

has patented an improvement in the class of thill couplings in which the thill iron is secured to the clip bolt by means of a spring plate fastened to the under side of the thill iron by a screw bolt.

Mr. William Langdon, of Upland, Pa., has patented a spirit level whose stock consists of an oblong bottom supporting a slotted vertical tube at each end, a transverse horizontal slotted tube in the middle, and a superposed median horizontal slotted tube over and at right angles to the middle tube. This invention is intended to meet all of the requirements for a plumb and level indicator.

Mr. John C. Isaac, of Cornwall-on-the-Hudson, N. Y., has patented a corner stone for boundary lines, consisting of a cast iron post having on four sides dovetail grooves for receiving blocks inscribed with letters. These blocks are held in their places by an iron cap which is secured by a rod running through the base of the post.

An improved permutation lock has been patented by Mr. Fred. E. Arnold, of Chicago, Ill. This invention consists in certain novel details of construction and arrangement of a sliding bolt, gear wheels, and setting devices, whereby provision is made for securing the bolt to prevent it from being moved without a knowledge of the arrangement of the parts with relation to each other.

An improved cultivator tooth has been patented by Mr. Levi S. Wood, of Marion, Ia. The object of this invention is to furnish cultivator teeth so constructed as to cut shallow near the plants and deeper at a little distance from the plants, which may be guided close to the plants, will not cover small plants with soil, and will leave the soil loose and level.

Messrs. Gavin Rainnie and George J. A. Robinson, of St. John, New Brunswick, Canada, have patented an iron fence post of a body made U-shaped in its cross section, and having hooked lugs to receive the fence wires, the base cast hollow and solid with the body, and having holes in its top and bottom and ribs upon its inner surface to receive and bind the ground rods.

Mr. Samuel Levin, of Pittsburg, Pa., has patented an improvement in eyeglasses which are employed upon one eye at a time—such, for instance, as watchmakers', lithographers', and engravers' glasses—and which improvement is applicable also to goggles, eye-shades, etc. The improvement is designed to relieve the operator from the effort of holding his glass by the contraction of the muscles about the eye, and to avoid the use of bandages or ligature passing entirely around the head.

Mr. Anton V. Semrad, of Chicago, Ill., has patented an improved mangle, consisting of a table supporting two rollers, which are pressed down upon the clothes by a weighted box resting on the rollers.

An asparagus buncher, so constructed as to gauge the bunches, press the stalks together, and hold them while being tied, has been patented by Mr. John Weeks and Frank H. Weeks, of Brooklyn, E. D., N. Y. The invention consists in a bed plate, an upright plate, two stationary jaws, and two movable jaws, and mechanism for operating the movable jaws.

An improved register knob has been patented by Mr. Geo. W. Lewin, of Somerset (Fall River P. O.), Mass. The invention consists of a slide having a boss in combination with a register knob having a perforate shell, spring, and flanged washer, all held together by a screw and nut.

An improvement in fences has been patented by Mr. Lewis W. Berger, of Canal Winchester, Ohio. The object of this invention is to furnish fences so constructed that they can be easily and quickly set up, taken down, and moved from place to place, and which will allow any desired panel to be removed to open a passage way without disturbing the other panels.

Our Trade with Sheffield.

The report of our Consul at Sheffield, Eng., shows that a vast increase has taken place in the exports from Sheffield to the United States during the year ending with September. The exports of steel during the last quarter were valued at £101,428 as compared with £52,550 for the same quarter last year; and the cutlery exports for the same periods were respectively £74,104 and £50,504. For the year the steel exports amounted to £383,889, and the cutlery to £238,605. The total exports from Sheffield to this country for the year amounted to £1,066,411 as compared with £559,733 last year.

Mr. Vanderbilt has recently given a very heavy order for steel rails to one of the Sheffield firms for delivery next year.

The Oldest Scientific Society.

The Academy of the Lyncei, according to M. De Laveleye, is the oldest scientific society in existence. It was founded at the beginning of the seventeenth century by four young men, who took as their symbol the Lynx—an animal then to be found in the Apennines—with the motto, *Sagacius ista*. The members "were to penetrate into the interior of things in order to know the causes and operations of nature, as it is said the lynx does, which sees not only what is outside, but what is hidden within." Their dream was nothing less than the organization of modern science based on the method of observation—the *church* of knowledge. The Academy was to have in the four quarters of the globe dwellings with sufficient endowments to maintain the members, who might live there in common. These dwellings were to be provided with libraries, laboratories, museums, printing presses, and botanical gardens—in a word, with

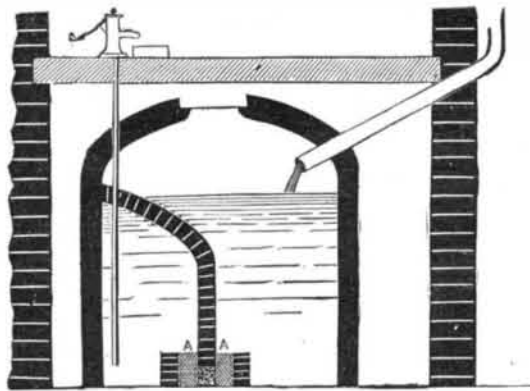
everything necessary for study. Their observations were to be communicated by writing to all the members. The Lyncei were to renounce marriage as a *mollis* and *effeminata* *requies*, and injurious to study; nevertheless, monks were not admitted. The Academy was reorganized in 1875, and has members of various nationalities. Among the English members are Gladstone, Freeman, Rawlinson, and Herbert Spencer.

FILTERING CISTERNS.

The charcoal for filters is probably most efficient if animal, *i. e.*, bone black; but as it is not always easily obtained, that ordinarily sold by the dealers, made from hard wood, pounded up fine, is good enough. If your sand or gravel is not clean, wash it in plenty of water. Sponges are not of much use, being perishable. The best material for rain water cisterns is brick, laid in hydraulic cement and plastered inside. No lime should be used for the plastering, but a mortar made of equal parts of cement and good, clean, sharp sand. This is rarely found clean enough to be used without first washing it. After the plastering is hard, it should be washed twice with a grout of cement and water, without sand, applied with a whitewash brush. If the ground is firm, and stands plumb without caving in, one layer of brick laid directly against the side of the pit is enough. In this case the form of the pit should be carefully trimmed to a true circle, and the walls trimmed plumb. Then the brick work can be laid directly against it, filling all small cavities between the brick and ground with cement, and not with earth. If the ground is not firm enough to stand in this way, a thicker wall will be needed, say eight inches. The earth that is filled around it should be puddled in with plenty of water, to insure a solid packing. Ramming the earth without puddling is not so good, and will not be likely to prevent the cistern from bursting when first filled with water. A very small crack will spoil it. The floor can be laid after the walls are plastered, so as to avoid stepping on it much after laying it. The floor should be dished like a saucer, to facilitate cleaning out.

For filtering, build a partition in the cistern by which any portion, say one-fourth, of its contents can be separated from the remainder. Insert the suction pipe or pump within this chamber, and allow the inlets to discharge outside of it in the larger part of the cistern. If the partition is built of one thickness of soft, porous brick the water will soak through it; but this brick partition should be domed over against the side walls to prevent any pollution of the filtered water by dust or splatterings from above. If the water is quite foul the pores of the bricks will be choked in time, and refuse to pass more water. In that case the partition must be renewed, or holes made near the bottom in which sponges, broken charcoal, or sand can be placed to do the work; and these can be renewed when found necessary.

If gravel and charcoal are used, they are deposited in layers, charcoal at bottom, and a few inches of gravel on top, each side the filtering wall, at A A (see cut), and confined by



FILTERING CISTERN.

dwarf walls on each side. Holes are left in the base of the filtering walls by omitting alternate bricks in the bottom course. The water is then filtered by passing down through one bed of charcoal and up through the other. The gravel is chiefly useful to put on top of the charcoal to protect it from wash.

This charcoal will need frequent renewal if there is much solid matter in the water. Hence two cisterns are convenient, so that one may be used while renewing the other.

The source of ice is often so questionable in its purity that it is doubtless the safer way to cool one's water for drinking without direct contact with the ice. Any metal that is difficult to corrode, like copper, is good to put the ice in, and if made double on the outside with an air space between the plates, it will not absorb much heat from the outside air. The very best material for holding the drinking water is glass, and if made thin, it will conduct the heat fast enough for all practical purposes, being immersed in the ice for such time as is found necessary. The cooling of the water can be much hastened, but the melting of the ice is also hastened, by putting a little salt in it, which makes a freezing mixture and cools off all the surrounding substances rapidly.

Lead pipe is not a desirable material inside of cisterns for drinking water. Iron is better, using gas pipe, coated inside with hydraulic cement. If this is carefully prepared and carefully handled while putting it together, it is nearly indestructible. It is used with success for service pipe in many New England cities, where it has been in use for many years, usually being adopted between the street mains and houses. —*The Plumber and Sanitary Engineer.*

HYDRAULIC CEMENT.

BY H. C. HOVET.

It is well known that common mortar hardens by drying, and that under water it gradually softens till it is dissolved away. To facilitate its setting, as well as to cheapen its cost, sand is mixed with lime, in the proportion of three to one, with just enough water to make a paste. When this yielding substance is properly used in masonry it becomes hard and adhesive, filling the joints completely and uniting the bricks or stones into a compact mass that may endure for centuries. Hydraulic mortar, that will "set" under water, is made by the admixture of ingredients that will in some way protect the lime from chemical aqueous action. The oldest recipe for its manufacture is given by Vitruvius, the Roman architect, and many have been given since, until the making of artificial cements has become a subject of very great importance. It is claimed by antiquarians that the art, indeed, dates back to the Neolithic age; and that ancient pottery, instead of being hardened by exposure to heat, was made from a mixture resembling Portland cement, and hardening without being baked. Prof. E. T. Cox has carefully analyzed Indian pottery found in Western mounds, showing the material to be a skillful admixture of calcareous, silicious, and aluminous earths, in proportions varying but little from the modern cements in familiar use.

This communication, however, chiefly relates to what are known as natural cements, whose commercial value has been largely developed in this country during the past ten years, and is capable of much greater development.

It is, no doubt, quite mysterious to those who have not given the subject particular attention, that there should be a class of stones that, having first been calcined and then reduced to powder, can be used as a mortar without being mixed with other mineral ingredients; and that this mortar, instead of crumbling or dissolving under water, is actually hardened by that very means until it is as firm as the rocks it binds together. This fact is said to have been discovered by a Mr. Parker, who took out a patent about sixty years ago for what he called Roman cement, though made from septaria found on the Isle of Sheppey. Medina cement is produced from similar argillo-calcareous nodules found on the Isle of Wight. Satisfactory experiments with septaria were also made in France and Russia. The Portland cement is an artificial imitation of these natural ones, by mixing masses of chalk and clay in certain proportions, drying the substance, and then treating it by a process like that to which the natural nodules had been subjected.

It is now known that many limestones, heretofore rejected as poor, if not worthless, contain naturally the very impurities, so to speak, most desirable to form a mortar capable of hardening under water. The true proportion to form a silicate of lime and alumina is according to the following formula: Silicic acid, 20.00; lime, 41.40; alumina, 38.60.

The combining ratio is 100 of silicic acid to 398 of the earthy bases. But it is a curious fact that water limestones, widely differing from each other in the proportion of their chemical constituents, often seem to have for practical purposes nearly equal hydraulic properties. The explanation is that the combining ratio varies with the relative quantities of effective substances. For instance, if lime and magnesia form the base, instead of lime and alumina, the ratio of silicic acid to this base should be as 100 to 277; and if lime alone, as 100 to 200. The presence of iron, sulphur, soda, or other ingredients, will, of course, cause a further variation of the ratio.

The reader may be interested in an account of one or two of the chief cement works in this country that may be regarded as specimens of all, for there is no great divergence in the process of manufacture. I had an opportunity a few weeks ago to visit the Howe's Cave Lime and Cement Works, in Schoharie Co., N. Y. This interest has been developed since 1870, although something had been done in a small way prior to that date. The credit of the enterprise is largely due to Hon. J. H. Ramsey, of Albany. The kilns and mill are situated about 500 yards from the mouth of Howe's Cave, and at the foot of a bluff from 100 to 200 feet in height. Into the face of this bluff a tunnel has been cut, about 8 feet from floor to roof, and extending in for 800 feet, the rock on either side being honeycombed by lateral branches. The whole bluff is limestone, the upper strata belonging to the Pentamerus and Delthyris groups, abounding in crinoids, shells, and corallines. Excellent lime is made from this material in the usual way. The lower strata of water limestone at the foot of the bluff, and profitable for working up into cement, are three in number, and altogether but 5½ feet thick.

Pipes from an engine in the mill convey the power into the tunnel to drive two steel drills, each one inch and a half in diameter, by compressed air. Two men are required to manage a drill. After a quantity of stone is dislodged by blasting it is carted out over a tramway. From 75 to 100 tons is regarded as a good day's work. A kiln burner takes the loads, that have already been assorted in the mine, and deposits the material in four kilns, two of which are always in use, and both together able to burn 200 barrels a day. The kilns are 30 feet deep, each rigged with what is called a "kettle," through the bottom of which the calcined stone is drawn out and taken by an incline up into the mill. There it first goes into a "cracker," where it is crushed into pieces about the size of walnuts. Next it is pulverized between millstones into a light brown powder. This falls into barrels that stand on what are termed "packers," which jump them up and down by steam power, causing

the cement to pack together into much less space than it would otherwise occupy. One man heads for two packers. A barrel ready for shipping is worth about 80 cents. The capacity of the mill is 60,000 barrels a year. This cement has a good reputation, and the company have all they can do to fill orders. Besides furnishing cement for various railroads and for government custom houses, they supplied 50,000 barrels for the new Capitol at Albany, and sent also 20 car loads for the State House being built at Indianapolis, there being in each case numerous competitors.

There are many other cement mills in the country, all run, however, very much in the same way. The Buffalo Cement Company make two grades, having no material chemical difference, but differing in process of manufacture. The ordinary cement is bolted, by which means the vitreous grains are separated and ground over again into what they brand as the "Buffalo-Portland Cement," and which, it is claimed, makes a remarkably hard and durable concrete. This process is patented by the inventors.

One of the oldest cement mills in the West belongs to Mr. W. F. Beach, of Clarksville, Indiana, and is situated near the Falls of the Ohio. The bed of hydraulic limestone here is 14 feet thick, and, according to Prof. E. T. Cox, its outcrop has been traced on 25,000 acres of exposed workable beds, and there are probably 20,000 acres more that may be reached by shafts or tunnels. Beach's mill has a capacity of 50,000 barrels per annum. Eleven mills in all are reported as running in 1879 in the State of Indiana. Six of them, together with those on the Kentucky shore, were, and probably are still, united under the name of the Union Cement Association, and the material made by them is known in market as the "Louisville Cement." A year or two ago I saw a statement that their annual capacity was 400,000 barrels, and their actual sales for the preceding year were 391,166 barrels. The supply is practically inexhaustible, and the demand is constantly increasing, as the public is becoming aware of the many uses to which cement is put already in Europe, and which it may also advantageously serve in our own country.

DECISIONS RELATING TO PATENTS.

U. S. Circuit Court—Southern District of New York.

CAMPBELL vs. JAMES, et al.—CANCELING STAMP.

Wheeler, J.:

1. The reissued letters patent No. 4,143 (Division A), granted to Helen M. Ingalls, October 4, 1870, for an improvement in postmarking and canceling stamp, the original patent having been granted to Marcus P. Norton, April 14, 1863, and reissued to Jacob Shavor and A. C. Corse, August 23, 1864, and reissued to M. P. Norton, August 3, 1869, declared valid.

2. The judgment of the Commissioner of Patents in disbaring a solicitor for surreptitiously placing a copy of a caveat in the official files extends only to the exclusion of the solicitor, and not to the effect of the paper as evidence *in pais*, although its effect upon the instrument as a caveat of record might be greater.

3. Where a document is introduced in evidence by a defendant to prove admissions by the inventor inconsistent with his claim, such document is legitimate evidence according to what should appear its just weight, as well as those facts in favor of the inventor as to such as are against him.

4. Although the weight of evidence might be in the defendants' favor if the question as to prior use of the invention were to be determined upon a fair balance of proof and upon the parol evidence alone, still, in order to defeat the patent by showing an invention prior to a clearly established one of the patentee, it must be as clearly established to the extent at least of removing all fair and reasonable doubts.

5. By the provision of the act of 1836, section 15, it was only public use or sale with the consent and allowance of a patentee before the application for a patent that would defeat the patent. The act of 1839, section 7, did not change the character of the public use or sale that would defeat a patent, but provided that no patent should be held invalid by reason of them unless "such purchase, sale, or prior use has been for more than two years prior to such application for patent."

6. The defense of public use for more than two years prior to the filing of the application upon which the patent was granted must be clearly proven. A private use for testing the invention, and informing the inventor as to its perfection and usefulness, with the design on his part all the while to procure a patent, will not sustain such defense.

7. If the reissues of an original patent are for any other or substantially different invention from that described in such original patent, they are unquestionably void; but the fact that the specifications or claims are different, the invention or discovery remaining the same, is of no consequence.

8. If a form of a device embraced in a reissued patent had not been mentioned in the original patent, it might well be said not to have formed any part of the conception of the inventor; but if described in such original patent, although referred to as not being so useful or desirable in the combination as another form of such device, it might nevertheless be properly embraced by the reissued patent.

9. It is doubtless true that a reissue of a patent to a person not the owner would not affect the title of the owner. The reissue and title should go together to make a good title to the reissue, or at least the reissue should be consented to by the true owner.

10. The defense that the plaintiff's title fails because one

of the parties through whom such title is derived did not own the patent when it was surrendered by and reissued to him was sought to be sustained by showing that a certain instrument of writing was forged by such party by placing it before and attaching it to the genuine execution of another and a different instrument. It appearing that the parties whose assignment such instrument purported to be had knowingly acted under the same: *Held*, that this ratified and confirmed the instrument as good from the beginning.

11. A conveyance executed by the signature of a company with seal, and by S., president, and another seal, is a good execution both for the company and for S. individually.

12. It appearing that the conveyance was one expressly in trust, upon condition that the plaintiff should have the sole management of the trust until a fair, just, and reasonable settlement should be had with the United States for the use of the invention in the postal service of the United States by the Post Office Department: *Held*, that as no such settlement had been made the limitation in the conveyance had not expired, and the right to bring suit for infringement was in the plaintiff.

13. The grant of letters patent for an invention is exclusive throughout the United States, and reserves no right to the Government to use the same.

United States Circuit Court.—Southern District of New York.

CAMPBELL vs. JAMES et al.—PATENT CANCELING STAMP.

Wheeler, J.:

1. The bill charged infringement by defendant while the patent was owned by plaintiff's assignee, and set forth in *hæc verba* the assignment of the patent, together with "all the right, interest, and claim for and to the past use of said invention and improvement under the said letters patent," and prayed for an injunction and for an increase of damages, "in addition to the profits and gains to be accounted for by the defendant," together with "such other and further relief as shall be agreeable in equity." *Held*, that the assignment which was proved by the instrument itself applied to infringement before as well as after assignment, and that the plaintiff was entitled to recover under such bill without doing violence to any of the well-settled rules of pleading.

2. It is now well settled that savings in cost by infringement of a patent may be recovered as profits. (*Carood Patent*, 94 U. S., 695; *Elizabeth v. Pavement Company*, 97 U. S., 126.)

3. An exception to the Master's report that the defendant might have used other forms of canceling stamps which would not have infringed, and that the saving by using plaintiff's invention instead of such other stamps would have been much less than that reported, *overruled*, it not appearing that any such other form was known to defendant or that the use of the same would not also have been an infringement.

4. An exception taken to the Master's report on the ground that plaintiff's device is one which can be used only by the postal service, which is wholly monopolized by the Government, which could send letters without postmarking them, or could lessen the frequency of the mails so that the postmarking could be done separately from the cancellation of the stamps by the old method without increase of clerical force, thus leaving the invention subject as to use and value entirely to the will of the Post Office Department, so that the use of it in the postal service would not deprive the owner of any opportunity to have it used otherwise and could not damnify him, and that, therefore, no damage can be recovered in the case, and that no profits can be recovered because there is no party before the court or that can be brought before the court who has received any, *overruled*, it appearing that the Post Office Department required the mails to be sent with certain frequency, and that the stamps should be canceled and the letters marked separately, and required that the defendant should do this either himself or by the employment of clerks to be paid by him out of the surplus revenues of his office.

5. Neither the official character of the defendant nor the fact that he turned over to the Government the savings made by the use of the patented invention can shield him against the owner of the patent.

6. The circuit courts have jurisdiction of all questions concerning the title to a patent and the right to recover for infringement of the same under the patent laws of the United States, irrespective of whether the parties to a suit are citizens of the same or different States.

7. Conveyances *pendente lite* do not at all affect the litigation as between the parties to the original controversy unless there are special statutes or circumstances to control; but courts of justice, even courts of law, and especially courts of equity, often protect the rights of the real owners to the fruits of a recovery as against those who are nominal but not real owners whenever their rights may have been acquired.

8. All interests in patents are assignable by an instrument in writing. No particular form is required; but still there must be some operative words expressing at least an intention to assign in order to constitute an assignment.

9. An instrument which makes no allusion to a patent further than to mention a claim for the use of the invention embraced therein cannot act to carry the patent. The fact that it was recorded in the Patent Office cannot make it an instrument of title, but could only complete its effect if it was one.

10. It is not important in equity proceedings for every pur-

pose that all the parties to the controversy should be upon opposite sides in the formal pleadings. It is sufficient that they are citizens of different States on opposite sides of the dispute, although not on opposite sides in the pleadings, for the removal of the case to the Federal courts.

11. An assignment of all property, except such property as is exempt by law from levy and sale under execution, cannot transfer a patent right.

U. S. Circuit Court—District of Rhode Island.

MILLER et al. vs. SMITH et al.—DESIGN PATENT.

Clifford, J.:

1. The introduction in evidence of letters patent affords a *prima facie* presumption that the patentee is the first and original inventor, and is sufficient to entitle the complainants to a decree, unless it is overcome by competent proof of greater weight.

3. Regulations and provisions applicable to the obtaining or prohibition of patents for inventions or discoveries, not inconsistent with the existing patent act, apply to patents for designs, without modification or variation.

3. Exhibits introduced by a party without needful explanation do not deserve and will not receive much consideration.

4. When the defense of want of novelty is made it is the duty of the tribunal, whether court or jury, to give it effect; but such proof or testimony should be weighed with care and never be allowed to prevail where it is unsatisfactory, nor unless its probative force is sufficient to outweigh the *prima facie* presumption arising from the introduction of the patent.

5. In the case of a design as well as a mechanical patent mere delay in applying for a patent will not forfeit the inventor's right to the same or present any bar to a subsequent application, providing the invention had not been in public use or on sale two years before the filing of the application.

6. A patent for a design consisting of letters of the alphabet having a described ornamentation is not bad because it embraces more than one letter.

7. While it is true that the test of infringement in respect to the claim in a design patent is the same as in respect to a mechanical patent, it is not essential to the identity of the design that it should be the same to the eye of an expert.

8. If to the eye of the ordinary purchaser the designs are substantially the same, if the resemblance is such as to deceive such an observer and sufficient to induce him to purchase one supposing it to be the other, the one first patented is infringed by the other.

ABSTRACT.

The record in this case shows that the patent is for an alleged new and useful design for jewelry of the various kinds specified in the description given in the specification. It consists of the letters of the alphabet, shown by photographic illustrations, which are of a rustic pattern ornamented by leaves, the claim being for sleeve buttons and other jewelry, composed of the letters of the alphabet, and having the described ornamentation of letters, substantially as given in the description and shown in the photographic illustration accompanying the application for a patent.

Rustic letters are employed, by which is meant, as the complainants allege, letters in which the necessary lines in the same represent the branches or trunks of trees unstripped of their bark, the ornamentation consisting of several separate leaves placed at intervals upon the lines of each letter, the lines exhibiting the appearance of the bark of a branch or trunk of a tree, which design is used for ornamenting buttons, studs, lockets, and other articles of jewelry. Photographs of the improvement were taken directly from gold sleeve buttons having leaves upon the letters in actual relief as given in the descriptive portion of the specification.

Sufficient appears to show that the complainants were jewelers, and that for a series of years they had been endeavoring to produce an initial letter sleeve button which would be more ornamental and better suited for ladies' wear. Proofs were introduced showing many such experiments and giving a history of the efforts to that end, and an account of the time and expenses incurred for its accomplishment, all of which resulted finally in producing the patented design. Experienced witnesses testify that they know of no other design relating to this class of goods which has been as successful as the subject of the patent in controversy, and the court is convinced that the invention is highly acceptable to the public and profitable to the patentee.

Inventors may, if they can, keep their inventions secret, and if they do it is a mistake to suppose that any delay to apply for a patent will forfeit their right to the same or present any bar to a subsequent application. Nor does any different rule prevail in the case of a design patent. Delay less than for the period of two years constitutes no defense in any case; but the respondents may allege and prove that the invention in question had been in public use or on sale more than two years prior to the application of the party for a patent, and if they allege and prove that defense they are entitled to prevail in the suit. Due allegation in that regard is made in this case; but the record contains no proof to support it, and it must be overruled. From all which it follows that the patent is a good and valid patent, and that the complainants, if they have proved the alleged infringement, are entitled to a decree in their favor for the profits made by the respondents in the violation of their exclusive right to make, use, and vend the improvement secured by the letters patent.