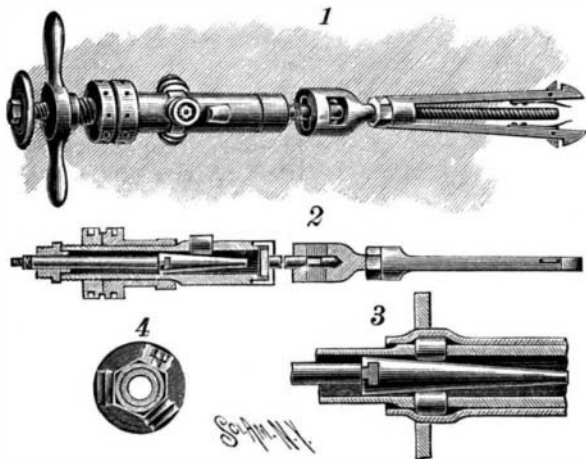


A TUBE EXPANDER AND BENDER.

The implement shown in the accompanying illustration is designed to lock fast to one end of a tube or boiler flue, and retain the parts in position to expand the tube inside of the boiler against the flue sheet when the device is rotated, afterward flanging the end of the flue to return its projecting end against the outer surface of the flue sheet. This device has been patented by Mr. P. H. Benade, of Punxsutawney, Pa. Fig. 1 is a side view of the tool and Fig. 2 a longitudinal section of its front portion, Fig. 3 being a detached view of parts showing its operation in expanding a tube in contact with a flue sheet. The body or shell of the tool receives a conically tapered pin, and it has three spaced apertures for the reception of cylindrical rollers adapted to expand the flue when they are forced outward by the tapering pin and the shell is rotated. On the inner end of a sleeve sliding on the front end of the shell is a hub with three integral studs, for the reception and revoluble support of grooved flanging rollers, shown in Figs. 1 and 4, these rollers impinging on the front end of a flue to flange it when the device has been moved longitudinally to position in the flue. Through a threaded plug in the front end of the shell extends a bar with threaded outer end forming a detachable shank for the conical pin, there being a hand wheel on the outer end of the bar. Integral with the front end of the shell is a collar with radial perforations for rotating the shell with a lever, a loose collar with radial perforations serving as a nut to bear against the fixed collar, forcing the sleeve further on the shell, the other end of which has a cap nut to receive a connecting rod.

This rod is of such length, proportioned to that of the



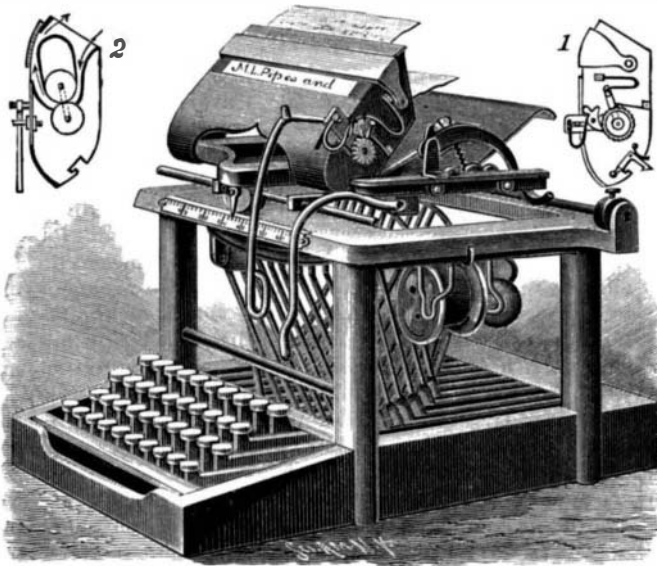
BENADE'S TUBE EXPANDER AND BENDER.

tubes or flues operated upon, that a spring-dog is supported thereby to engage the end of the flue opposite to the end being set, the dog having diverging limbs terminating in wedge-shaped enlargements at their outer ends, and being connected with the rod by an interlocking coupling box, which is prolonged as a threaded bolt. In use the dog is passed into the flue from the end which is to be expanded and flanged, an accurate adjustment for length being effected by revolving the dog on the bolt end, the dog automatically maintaining the connecting rod, coupling box, and its bolt end extension axially coincident within the tube. The adjustment is such that the rollers in the three spaced apertures of the shell will lie opposite the portion of the flue engaged by the sheet, so that a rotation of the shell by the handle bar will expand the flue and force it against the edge of the sheet as the conical pin is forced against the rollers by the hand wheel at the end. After such expansion has been effected, the device is adjusted to bring the flanging rollers against the outer end of the flue, and the operation is completed by the joint action of these rollers and the feeding collar or nut. After the flanging or beading of the flue end, the rollers are withdrawn by reverse movement of the collar, allowing the sleeve to be slid forward, when the tool is pushed through the flue rearwardly.

A COPYHOLDER FOR TYPEWRITING MACHINES.

The illustration represents a device easily applied to typewriters to facilitate reading the lines of the copy, which can be readily inserted and moved as desired. It has been patented by Messrs. Martin L. Pipes and Emile F. Pernot, of Corvallis, Oregon. The casing, of which an end view is shown in Fig. 1, is adapted to be fastened to the front rail of the carriage, which is held in a suitable recess by a spring-pressed hook lever. Within the casing, as shown in the transverse section, Fig. 2, are two longitudinally extending rollers, the trunnions of the upper one of which extend through an inclined slot in the ends of the casing, and are spring-pressed, to hold this roller on the copy placed between the two rollers. The trunnions of the lower roller are in fixed bearings, and on the outer end of one of them is a ratchet wheel, adapted to be engaged by a double pawl on the end of the casing, the pawl

being fulcrumed on an arm in which is a transversely extending slot, into which extends one arm of a bell crank lever, whose other arm extends downward on the front of the machine to within a short distance of the keys. A spring holds this lever in normal position,

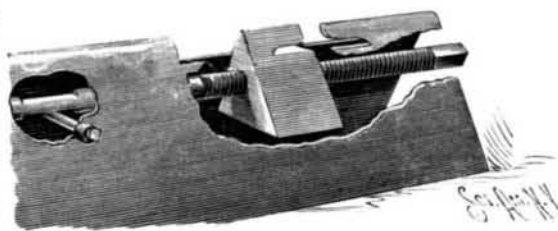
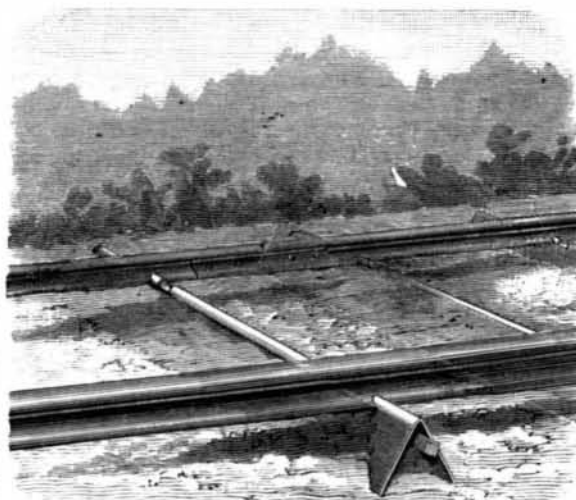


PIPES & PERNOT'S COPYHOLDER FOR TYPEWRITERS.

and in the front of the casing, at one end, is a slot, in which is an adjustable bolt, to limit the movement of the lever, so that the copy may be moved thereby just the desired distance. Higher up in the front of the casing is a longitudinal slot through which the lines of the copy appear, the width of this slot being increased or diminished, according to the height of the reading lines of the copy, by moving a plate with arms fulcrumed on the ends of the casing. A spring pawl holds the lower roller in place after it has been moved, and plates are arranged to guide the copy between the rollers, upward past the slot, and to the rearward, as shown by the arrows in Fig. 2. When the operator desires to turn the copy backward, it is only necessary to change the double pawl on the end of the casing, so that its other arm engages the ratchet wheel. The entire copyholder is held on the carriage, moving with and being swung upward with it when the operator desires to examine the typewritten copy.

AN IMPROVED METAL RAILROAD TIE.

A metal railroad tie designed to be light, strong, and durable, while having a degree of elasticity adapted to prevent injurious shocks to the rolling stock, is shown in the accompanying illustration, and has been patented by Mr. James P. Taylor, of Fort Worth, Texas. The tie is intended, when in position, to be



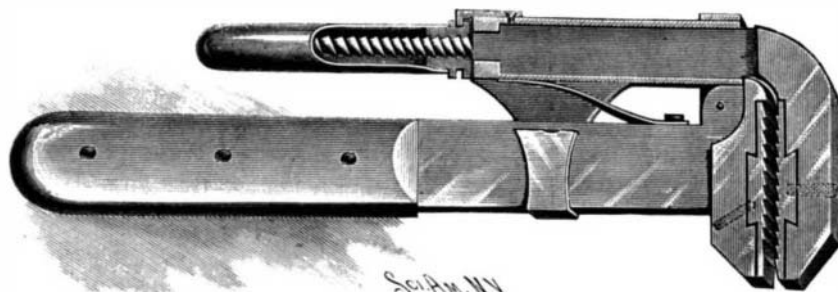
TAYLOR'S METAL RAILROAD TIE.

embedded in the ballast of the roadbed, and its shape is such as to facilitate the keeping of the roadbed dry and more stable than is the case with ties of the ordinary construction, as water will readily flow from its inclined sides. The body of the tie is preferably of wrought iron plate bent to nearly triangular shape in

cross section, with longitudinal slots at the apex of the triangle for the rail seats, integral lips or flanges of the tie being adapted to hook over the outer edge of the base flange of the rail. To facilitate the ready and firm fastening of the rail in position, there is located in the body of the tie a rod, oppositely threaded at each end, where blocks or nuts are mounted, as shown in the small figure, each block having a lug adapted to fit upon the inner base flange of the rail. The blocks are brought into engagement with the rail flange by the application of a wrench to the outer squared end of the rod, a middle portion of the rod being also squared, and resting upon a transverse bolt, to retain the rod from rotation when in place, sufficiently to prevent it from relaxing the lugs, although the rod will yield when turned by a wrench to adjust the parts.

AN IMPROVED WRENCH.

A wrench which is more especially adapted for use as a pipe wrench, but which may also be employed as a monkey wrench, and has practically two handles, one of which may be used as a lever to disengage the jaws from the pipe, and adjust the outer jaw to and from the inner jaw, is shown in the accompanying illustration, and has been patented by Mr. Frederick W. Kasch, of No. 504 East Avenue, Austin, Texas. The main shank of the device is rectangular in cross section, and has integral with its outer end a jaw, immediately beneath the heel of which is hinged one end of a sleeve, in such manner that the sleeve will have more or less swinging movement on the main shank. To one side of the sleeve, and limiting its outward movement, is attached a yoke which encompasses the main shank, the sleeve being normally held quite a distance from the shank, and parallel therewith, by a spring. The sleeve is rectangular in cross section, and has a reduced opening at one end, and within the



KASCH'S WRENCH.

sleeve slides an auxiliary shank having at its outer end an integral jaw extending over the jaw of the main shank. The auxiliary shank is reduced near its center to pass through the reduced opening of the sleeve, and the further portion of such shank is threaded and covered by a tubular handle. This handle has fitting in and projecting beyond its outer end a nut capable of receiving and turning upon the threaded section of the auxiliary shank, the nut having near its outer end a circumferential groove in which is inserted a tongue upon a clamping plate attached to the sleeve. By the manipulation of the tubular handle, through the medium of the nut acting upon the threaded portion of the auxiliary shank, the jaw of the latter is moved to increase or decrease the distance between the two jaws, the tubular handle forming a very convenient grasp for the hand in detaching the wrench from a pipe. This wrench is designed to be of a superior character in exactness of working, durability, and convenience.

Growth of Manufactures.

The trade statistics for 1889 of the eleven leading manufacturing industries—cottons, woollens, chemical, paper, agricultural implements, flour, lumber, glass, iron and steel, and ship building—are so complete and accurate that they anticipate the census reports, and furnish an instructive indication of the progress our entire industrial system has made in the last decade. These eleven industries in 1879 had \$1,165,000,000 capital invested in them, and 844,776 hands employed, they paid out in wages \$256,795,000, consumed \$1,197,000,000 worth of raw materials, and showed a gross product of manufactures of the value of \$1,774,000,000. In 1889 they had \$1,784,840,000 capital invested, and 1,274,000 hands employed, they laid out in wages \$320,689,000, consumed \$1,586,000,000 worth of materials, and gave a product of manufactures of the value of \$2,293,779,000. The increase has been in capital invested \$619,740,000, in the number of hands employed 429,224, in the amount of wages paid out \$93,894,000, in the materials consumed \$397,000,000, and in the value of the product turned out of \$519,779,000. There is over 50 per cent more capital invested in the specified manufactures than there was ten years ago, 50 per cent more hands employed, over 36 per cent more wages paid out, over 30 per cent more material consumed, and nearly 30 per cent greater product.—*Trade and Traffic.*