that the opening in the hollow tool post, and slot in ring, B, are also intended to permit the plunger and its supporting arm to pass through, in making a revolution. The plate or arm that connects the plunger to the driving shaft, should be of sufficient thickness and width to prevent springing in the lathe; the shaft being secured by a dog, and back carrier, so that it will revolve properly. This tool would prove a valuable adjunct in many shops that do certain kinds of work, requiring small round-rimmed fly wheels, hand wheels, etc., finished.

Harrisburg, Pa. WM. P. PATTEN

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