

BORN BLIND AND DEAF.

BY DANIEL C. BEARD.

Australia seems to be a spot set aside by nature for experiments in curious forms of animal life. By some means, in the far distant past, a representative of that singular order, the marsupials, reached North America, where it is still to be found in abundance, a source of wonder to the ignorant and a puzzle to men of science. It was not until 1848 that the mysteries and fables shrouding the birth of this animal were swept away by Bachman and some of his friends, who, by diligent work and patient experiment, set aside forever the wild theories of such men as Valentine, Marcgrave, Piso, Beverly, Pennant, and others, who held that the young of this creature grow upon the mammæ as the fruit does upon a stalk!

The *Didelphis virginianus*, in other words, the common opossum, is described by scientists as follows: "Head long and conical, muzzle pointed, ears large and membranous, rounded, and almost naked, tongue aculeated, internal toe of hind foot opposable to fingers," etc. Equally good and far less technical is the description given by a small street Arab as he gazed at one of these animals in the writer's possession: "Oh, looky, Billy," said he, "see that big rat; hit's got a pig's head, a coon's body, monkey's feet, and a rat's tail." The accuracy of the last description may be tested by reference to the accompanying engraving showing the parts in detail.

According to "Wood," fifteen days elapse, and the young opossum comes into this world, a diminutive, helpless babe, weighing not more than three or four grains, blind, naked, and deaf. It cannot even open its mouth, its jaws being sealed together, a small orifice only left at the muzzle, through which it receives its nourishment. One would think it was ill adapted to buffet with the rough world, but Nature, ever kind to her creatures, has ready prepared a soft cradle for its reception, where it is placed by its mother. The opossum, like its cousin the kangaroo, is a pouched animal; within the pouch are the mammæ; to one of these the young opossum fastens itself almost immediately after being placed in the pouch. The growth of this

babe is surprisingly rapid, increasing from three and three-quarter grains to thirty grains in a week. In four weeks' time its funny head may be seen cautiously peering out at the great wide world; and at the end of the fifth week the little fellow is able to leave its snug quarters and venture out. Not being over-confident of its ability to take care of itself it grasps with its prehensile tail the tail of its mother.

Next to the rabbit the Virginia opossum is one of the most prolific of animals, often appearing with a dozen or more in its pouch, while other older ones cluster upon its back, firmly anchored there by their tails.

You have but to spend a short time upon some Southern

said that these animals are readily domesticated, soon becoming very tame and gentle, which is probably true. But the one I have, possibly through disappointment at the loss of her family, has a very ugly temper. She occupies the house formerly the home of the pygmy musk deer, an illustration and description of which was published in this paper in April, 1879. Whenever I approach the house she retreats to the furthest corner, and there, with distended jaws, defies further molestation.

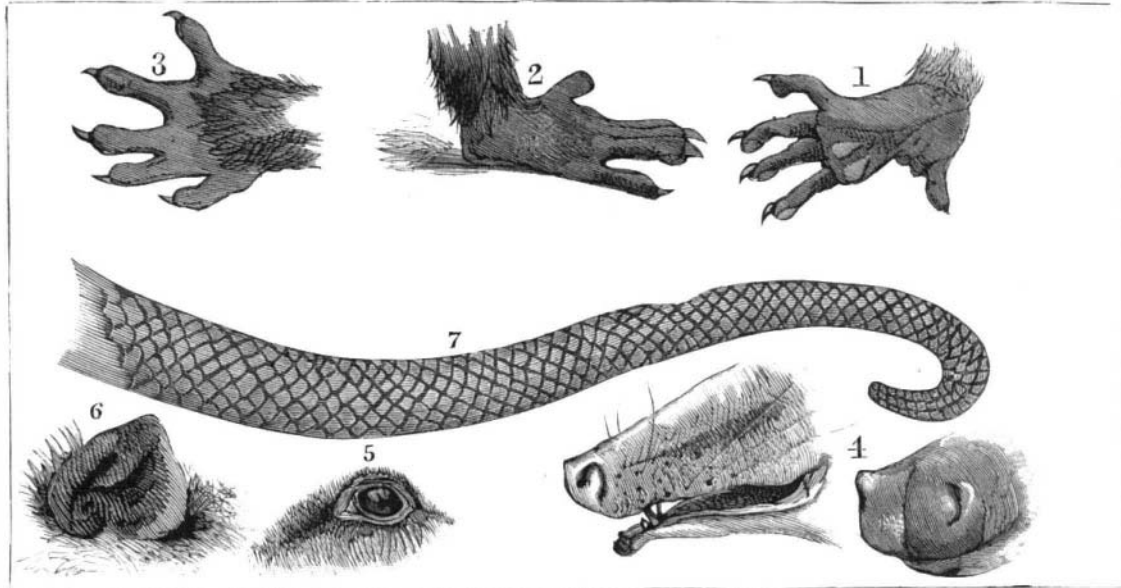
Removal of Grease Spots.

Fatty oils have a greater surface tension than oil of turpentine, benzole, or ether. Hence, if a grease spot on a piece of cloth be moistened on the reverse side with one of these solvents, the tension on the greasy side is larger, and therefore the mixture of benzole and fat or grease will tend to move towards the main grease spot. If we were to moisten the center of this spot with benzole, we should not remove it, but drive the grease upon the clean portion of the cloth. It is, therefore, necessary to distribute the benzole first over a circle surrounding the grease spot, to approach the latter gradually, at the same time having blotting paper in contact with the spot to absorb the fat immediately.

Another method, namely, to apply a hot iron on one side, while blotting paper is applied to the other, depends upon the fact that the surface tension of a substance diminishes with a rise of temperature. If, therefore, the temperature at different portions or sides of the cloth is different, the fat acquires a tendency to move from the hotter parts towards the cooler.—*The Pharmacist.*

Chicago's Manufacturing Industries.

The recent census of the manufacturing industries of Chicago discloses evidence of a phenomenal rate of progress during the last ten years. The footings show 3,752 establishments, \$80,692,102 capital, 113,507 persons employed, \$37,615,381 wages paid, and \$253,405,695 in value of the articles manufactured. This is nearly three times the annual product in 1870. The leading industry is meat



OPOSSUM.—1 Bottom of hind foot.—2. Top of hind foot.—3. Top of fore foot.—4. Side and front of snout.—5. Eye.—6. Ear.—7. Prehensile tail.

plantation to learn the charms of a 'possum hunt, and if you can overcome your scruples enough to taste the meat after it is prepared by one of the sable huntsmen, you will pronounce it good.

Though this marsupial sometimes makes raids upon hens' nests, and occasionally upon the hens themselves, the good it accomplishes in exterminating other more mischievous animals doubly repays for a few stolen eggs and an occasional chicken. One that Bachman kept in a stable chased or devoured every rat upon the place.

Through the kindness of my friend Mr. John Walker, of Flushing, I secured a large female opossum from Charleston, S. C. When caught she had three young ones in her pouch, but when the Charleston steamer arrived at this port I was disappointed to find the young ones missing. It is



OPOSSUM.—*Didelphis Virginianus.*

packing: 72 establishments, with \$8,464,000 capital, employ 12,891 persons, and put up \$81,570,000 in value of meats. The iron and steel manufactures reach about \$25,000,000. The rolling mill products are valued at \$15,673,624, not including the Bessemer Steel Works, the values for which are merged in a general item. The manufacture of clothing foots up \$17,423,697; sash, doors, etc., \$8,981,281; bridges and railroad stock, \$8,030,398; furniture, \$7,188,278; tanning and currying, \$5,637,000; alcohol and rectifying, \$5,024,220; lard oil, \$6,508,800.

DECISIONS RELATING TO PATENTS.

United States Circuit Court—District of Vermont.
HOLLY vs. VERGENNES MACHINE COMPANY.

Wheeler, J.:

1. The meaning of the claims in a patent is to be derived from the specification.

2. Two devices are substantially the same in the sense of the law of patents when they perform the same functions in substantially the same way to accomplish the same result, and, except when form is of the essence of the invention, it should not be regarded in the question of infringement.

3. In determining the matter of infringement attention should be paid to such portions as really do the work, so as not to give undue importance to parts used only as a convenient mode of construction.

4. The patentee is entitled to the exclusive use of the whole of his patented invention, and if it is of a combination of numerous parts, including in it other new and useful combinations of less of the parts, he seems to be entitled to the exclusive use of these lesser combinations, as well as to the exclusive use of the whole.

This suit is brought upon reissued letters patent, No. 5,132, dated November 5, 1872, for a new system of waterworks for supplying cities and towns with water, and original letters patent, No. 94,747, dated September 14, 1869, for a new safety valve for street water pipes, both granted to the plaintiff. The defenses are that the plaintiff is not the original and first inventor of the inventions described in the patents, and that the defendants do not infringe. The cause was heard at last term on pleadings, proofs, and arguments of counsel.

Before the plaintiff's invention water to supply cities and towns was, when the supply was located high enough, drawn into a reservoir, and from thence into a main pipe, from which others ramified through all parts of the city or town and into dwellings and other places to spigots, from which it could be drawn as wanted for use. In level places, where there was still an elevation for a reservoir, it was forced by pumps into a reservoir, and when there was no such elevation it was forced into a stand-pipe of the necessary size and height or into mains connecting with such a stand pipe, and the pressure of the water in the reservoirs or stand-pipes would regulate the flow to the spigots and hydrants. Where it had to be supplied by pumps the irregularity in the amount drawn at the spigots and hydrants would not admit of a uniform supply to the mains, and if pumps were employed for furnishing such a supply the incompressibility of water is such that when the drawing ceased the pipes would burst or the pumps or machinery be broken.

The plaintiff's inventions obviated these difficulties by providing pumping machinery which increasing pressure of water in the mains would slacken and decreasing pressure would hasten, and guarding against sudden shocks from the quick closing of hydrants by the use of an air chamber connecting with the mains, and preventing the danger of continued pressure from that source while the machinery was slackening by a peculiarly arranged relief valve applied to the mains, so that the water could be pumped directly into the mains and drawn therefrom by the spigots and hydrants at pleasure with safety to the works without any stand-pipe or reservoir. None of the systems set up as anticipations had these contrivances combined in this manner.

The London waterworks, constructed by Peter Maurice in 1583, as described by Thomas Ewbank in "Hydraulics and Mechanics;" the system of waterworks described in the English patent to Joseph Bramah, dated October 31, 1812; and the London bridge waterworks, described by William Mathews in "Hydraulia, 1835," had pumps forcing water directly into mains to be carried to inhabitants; but neither of them had any contrivances for slackening the quantity forced as any pressure increased from diminishing the quantity drawn, as described; neither does it appear from the descriptions given but that the water flowed through by a constant flow, and was caught as wanted for use. Birkinbine's system at the State Lunatic Hospital at Harrisburg, Pennsylvania, had connection with a reservoir at the top of the building. Linsley's system at Burlington, Vermont, had connection with a reservoir above the city. Birkinbine had no means for regulating the quantity pumped by the severity of the pressure in the mains, and Linsley had none for lessening the quantity as the pressure increased. His system was nearer like the plaintiff's than any other was, but his lacked some of the essential features of the plaintiff's. His had means for slackening the pumping machinery when the pressure in the mains decreased, to prevent the machinery from running away if the pressure should be removed by bursting or other casualty; but this is quite different from regulating the supply according to the pressure. He had pipes leading each way from the main carrying the water up to the reservoir, and as to those pipes the water was pumped directly into them without going to the reservoir; but as they

were connected by the main with the reservoir the pressure in them would be regulated by the pressure from the reservoir, and would not in any manner regulate the quantity pumped according to their requirements. Birkinbine had a safety valve on the main for the same purposes as the plaintiff's relief valve; but his valve was held by dead weights, while the plaintiff's is steadied by a dash pot. None of these things show that the plaintiff was not the original and first inventor of the inventions described in both patents.

This is in accordance with the decision of Drummond and Gresham, J. J., in *Holly vs. Union City* (14 O. G., 5), so far as that decision goes, which only involves the reissued patent. This suit rests upon the first claim to that patent, which is for—

"The above-described method of supplying a city with water—that is to say, by pumping directly into the water mains when the apparatus for that purpose is supplied with contrivances by which the pressure within those mains may be preserved in a great degree uniform, sufficiently so for practical purposes, or increased or diminished at pleasure, substantially as and for the purpose above shown."

It is objected that this claim does not specify any devices constituting the system mentioned, and that it is too indefinite to furnish a foundation for a claim for infringement; but this objection cannot prevail. The patent is to be read altogether for the purpose of ascertaining the meaning of the whole and of every part. Consequently the specification may be referred to for ascertaining the meaning of the claims. (*Bates vs. Coe*, 15 O. G., 337; *Brooks vs. Fish*, 15 Haw., 215.)

The specification describes pumping apparatus which the increase of pressure in the mains will slacken and decrease will hasten. It describes mains connected with an air chamber and a relief valve for easing the shock of sudden and continued pressure, and mains from which the water is drawn as wanted, or closed mains, operating by pumping the water directly into the mains without a reservoir or stand-pipe. The claim of the system as and for the purposes above shown is a claim for this combination of these various contrivances, operating together in this manner for this purpose. It is for these devices so combined and arranged, and not for any abstract principle or method apart from the devices themselves. The claim appears to be valid when so construed. (*Holly vs. Union City*, 14 O. G., 5.)

The plaintiff's pumping apparatus is arranged so that the increase of pressure in the mains will lessen the amount of water being pumped into them by forcing the water against a piston, the motion of which, operating through complicated devices, shuts off the motive power and slackens the pumps. This is the pumping apparatus supplied with contrivances by which the pressure within the mains may be preserved in a great degree uniform which is mentioned in this first claim, and that part of the patented invention covered by this claim is the combination of this apparatus with the mains, the air chamber, the relief valve, the pipes, and the spigots.

The answer and the evidence show that the defendants have put in waterworks for cities and towns, or participated in putting them in, which have the pumping apparatus described in letters patent No. 154,468, dated August 25, 1864, issued to John P. Flanders, one of the defendants, for an improvement in pumps, stated in the specification to relate more particularly to pumping engines adapted to the delivery of large volumes of water, as in town or city supply where no stand-pipe or reservoir is employed, and in the description referring only to such engines as pump directly into the mains. In this pumping apparatus the increasing pressure of the water in the mains decreases the amount of water pumped in by acting upon a valve, which opens and closes a duct leading from one end of the pump cylinder to the other around past the piston, so that when the pressure opens the valve the water is pumped from one side of the piston to the other and not forced along, and when the pressure is diminished by the opening of the spigots and drawing water the valve closes and the water is forced along again to take the place of that drawn off. This is a pumping apparatus supplied with contrivances by which the pressure within the mains may be preserved in a great degree uniform, as mentioned in this claim of this original patent of the plaintiff. The combination and arrangement are the same in defendants' works as in the plaintiff's, unless there is a substantial difference in these pumping engines, and the rest of the combination is the same, whether there is a difference here or not.

Two questions arise here: One is whether these pumping engines are substantially the same in this arrangement, and the other is whether the rest of the arrangement is a part of the plaintiff's patented invention if they are not. If they are, the defendants have taken the whole of the invention covered by this claim. If they are not, and the rest of the combination without them is covered by the patent, then the defendants have taken so much of the patented invention. In this matter of regulating the flow of water in such pipes according to the wants of consumers, without the aid of the force of gravitation furnished by reservoirs and stand-pipes, the plaintiff precedes Flanders and has produced something which underlies all that Flanders has produced, and if it includes what Flanders has produced, he has a monopoly of it. (*Railway Co. vs. Sayles*, 97 U. S., 554.) And these pumping machines are substantially the same in the sense of the law of patents when they perform the same function in substantially the same way to accomplish the same result, and except where form is of the essence of the invention it should not be regarded in questions of this kind, and it is not of the essence of this invention. Attention should be

paid to such portions as really do the work, so as not to give undue importance to parts used only as a convenient mode of construction. (*Machine Co. vs. Murphy*, 97 U. S., 120.)

Here the pressure in the mains does the work of lessening the flow. In the plaintiff's machine it does it by pressing against a valve and slackening the machinery propelling the water. In the defendants' machine it does it by pressing against a valve and lessening the effect of the machinery upon the water. The means are the same, the result the same, and the mode is different only in form. (*Foster vs. Moore*, 1 Curtis' C. C., 279.) If this was not so, the arrangement of the mains, air chamber, relief valve, and pipes was new, and a material part of the invention, which would be covered and included in this claim of the patent, and which the defendants would have no right to take and use in connection with Flanders' invention. (*Sellers vs. Dickinson*, 6 E. L. and Eq., 544, 5 Exch., 312; *Lister vs. Leather*, 8 Ell. and Backb., 1,004.)

Flanders' pumping apparatus is the equivalent of the plaintiff's in making up a system of waterworks with these other parts, although it may not be the same thing for other purposes. The question now is not whether they are the equivalents of each other for all purposes, but is whether they are for this purpose.

In *Sellers vs. Dickinson* the patent was for machinery, consisting, among other things, of a clutch box operating automatically to cut off the power from a loom whenever the shuttle became entangled, combined with other mechanical contrivances through which the momentum of the sley was made to move a brake against the flywheel to take up the momentum of the parts and prevent sudden shock from the stoppage. The clutch box was old, but its combination with the brake was new. The defendant's contrivance for accomplishing the same object, and for which he had obtained a patent, dispensed with a clutch box and had different contrivances from the plaintiff's for applying the momentum of the sley to the brake. It was argued that the patent was for a combination, and that there could be no infringement unless the whole combination of the same elements was used. This argument was overruled. Pollock, C. B., saying that if a portion of a patent for a new arrangement of machinery is in itself new and useful, and another person, for the purpose of producing the same effect, uses that portion of the arrangement and substitutes for the other matters combined with it another mechanical equivalent, that would be an infringement, and the plaintiff there had judgment. The defendants here use the pressure in the mains for the same purpose that the plaintiff does, and thereby complete the arrangement of the plaintiff's patent, the same as the defendant there used the momentum of the sley for the same purpose that the plaintiff there did, thereby completing the combination of that patent. These views do not differ from the decision in *Prody vs. Ruggles* (16 Pet., 336) and like cases, where it is held that a patent for a combination of several parts to accomplish a part is not infringed by a combination of less of the same parts alone, or with other substantially different, to produce the same result. That case was put expressly upon the ground that neither any of the parts nor any portion of the combination less than the whole was new.

The patentee is entitled to the exclusive use of the whole of his patented invention, and if it is of a combination of numerous parts, including in it other new and useful combinations of less of the parts, he seems to be entitled to the exclusive use of these lesser combinations, as well as to the exclusive use of the whole. (*Sharp vs. Tiff*, 17 O. G., 1,282.)

The pumping apparatus of Flanders may be an improvement upon that of the plaintiff, and properly patentable as such, so as to entitle him to the exclusive use of those particular devices, but that would give him no right to use his devices to infringe the plaintiff's patent with, although this fact may be of importance in determining the amount of profits or damages due to such infringement.

The other patent is for a dash-pot combined with a safety valve upon water pipes subjected to great pressure, to steady the motions of the valve in opening and closing. The dash-pot is an old and well-known contrivance for steadying motion, but it had never been combined with such valves before. The defendants use a dash-pot in the same combination, but they claim they do not infringe because their dash-pot is different from the plaintiff's. The plaintiff's is closed at the top and receives water, in which the loose piston works, at the bottom from the main on which it is placed. The defendants' is open at the top and receives water there, and is closed at the bottom. Their operation in steadying motion is alike. The pressure of the water in the main may communicate some motion to the piston in the plaintiff's dash-pot which it cannot do to that of the defendants'; but that is not noticed in the patent. The dash-pots each accomplish the same result by the same means in substantially the same way. The combination is the same, and the use of theirs by the defendants infringes the patent of the plaintiff's. (*Machine Company vs. Murphy*, 97 U. S., 120.)

It has been urged in argument that the defendants only make and sell the Flanders pump, and that they do not infringe the plaintiff's patents, although their purchasers may have infringed by putting them into systems of waterworks. If all they did was to make and sell these pumps merely, probably they would not infringe by that alone; but the answer and proofs go beyond this. Flanders, in his testimony as to what works they have put up, does not limit what they did to making and selling the pumps merely. The effect of the whole clearly is, they participated and concurred