Correspondence.

Ingrowing Toe Nails.

To the Editor of the Scientific American:

I notice the issue of the 15th Nov. contains a method of curing ingrowing toe nails. As I have had some trouble of that nature myself, I would like to suggest a method of relief which worked admirably with me. Raise the ingrowing part as much as possible by packing with lint or cotton beneath. Allow this to remain a day or so. Remove this and now put in its place mercuric oxide, HgO, easily obtainable at any drug store. Press in a little cotton to keep the mercury in place. Cleanse the parts every day or two, but be sure the mercury is kept over and around the ingrowing part. The mercury seems to destroy the nail where it touches it, and at the same time deadens sensation without producing any deleterious effects.

J. G. OWENS.

109 Ellery St., Cambridge, Mass.

THE BELT PROBLEM.

To the Editor of the Scientific American:

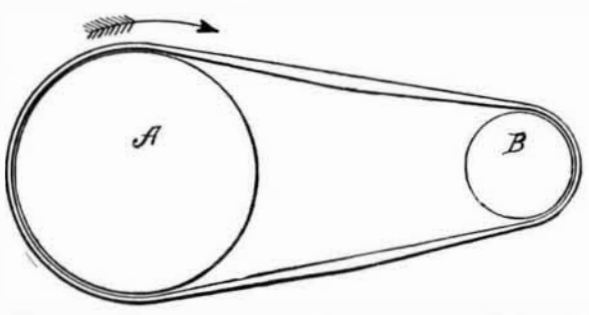
As no one has yet answered the query of your correspondent on that "Belt Problem" you published Oct. 4 last, I will try and do so.

The reason of the outside belt creeping on the inside one is because it is made to travel faster in consequence of the inside one increasing the size of the pulleys. For instance, if the inside belt is one-fourth inch thick, then the outside one would virtually be working over pulleys one-half inch diameter larger than the inside one.

The creeping process only takes place on the stretch of belt between the pulleys, and has considerable force. No wonder it pulled the rivets out of your correspondent's belt.

I don't see any objection to using two belts, one on top of the other, if the driving and driven pulleys are the same size; but if they are not, then the case is seriously complicated.

To illustrate: A pulley 36 inches diameter, making



100 revolutions per minute, driving with a belt a pulley 12 inches diameter, 300 revolutions.

Now if you put on another belt, say the inside one is one-fourth inch thick, you virtually increase each of the pulleys one-half inch diameter, and you have a conflict raging between the two belts that is anything but desirable, the inside one trying to drive the small pulley 300 revolutions and the outside one trying to hold it back to 292, the number of revolutions a 36½ inch pulley would drive a 12½ inch one.

I think it is quite clear the difference of 8 revolutions has to be adjusted by the outside belt slipping over the inside one as they pass over the small pulley.

The lower or pulling side of the inside belt between the pulleys is taut and the upper side slack, while the outside belt is the reverse, which shows the outside belt to be pulling against the inside one, thereby wasting considerable power.

As a rule I have learned to discard double belts. They undoubtedly absorb a great amount of power, because of the conflict between their inner and outer surfaces.

J. A. LOUGH.

Kansas, Nov. 8, 1890.

The Prophet Nahum Predicted the Modern Locomotive.

To the Editor of the Scientific American:

I have read your article on Job's steam engine. Please read the 4th verse of the 2d chapter of Nahum the Prophet, and see if you can in as few words describe a train of cars and limited express. He was way ahead of Stephenson.

B.

Titusville, November, 1890.

The following is the verse referred to:

Nahum II., 4th verse: "The chariots shall rage in the streets, they shall jostle one against another in the broad ways; they shall seem like torches, they shall run like the lightnings."

To Make Blue Prints Green.

To the Editor of the Scientific American:

Make four solutions as follows:

Solution A.—Water 8 ounces and a crystal of nitrate of silver as big as a pea.

Solution B.—Hydrochloric acid 1 ounce and water 8 ounces.

Solution C.—Pour a solution of iodide of potassium (iodide of potassium 1 ounce and water 8 ounces) into a saturated solution of bichloride of mercury until the red precipitate is *just* dissolved, and then add four times as much water as the resulting solution.

Solution D.—Water 16 ounces and iodide of potassium 1 drachm.

Then take the blue print and bleach it with solution A, when the image will become pale slate color, or sometimes a pale yellow.

Then wash thoroughly and immerse the print in solution B, when the image will again become blue.

Then, without washing, immerse the print in solution C, when the image will become green, but the "whites" will be of a yellow tint.

Then put the print in solution B again, without washing.

Then wash and pour solution D over the print to purify the "whites" and to give the green image a bluer tint; but do not leave print in this solution too long, as it has a tendency to make the print blue again.

LOUIS B. HAYS.

Pittsburg, Pa., Nov., 1890.

[Our correspondent has sent us an excellent print of green color as an example of his method.—ED. S. A.]

Hydraulic or Jet Propulsion.

BY JOHN S. MORTON.

The Evolution, built by Mr. W. M. Jackson, is completed and will soon be tested. Her method of propulsion (as invented and patented by him), which consists in forcing water by an engine and pumps into a conduit, and discharging it therefrom through a propulsive nozzle under heavy pressure, into the water of flotation, in a continuous stream at very high velocity, in quest of a "fulcrum" to push against, is not sound, as the result will prove. The pressure in pounds on the nozzle (0·5184 of a square inch in area) will be the entire sum of the propelling force of the vessel.

Her propulsion will be due to the reaction of said pressure, exerted inside the conduit at a point opposite to the nozzle, and not to the reaction of the nozzle thrust against an imaginary "fulcrum" in the water of flotation.

With 200 pounds of steam to the square inch on the high pressure cylinders, the propelling force of the vessel (after allowing for friction) will not exceed 1,007¼ pounds, which will not be sufficient to propel her much, if any, over 15 knots per hour. It will propel her just as rapidly as that number of pounds, suspended over a pulley and falling in space, would draw her, but no faster. If her nozzle thrust be 609 feet per second, as claimed, her slip will be nearly 96 per cent, and she will be utilizing in her propulsion but 46 of her 1,116 horse power.

Mr. Jackson can secure high speed only by increasing the conduit and nozzle pressure, or by enlarging the area of the nozzle, and the increased speed of the vessel will be proportionate thereto.

With her machinery as constructed and in place, by enlarging the nozzle to 3 inches in diameter, there would be exerted on it, with said 200 pounds of steam (after allowing for friction), a propelling force of 13,719 pounds, which would propel the Evolution as rapidly as that number of pounds suspended over a pulley as aforesaid would draw her, possibly up to 45 knots per hour.

Hydraulic or jet propulsion, properly applied (but not on Mr. Jackson's "theory"), must supplant the side wheel and the screw wherever speed and economy are estimated at their full importance and intrinsic value.

New York, Dec. 1, 1890.

The Denver, Lakewood and Golden Electrical Railroad, of Colorado.

This new road of standard gauge and double track, now in process of construction, to be completed in March, 1891, will be fourteen miles long, and will cost, fully equipped, $800,000.

A ten mile addition is contemplated to Lookout Mountain, which, when finished, will make it the longest electrical railroad in the United States.

The electricity will be generated by the water from the Clear Creek Canon and the Welch Ditch Co., fed by the melting snows of the Rocky Mountains, furnishing 1,200 horse power, owned by the company.

The surplus will supply electrical power to manufactories along the line of the road.

The electrical motor to be used for the rolling stock has not yet been decided upon. The cars will be made in Denver, similar in length, sumptuousness, and comfort to any now in use on trunk lines. The wheels will be of thirty-six inches diameter, and fitted with two thirty-five horse power motors, capable of moving sixty miles an hour and pulling loaded trailers when necessary.

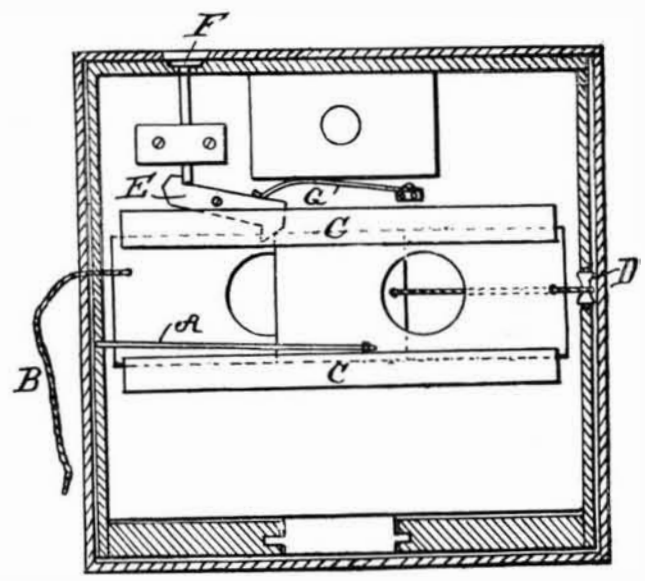
Cars will run hourly. Annunciator buttons will be placed at every seat to signal for the stoppage of the cars at any point along the road where passengers desire to alight. The management is largely interested in the land to be traversed by the road, and it is expected that, in due time, by judicious fostering the line will be a continuous suburban town.

The road will be brilliantly illuminated its entire length at night by incandescent lights at intervals of one hundred feet.

Golden, the Western terminus, a town of 3,000, is delightfully located in the foothills at the entrance of the canon to the Rocky Mountains, and is surrounded by such picturesque scenery that it is expected thousands of tourists and others will avail themselves of the facilities offered by the road during the summer months.

AN INSTANTANEOUS SHUTTER FOR HAND CAMERAS.

A great many amateur photographers make their own cameras, and many of the new ideas introduced into the camera of the stores result from some amateur's experiments. An ordinary hand camera is of very simple construction and can be made with few tools. The shutter is perhaps the most difficult part, and it is here that an amateur, with limited appliances for working, has to put in his study. The shutter shown in the illustration is well adapted for the hand camera and is very simple in construction. It is operated by a rubber band, A, and can be made very rapid by having a short band and slow by having a longer one. The illustration shows it set, an operation which is performed by pulling the string, B, out. When the shutter is sprung, the string pulls in out of the way, leaving just enough out to take hold of. The flaps can be made of thin wood, pulp board, hard rubber, or any similar substance. The hole in each is exactly the same size of the one in the end of the camera. They are put in place in the wooden grooves, C C, and a string is run from a hole in the end of one over the pulley, D, and to the end of the other, and tied so as to bring the three holes together. Then by means of the string, A, and rubber band, B, they are made to travel back and forth past each other in setting the shutter and making the exposure. The shutter is held open by the catch, E, which is operated by the thumb piece, F. This thumb piece is sunk into a hole in the



top of the camera, out of the way. A spring, G, holds the catch in place in a notch in the edge of the inside flap. There is no jar when the shutter is released, as the flaps move in opposite directions and one offsets the other. The front board of the camera has only two openings, one for exposure and one for the finder, and the only outside parts on the camera for working the shutter are the two for setting and releasing it. If the front board is hinged on, the speed of the shutter can be easily regulated by means of notches in the edge of the outside flap, making the rubber band taut or loose as required. The simplicity of the arrangement and lack of conspicuous brass work will recommend it to amateurs who wish to pursue their hobby without attracting too much attention.

A Plant that is Puzzling the Scientists of Pennsylvania.

A truly wonderful plant is at the Allegheny Conservatory, says the Pittsburg *Chronicle*. No one knows to what class it belongs or anything about it. It is the subject of much speculation among botanists, and they anxiously await the development of a bud that is forming. Then, they say, they can place the plant. The botanists have a suspicion that the plant is a tropical one, and Supt. Hamilton is treating it on that supposition.

The history of the plant so far as known is a unique one. During the summer one of a party of gunners brought down a crane. It was a beautiful specimen, and the taxidermist of the party set to work to mount it. In the bird's craw were found several seeds.

With a view to learning if the seed was killed by the bird eating it, they were placed in water. In a few days the seeds sprouted. They were planted in loam and kept in a warm room. Edward V. McCandless took charge of it. The plant was an object of interest to Mr. McCandless and his botanist friends, and its development was closely watched.

Recently it was transferred to the conservatory. The leaves are long and broad and heavy, not unlike a species of palm.