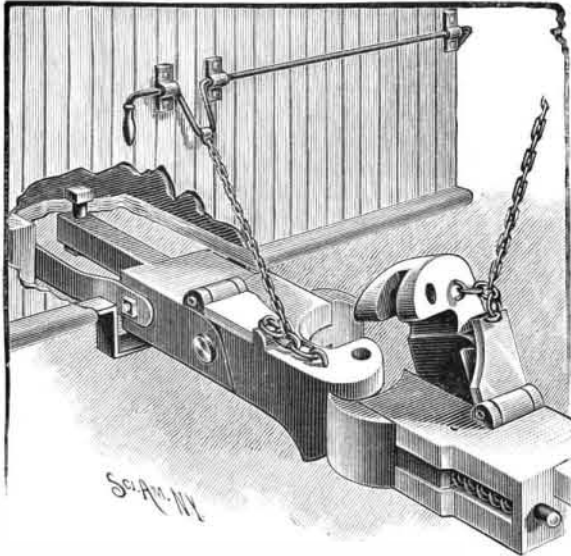


## AN IMPROVED CAR COUPLING.

The illustration shows a device adapted for use with passenger as well as freight cars, and which can also be applied in connection with the ordinary link and pin coupling, the hook being locked in place to prevent its displacement when the cars are coupled and prevent their accidental uncoupling. The invention has been patented by Mr. Simon J. Freeman, of Bradford, Pa. The drawbar is pivoted to the under side of the car, a spring holding it in normal longitudinal position, but allowing some sidewise movement. The hook pivoted on the front end of the drawbar is always held in horizontal position unless swung upward by the operator by the means shown, and is adapted to engage a corresponding hook part on the coupler of the opposite car. In the hook end of the hook is a slot adapted to receive

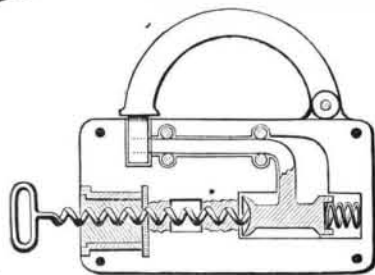


FREEMAN'S CAR COUPLING.

the ordinary coupling link, to be engaged by a vertically sliding pin. On top of the drawbar is pivoted a locking plate, extending over the pivoted end of the hook and abutting against a lug thereon, thus preventing the hook from accidentally swinging upward. An eye on the free end of the locking plate is connected by a short chain with the chain for raising the coupling hook, whereby the locking plate is raised out of contact with the lug as the hook is swung upward. To one side of the coupling hook is arranged a sliding hook having on its rear end a longitudinally extending shaft, around which is a coiled spring, the projecting ends of the sliding hooks yielding as the cars come together in coupling, and then being pressed forward by their springs to surround the ends of the coupler hooks, and hold them in place against accidental disengagement.

## AN IMPROVED PADLOCK.

The illustration represents an inexpensive and novel form of lock and key which has been patented by Mr. Woodson Mosley, of Toledo, Ark., the sectional view showing a transverse portion exposing interior parts with the key in position. At the rear of the case are the usual parallel ears, to which is pivoted the curved shac-



MOSLEY'S PADLOCK.

kle bolt entering a socket orifice at the front of the case, the shackle end being transversely perforated to align with a longitudinal channel in each half section of the case. The rear of this channel is curved downwardly and widened to provide for the movement of the downwardly curved inner end of the bolt, and is connected with a recess in which slides the bolt head, the rear end of which is cupped to receive a spiral spring holding the bolt in locked adjustment. The key consists of a spirally formed wire rod adapted for insertion in a corresponding passage in the lock body, and designed to abut against a cupped end of the bolt head, forcing it back and releasing the shackle. Between the front end of the lock case and the bolt head is a rectangular cavity dividing the spiral passage into two divisions, to prevent the use of an ordinary piece

of wire for a key, as such piece of wire adapted to take the form of the spiral would be likely to abut against the rear wall of the cavity, and thus be prevented from entering the rear section of the key passage, the key itself being made of correct pitch and unyielding material. In a circular recess in the front face of the lock is an adjustable sleeve, in which is a rotatable solid cylinder with a spiral key passage, there being on the outer end of the cylinder graduations, a slight deviation from a correct adjustment of the cylinder and sleeve preventing the complete introduction of the key. The sleeve and cylinder are also adapted for adjustment revolvably and longitudinally, the graduations on the exposed ends furnishing means therefor to cause the spiral passage in the cylinder to assume a proper relative position with regard to the similar key passage in the body of the lock for the introduction of the key.

**TESTING CAST IRON.**—In the case of those foundries which obtain their pig directly from blast furnaces the testing of cast iron is especially important, as charcoal blast furnaces are very sensitive to any accidental change in the mixture. The metal, which is taken from the furnace by means of a ladle, the matter floating on the surface being removed, is poured into an open sand mould in the form of a cavity of about twenty centimeters in diameter and seven or eight centimeters in depth. Iron which is rich in silicium and carbon becomes rapidly coated on the surface with a dull glowing cover of oxide formations. These dull formations also indicate an iron too rich in graphite. Bright and long lasting formations distinguish the iron best adapted for casting purposes. If the iron in a little time becomes rapidly blistered, or if it throws off hissing sparks, it is a proof that it is poor in silicium and hard. A practiced eye will readily perceive the peculiarities in the nature of the iron by carefully observing the formations.

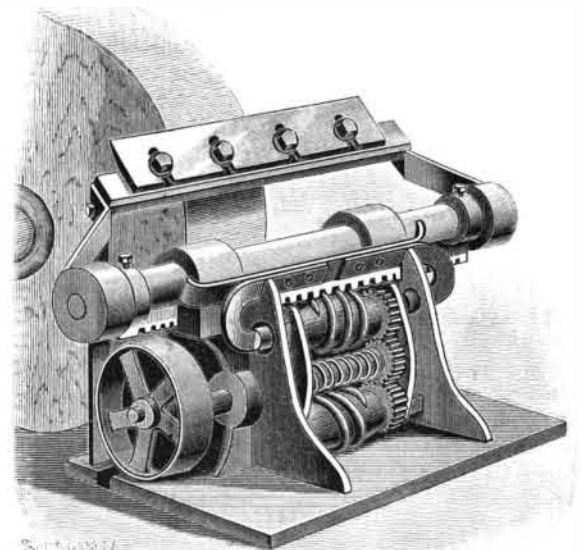
## AN IMPROVED BLANKET HARNESS.

The illustration represents an improvement in blanket stays, whereby stable blankets especially may be securely held in place, and the blanket worn with comfort. The invention has been patented by Mr. John Grim, of No. 323 Diamond Street, Philadelphia, Pa. A saddle is employed consisting of a single piece of soft leather curved to fit the back of the animal near the crupper, and to the upper face of the saddle are attached parallel billets, one of which is made to form a loop adapted to be engaged by a tie strap secured to the inner face of the blanket. The billet ends of two back straps are also secured to the forward end of the blanket and made to lap over its outside. At each side of the saddle are hip straps of a loop form, each having a sliding cross strap limited in its downward movement by stops, the cross straps serving to regulate the width of the loops and contacting with the outer upper portion of the animal's hips when the blanket is in position. Upon the inner face of the bow portion of each hip strap, or that part adapted to lie in the crotch, is a pad to prevent chafing, and there are connecting straps secured to each hip strap at this portion, forming a compensating attachment, whereby the animal will not be in the least incommode by the harness when walking, the hip straps automatically adjusting themselves to every movement. This harness may be quickly and conveniently attached to or detached from any blanket.

## AN IMPROVED KNIFE GRINDING MACHINE.

The accompanying illustration represents an automatically acting machine designed to rapidly and accurately grind straight-edge knives to a bevel edge. It has been patented by Mr. William D. Graves, Jr., of Presque Isle, Me. A cylindrical shaft is held to rock and slide in suitable housings in front of the grindstone, and below the shaft are grooves in the boxes for loosely supporting a rack held in place longitudinally by the hub ends of a knife-supporting frame. A skeleton knife-supporting frame is attached to the shaft, near its ends, by set screws, and the boxes in the upright housings have their horizontal bores in alignment for the revoluble support of the driving shaft, upon which are mounted two transverse rock arms, perforated to fit and rock upon the shaft, the rock arms carrying short journal shafts, on which are worm sleeves and pinions, the worm threads on the sleeves being pitched in opposite directions, and arranged with such relation to the teeth on the rack bar that the worms may be successively caused to engage the rack teeth by a half revolution of the rock arms on their support. In the upper part of each flange piece or lateral brace on the upright housings are open guide slots to receive a composite tappet bar and loosely support it to move endwise, this bar having on its side shifting dogs, which, in connection with movable abutment collars mounted on the body of the sliding rack bar, outside of the supporting boxes, are designed to limit the longitudinal movement of the rack bar. The abutment collars are so adjusted to the length of the knife to be ground that the latter will be made to traverse the stone or emery

wheel from one end to the other of the knife and grind it to a true bevel edge. These collars are adjustable in such manner that the reciprocal travel of the knife-

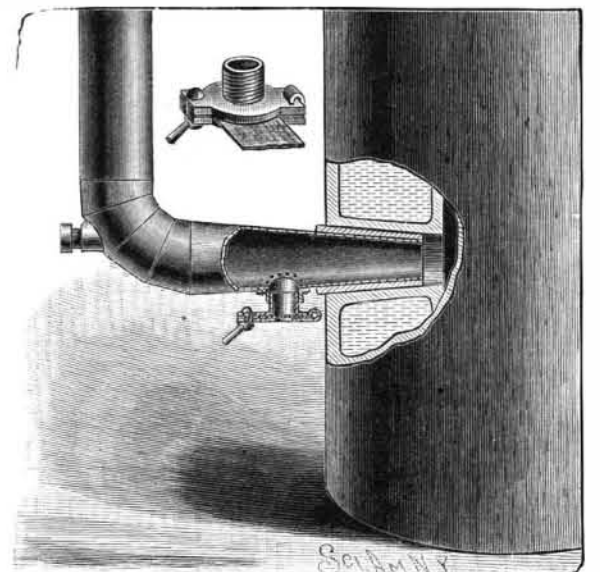


GRAVES' KNIFE GRINDING MACHINE.

carrying frame may be shortened to suit knives which do not require the full longitudinal movement of the machine.

## A SLAG ESCAPE FOR TUYERES.

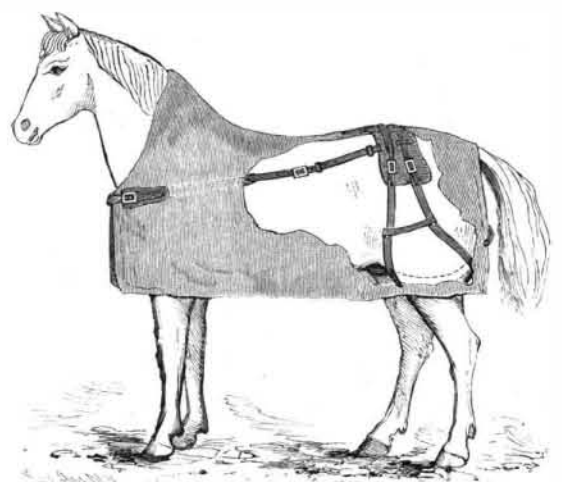
A simple form of slag escape and alarm, for use in smelting furnaces, to keep the blast pipe and tuyere open and give an alarm when the slag rises above a normal level in the furnace, is shown in the accompanying illustration, and has been patented by Messrs. John C. Bansemer and Edwin L. Davies. In the reduced end of the blast pipe, where it passes into the furnace through the usual water jacket, is formed an opening leading to a downwardly extending pipe or nipple, on which is secured a flange. On this flange is hinged a



BANSEMER &amp; DAVIES' SLAG ESCAPE FOR TUYERES.

centrally apertured plate, and between the flange and plate is placed a destructible cover, of muslin, canvas, paper, thin sheet metal, or other suitable material, such covering resisting the force of the blast and normally closing the aperture. When the slag rises in the furnace sufficiently to flow into the end of the blast pipe, and drop into the opening, the temporary cover of the aperture therein is quickly burned or melted away, so that the slag flows out without settling in the pipe and clogging it up, while the blast, following the slag, rushes through the opening, making noise enough to give an alarm.

For further information relative to this invention address Mr. Charles E. Beers, No. 262 South Second West Street, Salt Lake City, Utah.



GRIM'S BLANKET HARNESS.