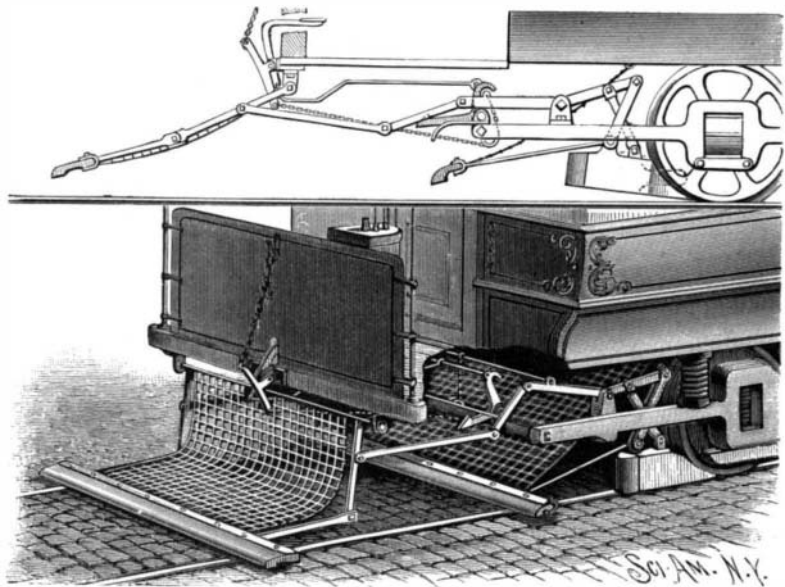


**AN IMPROVED CAR FENDER AND BRAKE.**

The illustration represents a fender with auxiliary brake mechanism so connected that both are released and moved into operative position at the same time, either by the motorman pressing his foot upon a lever or by an obstruction in the path of the car. The improvement has been patented by Mr. Paul M. A.

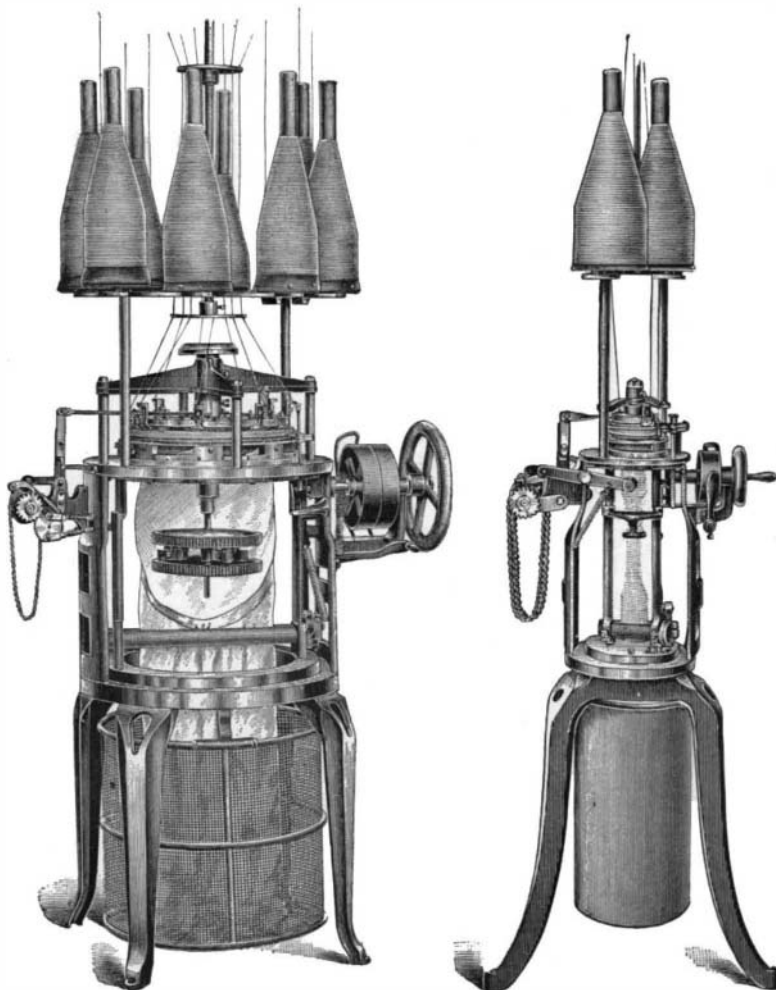


STEMMLER'S CAR FENDER AND BRAKE.

Stemmler, of Walden, N. Y. The principal view shows the fender down in position to pick up an obstruction in the path of the car, while the other view represents the fender and brake in inoperative position. The fender has side arms pivoted on brackets on the under side of the platform, the lower ends of the arms being pivotally connected with other arms by a cross bar carrying a strip of flexible material adapted to ride on the rails. A netting is attached to the side arms, and they are also pivotally connected by links with a brake shoe adapted to engage the tread of the rail. The brake shoes are also pivotally connected with the side arms of a second fender in the rear of the first one and directly in front of the car wheels. On each side of the car are levers pivotally connected with the brake shoe, and also connected by a link with a foot lever on the car platform, by pressing upon which the motorman or gripman may bring the brake shoes down to engage the rails and the tread of the wheels, at the same time swinging the fender down. When the operator does not see the obstruction, and it strikes the cross strip and bar of the front fender, the levers are also automatically released to move the fenders and the brake shoes into their lowermost position, the fender to pick up an obstruction and the brake mechanism to stop the car.

**IMPROVED KNITTING MACHINERY.**

The illustration represents a new circular ribbed knitting machine for making ribbed underwear, plain or fancy, royal ribbed Cardigan jackets, sweaters,



THE STAFFORD RIBBED UNDERWEAR MACHINE AND SHIRT SLEEVE.

skirts, caps, and jerseys. It is manufactured by Messrs. W. Stafford & Company, Little Falls, N. Y., and has an entirely new automatic take-up. It is of the spring type, worked by an eccentric driven by an incased gear cut on the bed plate of the machine, making a neat, direct-acting arrangement, very sensitive in adjustment and positive in action. The machines are also made with a weight take-up that is very simple and durable, being actuated by a worm gear and wheel which insures smooth and even motion.

Stationary bobbins are employed, making it possible to use the most perfect of stop motions, and the single chain and lever operates the dial cams. The cam rings and plates are made with the cams for each feed on separate segments, so that they can be readily removed without disturbing the needles, while being perfectly rigid when in place. The dial cams can be set in any combination for fancy stitches, and the cylinder draw cams are made to be easily drawn up or out, if desired. The dogs are adjustable from the outside without interfering with the cloth, and have a rolling contact which does not leave a mark. Great care is taken in the design and construction of these machines and all parts are interchangeable, so that duplicate pieces can be obtained at any time to replace parts which may be worn or broken.

In the ribbed shirt sleever the cylinders and dials, as in the larger machines, are of solid hard steel forgings. The cam ring is sectional, and the cams are of cast steel, ground after tempering, the cam system including the latest improvements. By a recent modification the lengths and changes are obtained without the use of chains, by a very easy adjustment, and the machine knits the arm, cuff and welt with or without slack course and widening attachment for arm, the operation being entirely automatic.

This company has facilities for designing and building knitting machines of all kinds, and fixtures to be used in connection therewith, as well as machines for making cut hosiery, mittens, etc. The knitting machines are fitted, if desired, with an electric stop motion, which has proved very convenient and reliable.

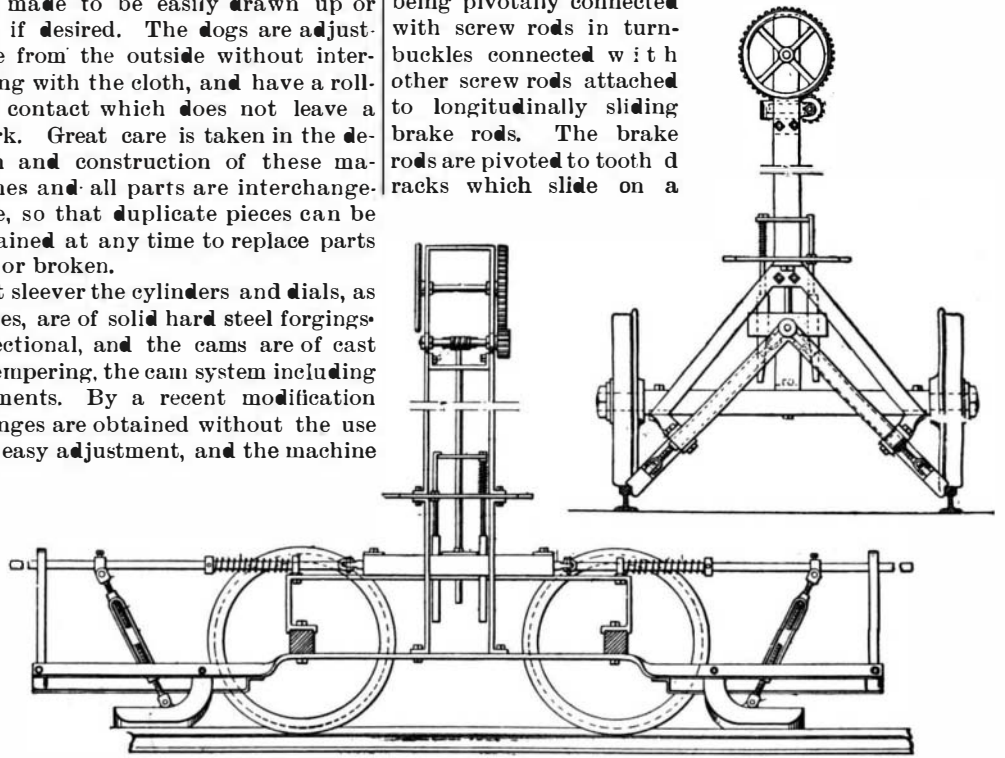
**Cultivating Sponges.**

Sponge farming has been found to be a very profitable industry, and at present there are hundreds of acres in the Gulf of Mexico, along the Florida coast, devoted to this novel purpose. The attempt to grow sponges was first made when it was discovered that the sponge fisheries of the Bahamas and the gulf coast of Florida showed signs of becoming exhausted. It has since been found that under proper cultivation sponges may be raised which are superior in quality and command higher prices than those found at sea. The site for a sponge farm is usually some arm of the sea where the salt water flows in freely. The only preparation necessary is to drop in rocks, stones, and other substances for the sponges to fasten themselves to and to dam up the lagoon so that the sponge seeds cannot be blown out to sea. The farms at first obtained their supplies of sponge seeds from the Fish Commissioners, but latterly they obtain them directly from the sponge fisheries. In the autumn of the year the various varieties of sponges are purchased by the sponge farmer, care being taken to secure both the male and female cells. The sponge seeds are generally kept in small "pounds" during the winter months, and here the masses of protoplasm develop and grow. The spores are liberated early in the spring. They swim about, the eggs grow rapidly and soon attach themselves to the rocks or coral at the bottom of the water. The sponge farm requires little attention after it is once started. The sponges grow slowly, and, as a rule, none are pulled

up till the end of the third year. The largest sponges are then gathered and the smaller ones are left to produce new seeds and grow to a larger size. The sponges may be readily gathered on sponge farms, since the water is usually shallow and smooth, and the dangers of ordinary deep sea sponge fishing are not encountered. The finest sponges raised in this way are said to sell for from \$1.50 to \$3 per pound. If no diseases or enemies get into the sponge beds, the sponges yield large crops year after year. The yearly income from the sponge farm is said to range from \$1,000 to \$10,000, according to its size, location, and age.

**AN IMPROVED CAR BRAKE.**

The illustration represents, in side and end views, a simple but very powerful brake recently patented by Mr. Frederick L. Desmoineaux, of Lawson, Col., in which the brake shoes are applied to the rails instead of to the wheels. Extending longitudinally of the truck is a frame between whose flat side pieces are pivoted swinging shoes, adapted to swing downwardly and outwardly to engage the track rails, the shoes being pivotally connected with screw rods in turnbuckles connected with other screw rods attached to longitudinally sliding brake rods. The brake rods are pivoted to tooth d racks which slide on a



DESMOINEAUX'S RAIL BRAKE.

plate fastened centrally to a truss, and the rods are spring-pressed to hold the shoes out of engagement with the rails, but by pressing upon a foot piece the shoes are swung firmly against the rails. By turning a hand wheel, also, the brake shaft may be turned with great power to firmly set the brakes.

**Height of Ocean Waves.**

Dr. G. Schott, as the result of studying the form and height of the waves of the sea, claims that under a moderate breeze their velocity was 24.6 feet per second, or 16.8 miles an hour, which is about the speed of a modern sailing vessel. As the wind rises, the size and speed of the waves increase. In a strong breeze their length rises to 260 feet and their speed reaches 360 or 364 feet per second. Waves the period of which is 9 seconds, the length 400 or 425 feet, and the speed 28 nautical miles per hour, are produced only in storms. During a southeast storm in the southern Atlantic Dr. Schott measured waves 690 feet long, and this was not a maximum; for in latitude 28° south and longitude 39° east he observed waves of fifteen seconds' period, which were 1,150 feet long, with a velocity of 78.7 feet per second, or 46½ nautical miles an hour. Dr. Schott does not think that the maximum height of the waves is very great. Some observers have estimated it at 30 or 40 feet in a wind of the force represented by 11 on the Beaufort scale (the highest number of which is 12); and Dr. Schott's maximum is just 32 feet. He believes that in great tempests waves of more than 60 feet are rare, and that even those of 50 feet are exceptional. In the ordinary trade winds the height is 5 or 6 feet. The ratio of height to length is about 1:33 in a moderate wind, 1:18 in a strong wind, and 1:17 in a storm; from which it follows that the inclination of the waves is respectively about 6°, 10°, and 11°. The ratio of the height of the waves to the force of the wind varies greatly.

**A Fast Torpedo Catcher.**

The Bruiser is the latest addition of the torpedo destroyer class to the British navy. She is 201 feet 6 inches long, 19 feet wide, 13 feet deep, 7 feet 4 inches draught, 220 tons displacement, 4,156 I. H. P. Polished propellers having three blades. On her recent trial in boisterous weather the mean speed of six mile runs was 28.14 knots per hour. The speed for three hours was 27.97 knots.