DECISIONS RELATING TO PATENTS.

BY THE SUPREME COURT OF THE UNITED STATES.

GAGE *et al. v.* HERRING *et al.*

Appeal from the Circuit Court of the United States for the Northern District of New York. Reissued Patent 4,712. Original patent 19,984.

If a patent containing a single claim for a combination of several elements is, within four months before its expiration, reissued and extended with the same description as before, but with two claims, the one a repetition of the original claim, and the other for a combination of some of the elements only, the reissue is invalid as to the new claim and valid as to the other.

A patent for a combination of several elements is not infringed by using less than all the elements of the combination.

In a patent for an improvement in cooling and drying meal during its passage from the millstones to the bolts, the claim was for the arrangement and combination of a fan producing a suction blast, the meal chest, a spout forming a communication between the fan and the meal chest, a dust room above to catch the lighter part of the meal thrown upward by the current of air, a rotating spirally-flanged shaft in the meal chest conveying the meal to the elevator, a similar shaft in the dust room conveying the meal dust to the elevator, and the elevator taking the meal to the bolts. Within four months before the expiration of the patent it was reissued and extended with two claims, the one a repetition of the original claim, and the other for the combination of the fan, the communicating spout, the meal chest with the conveying shaft in it, and the elevator, but omitting the dust room with its conveying shaft. *Held* that the reissue was valid for the old claim only, and was not infringed by the use of the fan, spout, meal chest with its conveying shaft, elevator, and dust room, without any conveying shaft in the dust room or other mechanism performing the same function.

Solders, Soldering, and Brazing.

A practical mechanic furnishes the *American Artisan* an article on soldering and brazing, which contains useful information for the young metal worker, and if the facts given are not new to some of the older and more experienced tin and copper smiths, they may find it convenient to have their memory quickened.

In uniting tin, copper, brass, etc., with any of the soft solders, a copper soldering iron is generally used. In many cases, however, better work may be done without the soldering iron, by filing or turning the joints so that they fit closely, moistening them with soldering fluid, placing a piece of smooth tinfoil between them, tying them together with binding wire, and heating the whole in a lamp or fire until the tinfoil melts. We have often joined pieces of brass in this way, says the writer, so that the joints were quite invisible. Indeed, with soft solder, and especially with bismuth solder No. 19 or 21, almost all work may be done over a lamp without the use of a soldering iron or fire.

Advantage may be taken of the different degrees of fusibility of the solders in the table to make several joints in the same piece of work. Thus, if the first joint has been made with fine tinner's solder, there would be no danger of melting it in making a joint near it with bismuth solder No. 16, and the melting point of both is far enough removed from No. 19 to be in no danger of fusion during the use of that solder. Soft solders do not make malleable joints. To join brass, copper, or iron, so as to have the joint very strong and malleable, hard solder must be used. For this purpose No. 12 will be found excellent; though for iron, copper, or very infusible brass, nothing is better than silver coin, rolled out thin, which may be done by any silversmith or dentist. This makes decidedly the toughest of all joints, and, as a little silver goes a long way, it is not very expensive.

In preparing solders, whether hard or soft, great care is requisite to avoid two faults—first, a want of uniformity in the melted mass; and, second, a change in the proportions by the loss of volatile or oxidizable ingredients. To obtain hard solders of uniform composition, they are generally granulated by pouring them into water through a wet broom. Sometimes they are cast in solid masses, and reduced to powder by filing. Nos. 10, 11, 12, 13, 14, and 15 are generally rolled into thin plates, and sometimes the soft solders, especially No. 21, are rolled into sheets, and cut into narrow strips, which are very convenient for small work that is to be heated by lamp. Of course, where copper, silver, and similar metals are to be mixed with tin, zinc, etc., it is necessary to melt the more infusible metal first. When copper and zinc are heated together, half the zinc passes off in fumes. In preparing soft solders, the material should be melted under tallow, to prevent waste by oxidation; and in melting hard solders the same object is accomplished by covering them with a thick layer of powdered charcoal.

Hard solders, Nos. 6, 7, 8, and 9, are usually reduced to powder either by granulation or filing, and then spread along the joints after being mixed with borax which has been fused and powdered. It is not necessary that the grains of solder should be placed between the pieces to be joined, as with the aid of the borax they will sweat into the joint as soon as fusion takes place. The same is true of soft solder applied with soldering fluid. One of the essential requisites of success, however, is that the surfaces be clean, bright, and free from all rust. The best solder for platinum is fine gold. The joint is not only very infusible, but is not easily acted upon by common agents. For German silver joints, No. 14 is excellent.

For most hard solders, borax is the best flux. It dissolves any oxides which may exist on the surface of metal, and protects the latter from the further action of the air, so that the solder is thus enabled to come into actual contact with the surfaces that are to be joined. For soft solders the best flux is a soldering fluid which may be made by saturating equal parts of water and hydrochloric acid (spirit of salt) with zinc. The addition of a little sal ammoniac is said to improve it. It is not impossible that fluxes of even greater efficiency might be discovered by a little well directed effort; but for the present these answer every purpose. In using ordinary tinner's solder resin is the best and cheapest flux, and possesses this important advantage over chloride of zinc—it does not induce subsequent corrosion of the article to which it is applied. When chlorides have been applied to anything that is liable to rust, it is necessary to see that they are thoroughly washed off and the article carefully dried. The following table gives recipes the writer has tried, and which he says will be found exceedingly reliable. Some are taken from the Mechanical Manipulation of Holzapfel, whose name is a sufficient guarantee for their excellence:

TABLE OF SOLDERS.

No.	Name.	Composition.	Flux.	Fluxing point.
1	Plumber's coarse solder	Tin, 1; Lead, 3	R	
2	" seated	" 1; " 2	R	
3	" fine	" 1; " 2	R	
4	Tinner's solder	" 1; " 1	R or Z	
5	" flux solder	" 2; " 1	R or Z	
6	Hard solder for copper, brass, iron	Copper, 2; zinc, 1	R or Z	
7	" " " " "	Good tough brass, 5; zinc, 1	B	
8	" " " " "		B	
	more fusible than 6 or 7	Copper, 1; zinc, 1	B	
9	Hard solder for copper, brass, iron	Good tough plate brass	B	
10	Silver solder for jewelers	Silver, 19; copper, 1; brass, 1	B	
11	" " " plating	" 2; " 1	B	
12	" " " brass, iron	" 1; " 1	B	
13	" " " " "	19; copper, 1; brass, 1	B	
	more fusible	5; brass, 5; zinc, 3	B	
14	Gold solder	Gold, 12; silver, 2; copper, 4	B	
15	Bismuth solder	Lead, 4; tin, 4; bismuth, 1	R or Z	
16	" "	" 3; " 3; " 1	R or Z	
17	" "	" 3; " 2; " 1	R or Z	
18	" "	" 3; " 1; " 1	R or Z	
19	" "	" 2; " 1; " 1	R or Z	
20	" "	" 3; " 2; " 2	R or Z	
21	Pewterer's solder	" 3; " 1; " 2	R or Z	

	Fusing point.
	340° Fahr.
	441°
	370°
	324°
	340°
	320°
	310°
	300°
	330°
	302°

Abbreviations: R, Resin; B, Borax; Z, Chloride of Zinc.

Steam Fire Engine Test.

A new third size Silsby fire steamer was successfully tested lately at New Haven, Conn., in the presence of a large number of city officials and prominent members of the fire departments from various cities.

The fire was lighted, says the *Fireman's Journal*, at 2:55 o'clock, and in two and one-quarter minutes the gauge indicated ten pounds of steam, fifteen pounds in three minutes, twenty in three and one-half, and thirty pounds in four and one-half minutes. A minute later, a stream was playing on the Green. In order to make the test thorough, the steamer was made to pump its water from the cistern at the corner of Court Street, which held at the start 20,000 gallons. The official record was as follows:

Test.	No. of lines.	Feet each line.	Nozzle inches.	Horizontal.	Vertical.
1	1	200	1¼	278	195
2*	1	350	1¼	274	...
3	1	150	1¼	...	210
4	2	100	1	240	170
5†	2	100	1½	260	160
6†	2	100	1¾	250	150
7‡	2	100	⅞	195	140
8	1	1,500	1	165	...
9§	2	50	1¼	319	215

* Pipe on top of City Hall tower at elevation of 160 feet. † Two lines of 100 feet each, siamesed into one. ‡ Two lines of 100 feet each, siamesed into four lines of 50 feet each. § Two lines of 50 feet each, siamesed into 1¼ inch nozzle.

The steamer for over two hours worked with the greatest vigor, pouring out immense streams of water wherever the pipes were directed. She carried 120 pounds of steam, and in no instance, no matter how severe the test, did she fail to respond. The new steamer is by far the most powerful and handsome one in the city, and is a great addition to the New Haven Fire Department. One bigtest was forcing the water to the top of the City Hall tower, 160 feet high, and throwing a stream out upon the Green, a distance of 274 feet. The throwing of a stream a distance of 260 feet through a one and a half inch nozzle, and 250 feet through a one and three quarter inch nozzle, excited the admiration of old firemen, as did the supplementary test suggested by Mr. Denne, in order to fully illustrate the great power of the steamer in throwing a stream a long distance through 100 feet of hose, siamesed with a one and one-quarter inch nozzle. The stream was carried the remarkable distance of 319 feet.

Professor Huxley on Oysters.

Professor Huxley lately lectured at the Royal Institution upon "Oysters." He stated that the shells of the oyster are held together by an India-rubber like ligament controlled by a muscle. By this ligament the oyster can hold his shells tightly together. When the animal is killed without the destruction of the ligament, the latter expands and acts like a spring, keeping the shells open, except when pressed. It is absolutely necessary to the life of the oyster that the shells should open to some extent, consequently any great pressure on the shells is injurious to the animal. He did not wish to set his hearers against eating an animal which plays about the palate like gustatory summer lightning, still the oyster possessed elaborate apparatus, such as a foot, mouth, and even liver, the latter of which he trusted was not liable to get out of order. In short, the animal was of much greater complexity than the best repeater watch, and it has a highly developed nervous system. Its mouth has no jaws, and it lives by food carried to it by oceanic currents. It lays an enormous multitude of eggs, which lie like cream upon what is called its beard. The eggs of the English but not of the American oyster are incubated by the parent. In about a fortnight, more or less—for much depends upon the temperature—the young larvæ, each about one one-hundred-and-fifteenth inch in diameter, are set free from the egg. The young one has a bivalve shell, as regular and symmetrical on both sides as that of the cockle, and a great disk protrudes from the back of the neck. One oyster may contain a million eggs, which is enough to break the heart of Malthus. The young one floats about for several days, during which it may be carried by currents perhaps seventy or eighty miles, when it falls to the bottom and turns over on its left side; one of its valves then becomes fastened to the support below, and grows thicker as time passes on; the upper valve becomes flat. The age attained by the oyster is said to be twenty or twenty-five years, but this is not quite certain. It requires at least three per cent of saline matter in the water in order to live.

Enormous numbers of oysters perish. Excessive variations in temperature kill off multitudes, and the oyster, in its early stage, is eaten by everything which has a mouth. Some are killed in the struggle for existence, for only a limited number can live in an oyster bed, the amount of food being limited in its supply over a given area. In its later life it becomes the prey of star fish, ground fish, and parasites which work through its shell. When its shell is very thick it is attacked by various tunnelers, more especially the dog whelk. The dog whelk has a curious thing like a center-bit in his mouth; he settles on the oyster, and bores a round hole in his shell; it is a beautiful bit of engineering; he takes his time over it, for he has nothing else to do, and does not finish under several hours. Then the master of the oyster bed comes along and plucks up the whelk, which looks at him with a molluscous, innocent, friend-of-humanity-kind of a smile, and says: "Why can't you let me go on making my tunnel? I only want to enter into international relations." The owner of the oyster bed, however, put his heel upon him. This dog whelk parable was loudly applauded by five or six of the listeners. The rest of the auditory laughed.

Next, said the lecturer, man comes in as a destroying agent. The scarcity and high price of oysters of late years are due to several causes. One of them is the increase of facilities, by means of new railways, for the transport of fish, not alone into the interior of the British Islands, but all over Europe. In England small towns which once had none now have fish shops. Another cause is that for many years the spatting has been bad; the meteorological conditions of the last twenty years have been bad for the oyster. There is no doubt that these two unavoidable influences have been at work, with the natural result of a rise in price with increased demand, without increased supply. Another alleged cause is over-dredging, thereby leaving too few to continue the brood. Professor Huxley said that it was useless to have a close time for oysters during a few months, if the fishermen might dredge as many as they pleased the rest of the year. And the general tendency of his closing argument, drawn from French statistics, was that over-dredging did not seem to have to do with the matter, the causes affecting the multiplication of the oyster being of too vast a nature to be much affected by such operations of man.

Slugs in Gardens.

Many gardeners have trouble with garden slugs. Baiting the slugs with bran is probably the surest way of catching them. The easiest way to proceed, according to James Vick, is to take some pieces of slate, or flat stones, or flat pieces of tin, and lay them about in the garden among the plants, distributing them very liberally; just at sundown go out and place a teaspoonful of bran on each piece of slate or tin, and the slugs will soon become aware of it, and begin to gather and feed on it. In about two hours, when it is dark, go out again with a lantern and a pail containing salt and water, and pick up each piece on which the slugs were found feeding, and throw slugs and bran into the brine, where they instantly die. It is well, also, to go around again in the morning, and many slugs will be found hiding under the pieces of slate, and can be destroyed in the brine. By following up this method persistently for a few weeks the garden may be effectually rid of the nuisance.