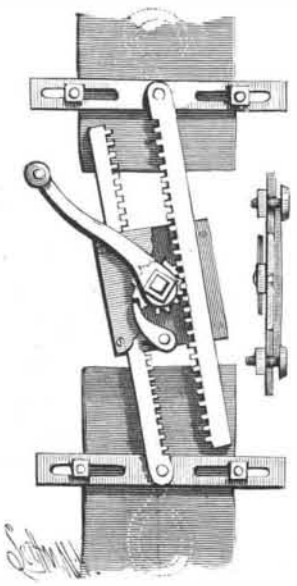
AN IMPROVED BELT TIGHTENER.

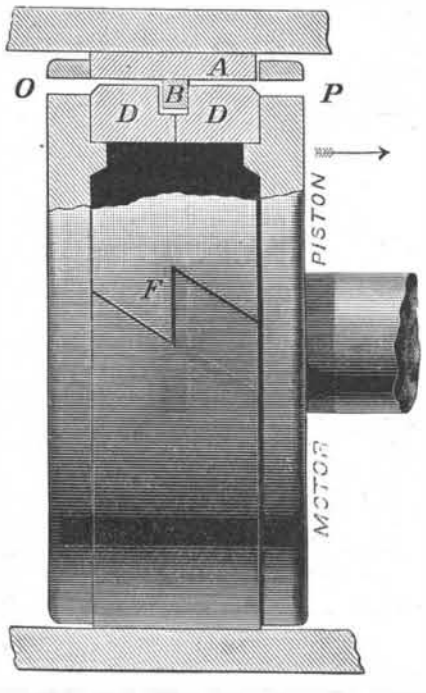
A simple and easily operated device for stretching a belt while on the pulleys, and holding it stretched while the operator cuts out a portion and relaces the ends to shorten the belt, is illustrated herewith, and has been patented by Mr. Dock Bowman, of Cynthiana, Ky. In an open ended casing is mounted a shaft carrying a gear wheel, with racks meshing into it, and cross bars pivotally connected with the racks, the cross bars being adapted to be secured to the belt to be tightened. By turning th crank arm on the shaft, the racks are moved toward each other in opposite directions, pulling the cross bars toward each other, and thus stretching the belt, the belt being held in taut position by a pawl, which locks the shaft until the operator cuts out part of the loose portion of the belt between the cross bars and relaces the ends. If it is desired to use the tightener on chain belts, the cross bars are provided with a hook, shown in dotted lines, which can be inserted into the links of the chain.



BOWMAN'S BELT TIGHTENER.

AN IMPROVED BALANCE PISTON RING PACKING.

A piston ring packing made on the theory that a certain amount of the fluid under pressure creeps in between the ring and cylinder is illustrated herewith, and has been patented by Mr. James Brandon, of No. 390 Eleventh Avenue, New York City. The engraving represents a piston partly in section, in which A is the main packing ring, cut for expansion, and made to break joint at F. D D may be regarded as part of the body of the piston, made in two parts as shown; or in one part, or solid with the piston heads, as may seem most advisable. In putting the rings in old pistons, the part, D D, is made to fit nicely over the lugs of the spider, being clamped by the follower. B is a small ring fitted in the groove in the central part of the body of the piston, D D. The ring, B, is cut for expansion, and made to break joint in the usual way. It is made to bear against the outer ring, A, the same as a packing ring bears against the cylinder. O and P represent two of the several holes in the flanges as shown. Assume the piston is moving forward, as from left to right in the engraving, and that it is used for a steam engine, the outer ring, A, will take the position in which it is shown. The steam pressure being behind the piston will pass through the holes, O, between the ring, A, and body, D, forcing ring, B, against the forward side of the groove in D D. It may be seen that the pressure of the steam, forcing the ring radially against the cylinder, is limited to that of the inside surface of ring, B, and that part of ring, A, lying between ring, B, and the rear flange of piston, leaving that part of ring, A, lying between ring, B, and the front flange of piston relieved from the internal pressure. Assume the piston



BRANDON'S BALANCE PISTON RING PACKING.

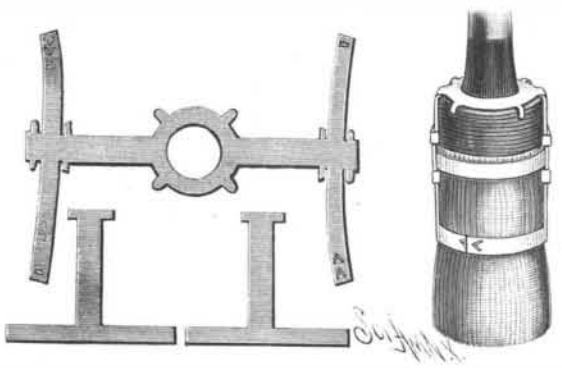
is used for a pump. Then as the pressure is in front of the piston, it will pass through the holes, P, or between the front flange and the ring, A, forcing the small ring, B, against the rear side of the groove in D D. Now it may be seen that when it is used for a forcing piston, the pressure on the inside of the ring forcing it to the cylinder is limited to that of the inside surface of ring A lying between B and the front flange of the piston, leaving that part of ring A lying between B and the rear flange of piston relieved of internal pressure through holes, O. The ring, A, is fitted in the usual way, between the flanges of the piston, and B in the groove, the spaces on the side being left open so as to more easily understand the working, from the engraving. The construction is not limited to that shown, which is intended to explain the principle involved. The aim is to provide a piston that shall be self-packing against pressure, but in which the pressure shall be so balanced as to permit neither the forcing the rings outwardly so hard as to rapidly wear out the rings and cylinder nor forcing them inwardly so as to permit the fluid to pass by them.

The Wild Horses of Nevada.

Nevada horse raisers aud ranchmen on the Pioche and White Pine ranges are complaining of the wild horses of that region. In the Shellback Mountains are bands of from 150 to 200 of these horses, each under the leadership of powerful stallions, and they make regular raids on the ranches and run off the horses of the ranchmen. A horse once gone is goue forever, the Nevada men say, for the wild horses are cunning and wary, and will not let a man get within rifle shot of them. Last spring fifteen experienced horsemen and hunters started out with the object of killing as many of the "boss stallions" as possible. In a ten days' hunt they managed to kill just one horse. The wild horse of Nevada is said to be about the most ugly beast alive.

A CLAMP OR BRIDLE FOR PAINT BRUSHES.

A simple and easily applied brush clamp, the members of which can be readily struck up and fitted to their places, no springs being necessary to engage the adjusting sections, has been patented by Mr. Aaron B. Kistler, of Aquashicola, Pa., and is illustrated herewith, together with face views of certain blanks of



KISTLER'S PAINT BRUSH BRIDLE.

which the clamp is composed, before being bent and fitted to their places. The clamp consists of three main portions, all made of sheet metal, one piece having a central apertured head which fits over the handle of the brush, arms projecting from opposite sides of this head and being bent downward over the sides of the brush, the outer ends of the arms having crossing band strips which are bent round the bristles and engaged with one another by cut-out lips or hooks and eyes. Adjustable sections and binding bands are also adapted to be bent around the bristles, and engaged in position in like manner, whereby the whole device lies flat on or against the brush, offering no obstruction to its use on all sides, these clamps being equally adapted for use with new or old brushes, and suitable for brushes with different lengths of bristles.

A Rat Plague in China.

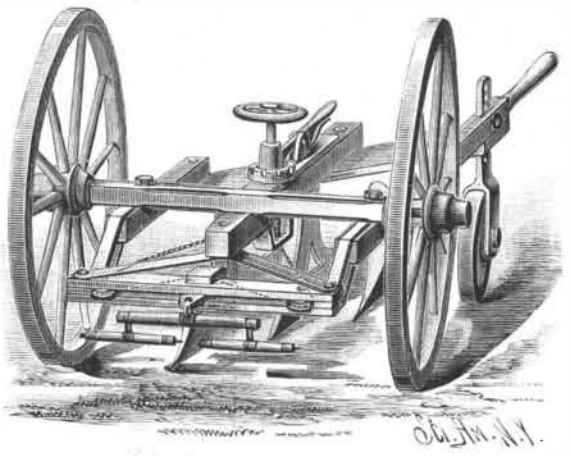
Almost every newspaper from Australia has something to say about the rabbit plague in that colony.

The SCIENTIFIC AMERICAN of Dec. 24, last year, contained a report from the Department of Mines, Sydney, New South Wales, detailing the extraordinary destruction caused by rabbits in that colony, and accompanied with the offer of £25,000 sterling as a reward to any person who would contrive a method for their extermination.

And now comes a similar wail from China, stating a danger which threatens that empire. A recent number of the Pekin *Gazette* contains a memorial to the Emperor from the Governor of Uliassutai stating that, owing to the appearance of swarms of rats, it has been found necessary to alter the routes of the government courier service in three of the postal stations in the Khalkha region in Outer Mongolia. For two years past the pasturage of the districts in question has suffered severely from the ravages of these vermin, and last year nearly every blade of grass was eaten up. The whole country has been honeycombed with their burrows, the horses and camels are in a famishing state, and there is no means of keeping them alive. The burrows are a source of great danger to the mounted couriers, and the want of forage renders it impossible to maintain a supply of animals for the service.

AN IMPROVED DRAFT ATTACHMENT FOR PLOWS.

A draft attachment more especially designed for use with gang plows and other agricultural implements or machines, to allow the draft of the animals to be adjusted laterally to accommodate the work, is illustrated herewith, and has been patented by Mr. Heber E. Bradbury, of Beaumont, Cal. On the front of the side timbers of the frame are downwardly bent iron straps, between which are held the opposite ends of a draft bar, formed preferably of two metal plates, held apart to accommodate a draft block which may be shifted laterally either way, pulleys being also journaled near opposite ends of the draft bar, and braces extending

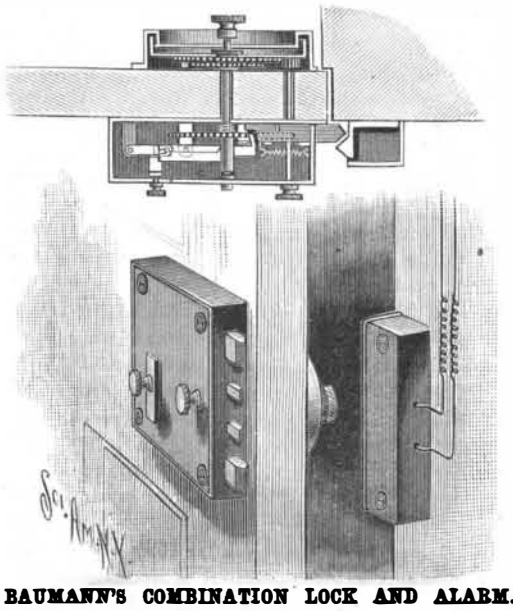


BRADBURY'S DRAFT ATTACHMENT FOR PLOWS.

therefrom to a center bar of the frame. Chains connected to opposite sides of the draft block pass around the pulleys near the ends of the draft bar, and their rear ends are wound in reverse directions on the lower end of a vertical shaft journaled in the plow frame. To this shaft, above the frame, is fixed a catch plate having radial notches, with which a spring-actuated latch lever is pivoted to engage. By turning this shaft in one direction, by its hand wheel, when the latch lever is disengaged from the catch plate, the draft block will be moved toward one end of the draft bar, and by turning the shaft in the other direction the draft block will be moved the contrary way. The draft block, to the forwardly projecting end of which the double-tree is connected by a link, is preferably made of metal, the single-trees being coupled to the double-tree, while the shifting of the block is readily accomplished without unhitching the horses.

A COMBINATION LOCK AND ALARM.

A lock provided with means for being readily set to a great number of different combinations, and connected with an electric alarm, which connection may also be used with an electric light or signal light, has been patented by Mr. Robert Baumann, of No. 733 South Seventh Street, St. Louis, Mo., and is illustrated herewith, one view being in section. Through the inner and outer casings of the lock, secured to the inside and outside of the door, extends a horizontal shaft, provided on its outer end with a knob extending a short distance beyond a recess in the front casing, and on a square part of the shaft is held a collar rotating a wheel on which are marked numerals from 1 to 100, one of the numerals appearing at a time through an aperture in the rim of the outer casing. The shaft, which is adapted to turn and slide in its bearings, has a radial arm engaging a lug on a vertical lever, a spring arm being operated on by the vertical lever and a bell crank lever held in locked position by the outer end of the spring arm, a locking plate being pivotally connected with the bell crank lever, while there are spring plates adapted to be connected with a battery



BAUMANN'S COMBINATION LOCK AND ALARM.

and an alarm. When a person desires to enter the door without knowing the combination at which the lock has been set, he can neither by sound nor sight determine the relative positions of the parts of the lock, and will consequently be unable to open the door.