has patented an improvement in knitting machines whereby a double web, with two threads, is formed in such manner that, if the threads be of different colors, the finished fabric will be striped lengthwise.

Mr. Patrick Deevy, of Melrose, Iowa, has patented an improved guard finger and sickle bar. The sickle bar is sectional, each section carrying a cutter as a part of it. These parts are made interchangeable, and by tongue and groove devices may be put together and fastened by screws to form one rigid bar. Each finger or guard is made in two parts, mortised and tenoned together at one end, and in the under part or section is a mortise in which is fixed a cutting blade that can readily be removed for sharpening and replaced securely without the aid of screw or bolt.

DECISIONS RELATING TO PATENTS.

United States Circuit Court—Northern District of Illinois.

RESWEATING OF TOBACCO.—ROBINSON *et al. vs.* SUTTER *et al.*

Blodgett, J.:

This is a suit for infringement of letters patent granted by the United States to complainant, Abraham Robinson, on the 10th day of June, 1879, for an improved apparatus for resweating tobacco.

The defense set up is, first, that defendants do not infringe complainants' patent; second, that complainants' patent is void for want of novelty.

It seems from the proof that in the manipulation of tobacco it is deemed very desirable to obtain a dark uniform color in the leaf, especially of that to be used for cigar wrappers; that in the natural sweating which the leaf undergoes in the ordinary process of curing it is left spotted, or some leaves will be darker than others, and the process of resweating is intended to bring the tobacco to a dark and uniform color.

Robinson claims to have discovered that tobacco can be successfully resweated by packing the leaves closely in a mass in a wooden box or tub made substantially tight, except so far as the pores of the wood will admit vapor or moisture to slowly percolate through the wood and diffuse itself with the mass of leaf from a body of warm water and expanded steam contained in an outer tank or chamber surrounding the tobacco holder, the process to continue from three to eight days according to the mass of tobacco to be operated upon. The apparatus which he devised for this purpose, and which is covered by his patent, consists: First, of a tank or chamber adapted to hold a body of water and sufficiently tight to hold expanded steam, or steam generated or let into the chamber at a very low pressure. The model presented here consists of a tank which is water-tight at the bottom and substantially water or steam tight above, with the tobacco holder let into it and suspended by a rim upon the edge, the holder being made tight, as described; but the patentee does not restrict himself to this precise form of construction. Second, a tobacco holder in which this mass of leaf tobacco is placed, which tobacco holder is placed or suspended inside of the tank or chamber. Third, a steam generator for producing steam, by which the water in the chamber is to be warmed and steam generated, whereby a warm humid atmosphere is kept constantly about the tobacco holder, and the warm moisture gradually diffused through the tobacco in the holder.

The device used by defendants operates upon precisely the same principle as that of complainants—that is, it has a tank or chamber within which the tobacco holder is placed. The bottom of the tank is supplied with water which is heated by an outside steam generator or heater; and the only difference between the two devices of the complainants and the defendants is that the defendants' tobacco holder is not made tight, so as to exclude moisture except through the pores of the wood, the defendants, in practice, using the ordinary tobacco cases in which leaf tobacco comes packed to hold the tobacco during their process of resweating. In other words, the defendants open the doors in their tank and slide the ordinary tobacco case full of tobacco into this steam box, and allow it to remain there until the tobacco has become resweated, which is in no respect different from the process of Robinson, except as hereafter noted; but it is claimed that this is a substantial difference, because it is insisted that complainants' claim requires their tobacco holder to be tight, while the defendants' tobacco holders are not tight. I think, however, the word "tight," as used in his claim, is to be construed, in the light of his specifications, as meaning sufficiently tight to subserve the purposes to be accomplished. The term as used here must be held, I think, to mean comparatively or approximately tight—close enough to exclude an excess of steam or moisture, and open or porous enough to allow the warm moisture to sweat or percolate into the tobacco holder, so as to warm and moisten its contents; and it would seem that slight crevices or openings arising from defective mechanical construction, if not large enough to admit steam in such quantity or volume as to wet the tobacco, would not violate this patentee's rule of construction.

1. The word "tight," used in the claim to qualify the wooden tobacco holding vessel, *Held* to mean sufficiently tight to subserve the purposes to be accomplished by the invention.

2. Crevices or openings in the wooden tobacco holder arising from defective mechanical construction, if not large enough to defeat the operation of the device, will not relieve the apparatus from the charge of infringement.

3. The patent shows an organized apparatus consisting of a steam and water containing chamber and a wooden tobacco holder specially constructed for that purpose suspended in said chamber. The defendants employ the steam and water containing chamber, but, instead of using a wooden tobacco holder specially made for that purpose, use for containing the tobacco in the chamber the ordinary wooden tobacco case in which leaf tobacco comes packed; *Held* to be an infringement.

United States Circuit Court.—District of New Jersey.

HARVESTER PATENT.—TYLER *et al. vs.* CRANE.

Nixon, J.:

1. In a suit for infringement of reissued letters patent No. 6,609, granted August 24, 1875, to Samuel W. Tyler, for an improvement in harvesters, two defenses were set up; first, want of novelty; second, the defendant's machine did not infringe.

2. *Held* that the patentee's device of placing the gearing and shafts that impart the motion to the cutters upon a rigid common support or frame formed in one piece, to correct the practical defects of twisting and warping in existing two-wheel machines, is sustainable.

3. That defendant's machine, having two wheels with connecting axle, and containing the solid piece or frame made of a single casting for the support of the intermediate draught and gearing sustained by the axle, differing only from the mechanism of the patentee's in having the solid piece directly and not mediately attached to the axle of the wheels, is an infringement.

Correspondence.

Captain Eads' Ship Railway over the Isthmus.

To the Editor of the Scientific American:

Referring to your issue of November 13, 1880, I suggest an improvement which I think might be made in the car of Capt. Eads for his projected ship railway, which you illustrate.

As illustrated the principal weight of the ship is on the keel, which rests rigidly on the car, while the bilge is supported by solid and unyielding blocks.

Now, to accomplish this without severe strain to the ship while in transit, the car or cradle must be perfectly rigid, while all elasticity must be in springs over the wheels.

It would seem that in order to construct a car four or five hundred feet long, which would be rigid enough not to bend and thus cause the ship to be unevenly supported while passing over any curve in grade or uneven place in the roadbed from whatever cause, would require a very great additional weight of metal, more than would be required were the keel rests and bilge blocks made to rest on air cylinders, all of which should be connected by hose or some other flexible connection by which compressed air could pass from one to another. Thus, regardless of the bending or twisting of the car, either longitudinally or otherwise, the ship would at all times have a perfectly even and elastic support, which would not in any case bring an unequal bearing or strain on the vessel in transit or wheels of the car, as when any bearings would be relieved by curve in grade or depression in track the compressed air from others would be forced through the connections, thus making every bearing do its exact portion of duty and allowing none to be overloaded or any unequal strain to the ship. This would avoid the necessity of any tilting tables, as the grade could be changed by a gentle curve.

The body of a cradle or car of this kind should be as light and flexible as strength and perfect safety would permit.

Another advantage of this system would be that in handling a large ship, instead of requiring another and longer car than for a smaller one, it would only be necessary to attach a section to make it the required length, and connect the air tubes as is done with air brakes on ordinary railroads. This in order to secure equal pressure in the cylinders of both sections.

My method of constructing such compressed air springs would be to build in the center of the cradle cylinders large and numerous enough to support the proper proportion of a ship's weight.

To support the balance of the burden, each bilge block should contain an air cylinder, and all cylinders should be connected as above stated. By arranging in this way with air-tight pistons to support the plates on which the ship would rest, a lighter car could be used with better result, and the bilge blocks might be moved into place as easily as if solid. Some such principle applied to the cradle would allow a more cheaply constructed roadbed than would be possible with a rigid car, and the ship would be relieved of any injurious strain in transit. WALTER B. GUILD.

New York, January, 1881.

[NOTE.—Capt. Eads appears to be fully alive to the value of the points above mentioned. One of the patents taken by Capt. Eads is for a hydraulic cradle to carry the ship, in which the vessel is supported on hydraulic jacks, all connected, as our correspondent suggests.—EDS. S. A.]

The Flywheel Explosion.

To the Editor of the Scientific American:

Please allow me to make a few comments upon Mr. Rose's article on "A Mysterious Explosion," on page 38 of your paper. He says: "If the flywheel broke first, it should have left the spindle all right running in its bearings." This is true, if all the fragments separated simultaneously; but—considering that every ounce of the rim of a 30-inch wheel at 2,000 revolutions per minute has a centrifugal force of about 100 pounds—suppose any considerable portion of one side to have gone first, would not the remaining unbalanced part have wrenched the spindle from its bearings in a twinkling?

Of the holes drilled in the rim of the wheel, Mr. Rose says "their number and size (as shown in Fig. 10) preclude the idea that they could have been made to balance the wheel, especially as it appears a well shaped casting," etc. There may be a difference of opinion on that point. What is the alternative? As near as I can judge by measurement of the figure, the weight removed by boring these holes would be not far from three-quarters of a pound. If, then, being a "good casting," the wheel was in balance without the holes, it would with them be out about 12 ounces on a radius of 14 inches. Is it at all probable, I may say, even possible, that it was used in that condition, at the velocity named? O. A. BENTON.

Amenia, N. Y., January 18, 1881.

Soldering Cast Iron.

To the Editor of the Scientific American:

A few weeks ago, being in a manufactory where hardware of all sorts is made for harness, I was told that pieces of cast iron could not be soldered together; and that if any inventor could devise a process by which cast iron *could* be soldered, he could not fail to disclose a process that would be of untold value, especially to manufacturers of harness hardware. As I have been accustomed, for many years past, to solder together pieces of cast iron, always with most satisfactory results, it occurred to me that perhaps the little experience which I have had may help some mechanics out of a little difficulty.

Many years ago the cistern pump of a neighbor was allowed to freeze up when partially filled with water, the result of which was the cylinder was bursted for about six inches in length. The part of the cylinder at the crack was placed on the grindstone, and ground away until the iron was clean and bright for an inch or more on both sides of the crack. Then the cylinder was put in a vise and screwed up tightly, and held in the vise while solder was applied along the crack. The first process was to "tin" the surface of the cast iron, so that the solder would take a strong hold of the iron. Muriatic acid was applied with a swab to the bright iron, after which a little of the best kind of solder was laid on and rubbed rapidly over the surface, with the soldering iron as hot as it could be without burning the tin off the copper soldering iron. After the cast iron had been well tinned solder was applied, and piled on over the crack until it was at least one-eighth of an inch thick all over the crack. That soldering never failed so long as the pump was in use.

Last year a cast iron wheel on our portable forge was broken, by an accident, into so many pieces that it was judged to be impracticable to mend it. As no one could determine where such forges were manufactured we could not procure a new wheel. To make a new pattern for another wheel like the broken one, pay for casting and fitting up, would cost several dollars; so I concluded to solder the parts together. Several machinists laughed me in the face for suggesting such a manner of repairing that wheel. But I took all the parts, and went where I could have the use of an emery wheel, and the surface of the iron on both sides of the cracks or breaks was neatly polished for at least half an inch to an inch from the break. Some of the arms were broken in two pieces. There were eight arms. Some of the arms tore away a piece of the rim. In some pieces it was not practicable to touch the surface with an emery wheel or file. The only way of removing the hard scale and rust from such places was with a sharp cold chisel. All the polished surfaces were first *tinned* in a thorough manner, after which the arms were put in their respective places, and the parts neatly and thoroughly soldered all over the breaks. The job cost about fifty cents' worth of time, and ten cents for the solder. The wheel runs as true as it did before it was broken, and to all appearance every part is as strong as ever. Indeed, we all judge that the parts would break in the solid iron sooner than where the arms and rim are soldered. There will be no difficulty in soldering cast iron if the surface is first polished and then well *tinned* with a hot soldering iron.

I always keep several small bottles containing muriatic acid of different degrees of strength. One bottle has in it pure acid. Another contains about three parts of acid and one part water. Another bottle contains about three parts acid and one part water, in which we have dropped numerous small pieces of sheet zinc. The acid will dissolve the zinc in a few hours. The acid in this last bottle is employed when soldering tin. The acid will corrode and clean the surface so that melted solder will unite with the clean and rough particles of iron, taking such a firm hold that one can scarcely perceive where the iron ends or where the solder begins. Wrought iron and steel also may be soldered with less difficulty than cast iron, if the surface is first polished and afterward tinned with good solder. If the surface is not tinned *thoroughly* the solder will not adhere with satisfactory tenacity to the iron. The reason why it is so easy for any one to solder tin consists in the fact that a sheet of tin is simply thin iron well covered with tin. After the surface of any piece of metal has been *tinned* any tinker can make melted solder adhere to the surface. S. E. T.

Orange, N. J.