

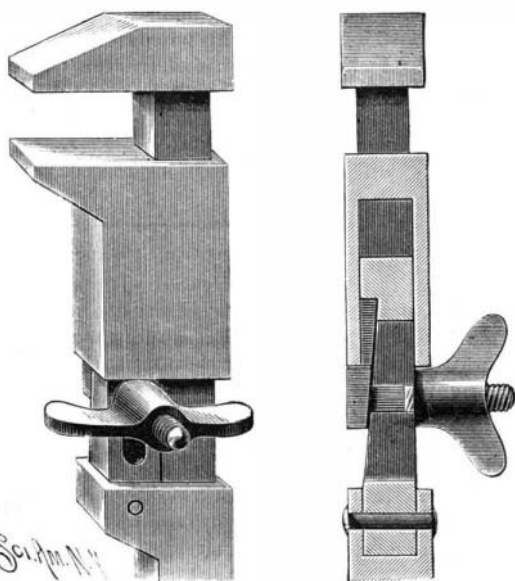
A Steel Chimney.

Steel is being used in the construction of the immense chimney of the Fair building at State, Adams and Dearborn Streets, instead of brick. The chimneys of the Leiter building, at State and Van Buren Streets, will also be constructed of the same material. This new feature of construction has been introduced by Architects W. L. B. Jenney and W. B. Mundle. The chimney when completed will be 250 ft. high, being considerably higher than any other in the city. The outside diameter is 9 ft. 5 in., while the steel varies in thickness from five thirty-seconds at the top to three-eighths of an inch at the bottom. The lower 75 ft. of the chimney is lined with fire brick eight inches deep, formed to fit the shell compactly all around. Above this it is lined with hollow tile. This lining is supported at intervals of 25 ft. by angle iron riveted to the steel shell; in other words, the chimney is lined in a manner similar to blast furnaces and foundry cupolas, and no expansion by heat can lessen its strength. The joints are all hot riveted. The steel shell is carefully protected from corrosion and from any attacks by the weather by painting inside and out. The weight of the chimneys is spread to the foundations in the same general way as that of the columns of the building, the base or foundation on which it rests being constructed in the same manner. The ground first is covered with a layer of cement, then two layers of steel rails in cement and one layer of I-beams, on which the cast iron shoe which takes the shell of the stack rests. The capacity of the chimney is twelve 60 in. boilers 20 ft. in length. The chimney is now up to a height of 150 ft. The cost will be about \$7,000. In the one to be constructed in the Leiter building the diameter will be a trifle larger, being 10 ft. 3 in., while the height will not be so great, being calculated at 200 ft. This will afford an escape for the smoke from the fire boxes of nine 72 in. boilers, each 20 ft. long.

This is the first time this material has been used in the construction of the chimneys of mercantile buildings. The magnitude of the building and the necessity of economizing in space, the foundations for the columns occupying about all the ground, led the architects to adopt steel as the material for this purpose. Brick has been used almost entirely heretofore, but upon investigation it was found that the weight of a brick chimney of this size would be almost 700 tons, while of steel construction it would weigh, including the linings, a little less than 250. The outside diameter of the present chimney is 9 ft. 5 in., while were it constructed of brick it would be 16 ft. 6 in., thus making a great saving in space.—*Chicago Journal of Commerce.*

A SIMPLE AND DURABLE WRENCH.

In the wrench shown in the illustration, one of the jaws may be moved toward or from the fixed jaw, and held in the desired position, without threading the shank of the fixed jaw or the guide bar of the movable jaw. The improvement has been patented by Mr. Samuel Stock, of Pontiac, N. Y. The movable jaw has a large rectangular opening in front of the shank, as shown in the sectional view, in which enters a guide bar, which also serves as a lock bar, and is longitudinally slotted. The outer end of this bar is seated in a socket formed in a side projection from the ferrule, where it is held by a pin, and one side face of



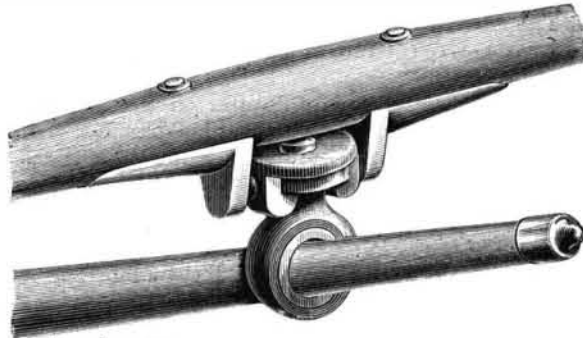
STOCK'S IMPROVED WRENCH.

the bar is beveled the length of the slot. A bolt used with the device has an outer end portion beveled to correspond to the inclined face of the lock bar, the portion of the bolt passing through the slot being square, to prevent the turning of a winged lock nut, the bolt and nut forming supports for the movable jaw. When the jaws are adjusted to clamp the object, the bolt head and nut are brought to bear against the outer portion of the movable jaw, and the nut is screwed in upon the bolt. With this construction the shank is not weakened by having a thread cut

on it, and the wrench has a neat appearance and is inexpensive to make.

AN IMPROVED NECK YOKE.

A durable, safe and inexpensive yoke center, for connecting the neck yoke with the poles of a vehicle, one which moves freely in relation to the pole and will not permit the yoke to pound thereon, is shown in the accompanying illustration. It has been patented by Messrs. David H. Gotshall and Herbert Petit, of No. 507 Second Street, Astoria, Oregon. The yoke is of the usual construction, and in elbow lugs attached by bolts to its under side are journaled the trunnions of a circular plate having a depending flange, which extends around all but the front side of the plate, and which is doubled under at right angles to receive the flat head of a pole ring. The head may be readily



Sci. Am. N.Y.

GOTSHALL & PETIT'S NECK YOKE.

slipped into the recess of the plate, and a neck between the body of the ring and the head comes opposite the bent portion of the flange, so that the ring may have all necessary movement. The ring is prevented from accidental removal by a pin extending downwardly through the plate and into the head of the ring, but there will be little strain on the pin, the lateral strain from the flat head coming on the flange of the plate. The ring is lined with leather or other suitable material to prevent wear and rattling.

Squandering a Nation's Patrimony.

At the recent celebration of the Fourth of July at Woodstock, Conn., Mr. Murat Halstead delivered a striking address, to which he gave the title of the "Preservation of the People's Inheritance." It could be more accurately described as an account of the reckless way in which mankind in general, and Americans in particular, had squandered, and were continuing to squander, their inheritance. In speaking of the decline of certain nations, Mr. Halstead said:

The lands have been wasted, the forests are no more, the soil that once made fruitful hills and blooming valleys is at the bottom of the seas, and the streams that watered the peopled plains are lost in the sands that are the tombs of the profligates who have perished. The elements of possibility, the foundations of prosperity, are gone, never to be restored, and those cancers of the earth, the deserts, are eating away more and more that which should sustain the generations to come.

Coming down to our own country, the speaker referred to the exhausted fertility of tobacco lands and wheat fields; to the extermination of food fish and noble game and water fowl; particularly to our vanishing forests.

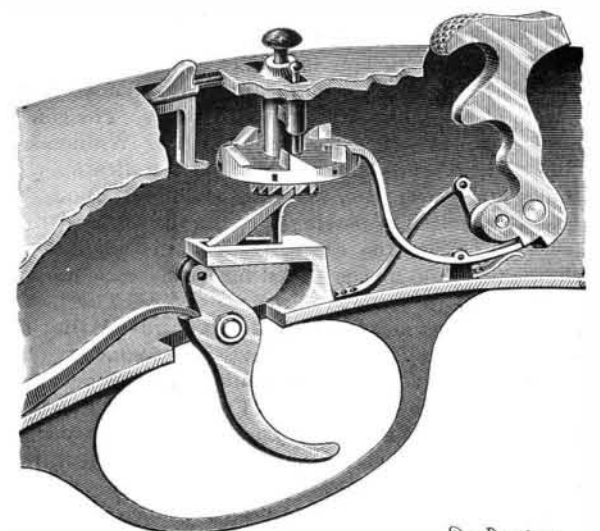
The woods have been torn from the mountains, and brooks have departed because the springs have ceased to flow; and, when not dwindled almost to dust beds, the ancient mill streams are roaring floods, for the slopes of the ridges are bared and the rainfalls rush from them as over roofs of slate; the hillsides are plowed up and down, preparing gutters to feed the freshets with the soil that is far more precious, in the eyes of those who have been taught the art of seeing, than the precious metals. It is the passion and pride of the average American to smite the trees and shoot the birds and slaughter the last of our running game—and if there are laws for the protection of trees in parks, or game laws to save the quail and squirrel, or to prevent scouring the rivers with seines out of season, and to provide fish ladders and abolish fish traps, they are regarded as tyrannical, a style of oppression identified only with effete monarchies and the tottering despotism of worn-out worlds. The buffalo have been exterminated, a noble race murdered, so that they are hardly enough to supply museums; and if there is a moose left in Maine he has been accidentally spared, and must be pursued by the hunter with remorseless fury to shed his blood to the final massacre. It is a crime to cut down the woods on a mountain, a crime to heedlessly kindle fires to burn forests; but our people have no realizing sense of the sort, and sneer at the Swiss and Germans, who require three permits to fell one tree. In New York there is a struggle that seems hopeless to preserve the remnants of the once majestic and always romantic Adirondack wilderness. In our new States the statesmen dare not stand against the timber thieves.

In some parts of the address Mr. Halstead's rhetoric

was rather too intense for scientific accuracy; but, after all, the real sting of the indictment is in its truth. To the speaker's hopeful spirit the establishment of fish hatcheries by the government, the effort to protect the seals of Behring Sea, and the reservation of the Sequoia groves were acts which gave promise of a time coming when more serious thought would be given by our nation to the preservation of its heritage. He noted, too, as hopeful indications, that arbor days were celebrated in many States; that tree planting by children had become fashionable, and that the discussion over the Adirondack woods, although it might not save the wilderness, would ultimately, perhaps, save many other forests. We feel inclined to consider it another cheering sign that an orator of national repute has felt impelled, on that anniversary when Americans are in their most exultant mood, to raise his voice in earnest protest against the reckless destruction of our forests. No higher public service can be rendered by the country's leading men than the reiteration of warnings like this, until it comes to be universally understood what the ruin of our forests means.—*Garden and Forest.*

A TRIGGER MECHANISM FOR GUNS.

A mechanism by which guns having more than one barrel may be fired by a single trigger, with a safety catch, so that the gun cannot be accidentally fired, and a device to indicate the barrel to be exploded, is shown in the accompanying illustration. It has been patented by Mr. Frank D. Granger, of Ellsworth, Kansas, an assistant in the United States Coast and Geodetic Survey. Extending down from the top of the breech is a hollow casing in which is vertically mounted a pin normally pressed upward by a spring, and on the lower end of the pin is loosely mounted a firing disk having on its upper surface a series of cam teeth adapted to alternately raise the sears and release the hammers. Only one sear and a simple style of hammer are shown to illustrate the mechanism, but the improvement may be connected with any of the common forms, especially those generally found in double barreled guns. The hammers have tumblers at their lower ends engaged by the forward ends of the sears, and the hammers are normally pressed forward by springs secured in the lock case, the hammers being thus held in cocked position until the sears are raised at their rear ends by the cam teeth of the firing disk. The under side of the disk has twice as many cam teeth as there are on its upper surface, to engage a pivoted spring-pressed trigger arm which extends upward through a slotted guide, so that when the trigger is pulled the disk will be turned, one of its cam teeth engaging a sear to raise it and fire the gun. When it is desired to fire a barrel which would not normally be fired by a sear, the pin in the top of the breech is pressed downward, carrying the disk down, so that its teeth will not engage the sears, while the disk will be pushed around one notch by the trigger arm, and may be brought into the right position for firing either barrel. A slide block carrying a safety catch is held in the breech behind the vertical pin, by which the disk may be locked so that it cannot be turned, the catch being released by pushing the block rearward. To show which barrel is about to be fired, spring-pressed pins are arranged in arms extending one from each side of the central pin, these pins extending downward into



GRANGER'S LOCK FOR FIRE ARMS.

the path of the cam teeth on the firing disk, so that as the latter is revolved one pin or the other will be made to project above the top surface of the breech, indicating the barrel to be fired.

DISSOLVING CAOUTCHOUC.—Caoutchouc can be dissolved more readily by adding from 5 to 15 per cent of oil eucalyptus to the benzol or carbon bisulphide used; in the latter proportions, the mixture of carbon bisulphide will dissolve nearly 20 per cent of caoutchouc.