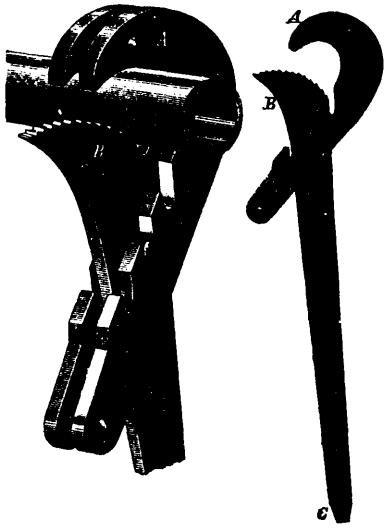


COMBINED PIPE TONGS, WRENCH, AND SCREW-DRIVER.

The accompanying illustration represents a device recently invented by Messrs. States & Cook, of Topeka, Kansas. It is a combination of the three tools that the gas and steam fitter has the most constant need of—the pipe tongs, the wrench, and the screw-driver.

The double jaw or clamp, A, laterally connected by stay pins, is curved, and has its lower part notched in order to form a support for the pivot pin of the single jaw, B, which enters between the double clamp, A, referred to. The jaw, B, has an eccentrically shaped and serrated clamping end, and has the lower end or handle so shaped as to answer as a screw-driver. The action of the jaws is apparent from the figure.

S. A.

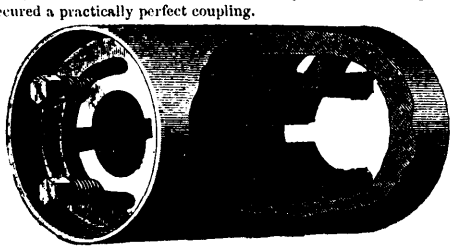
SHAFTING COUPLINGS.

The requirements of a good shafting coupling are that it shall hold each shaft-end firmly and evenly; be simple and inexpensive; take up little room; be readily applied and removed; shall not permanently bruise or deface the shaft; shall not work loose or rust fast; and shall be strong enough in material to resist the torsional and other strains put upon it. Failing in any one or more of these particulars, a coupling is apt to cause expense, delay, and loss. Sleeve or box couplings require the most accurate fittings of both shaft and hole; the key-ways are expensive to cut, and permanently deface the shaft, and the keys difficult to fit and remove. Keys are apt to be cut so as to bind upon face and back instead of upon the sides, tending to split the coupling if tightly driven. If not driven tightly enough, the coupling is insecure, and damage may ensue.

The flanged or plate coupling is a bulky and burdensome affair, and always reminds us, in appearance, of a French pipe-joint. It requires as accurate fitting of the hole, as does the box coupling; and in addition, the faces of the flanges must be mathematically true and at right angles to the axis of the bore; the bolt holes, too, must be equidistant from each other and from the centre. The disadvantages of keyed couplings attach themselves here also.

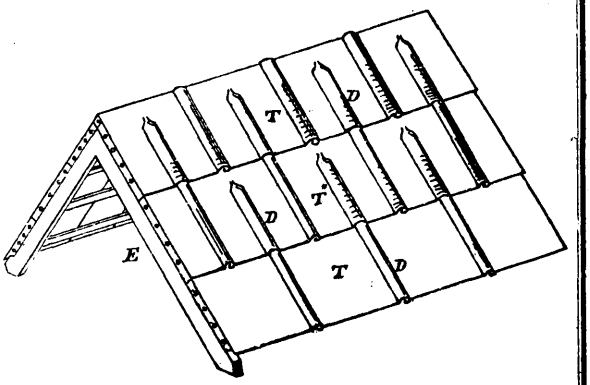
A compression coupling with a longitudinal cut in the sleeve, and which has its "grip" given it by screwing or driving rings upon the outside, or by bolts passing through it, has the merit that it does not deface the shaft with a key, requires no accurate hand-fitting; and can be applied or removed with ease. But as it is next to impossible to get two shaft ends turned exactly of the same diameter, the larger shaft end will be tightly bound, and the smaller end gripped only by the end of the coupling; and there is liability to work loose, with the attendant damage and loss.

If we add a transverse cut to this compression sleeve, we overcome this last difficulty, permitting each end of the coupling to grip tightly and over its whole bearing surface, and giving a uniformly distributed pressure upon nearly the whole surface of each shaft end; and if we employ such means of tightening as will not be likely to fail (as in the case where bolts are used, and there is a severe tensile strain, giving liability of the bolt breaking or the thread stripping, with the alternative of the nuts working loose, and the likelihood that the whole may become rusted tightly together), we have secured a practically perfect coupling.



CRESSON'S INTERNAL CLAMP SLEEVE COUPLING.

The coupling shown herewith* has a compression sleeve, cut both longitudinally, to give the grip, and transversely, to allow it to grip two shafts of differing diameters. The compression is effected by taper screws, which thrust against an outer shell or wall, and may be slackened as readily as tightened up. There is but one piece to handle. The grip is as powerful as could be devised, and the tightening device not subject to work loose or to rust fast.



IMPROVEMENT IN METAL SHINGLES.

"The object of this invention is a metallic shingle which is durable, comparatively light, and can be cheaply and easily manufactured and applied. The engraving is a perspective view, showing a roof constructed with these shingles.

The shingle consists of a metal plate, *T*, having at one or both edges ribs, *a c*. *B* represents a small tag with a rib which fits over a corresponding rib of the plate *T*, as hereafter described. *D* is a raised rib midway between the ribs *a c* of the plate *T*. The ribs *A* are formed by bending the edges of the plates to curl upwards, and the ribs *C* by bending the edges downwards, and these ribs *C* are made slightly larger than the ribs *A*, so that the latter may slide easily and fit snugly into the larger ribs *C*. The rib of the tag *B* slides over the smaller rib *A*, and the flat part is nailed down to the roof or rafters and prevents the slipping of the plates. The shingle *T'*, intended for the bottom of the roof or lower course, need have no central rib *D*, and the side shingle *T''* need have but one rib, the opposite side being plain so as to facilitate bending it down and nailing to the edge of the roof.

The shingles *T'* are placed on the lower course, the smaller hollow rib *A* of each shingle being slipped into the larger rib *C* of the next shingle. In applying the next course, the side half shingle *T''* is first secured, and then the shingles *T* successively in the same manner as the first row, the hollow ribs *D* receiving the ribs of the course below, so that the joints of the shingles in each row are midway between those of the other rows, permitting the desirable alternate arrangement common with ordinary shingles.

It is claimed that this shingle is easily made, simple in construction, only three different forms being required in making a roof; and that the roof-covering is watertight, ornamental, and easily applied and removed."

[Patented April 3d, 1877, by Edward Locher and Christian Knispel, of Newark, New Jersey.]

THE FRENCH EXPOSITION OF 1878.

By the courtesy of our contemporary, *The Manufacturers' Review and Industrial Record*, we are enabled to present to our readers the accompanying illustration and description of the above-named project, viz:—

The architecture of the buildings for the French Exposition of 1878, differs widely from that of the Paris Exposition of 1867, as well as from the Philadelphia Exhibition of last year. Preparations for the great fair are already well advanced. The main building, in the Champs de Mars, will extend from the Ecole Militaire to the river Seine, at the bridge of Jena. Crossing the bridge, brings one to the beautiful gardens of the Trocadero, a view of which as it will appear in the summer of 1878, from the bridge, is given in the illustration below. There are to be other subsidiary buildings and offices erected in the grounds, and a grand central hall for *fêtes*, etc., will stand in the middle of the further end on the higher ground, towards the Bois du Boulogne.

The two crescent-shaped side structures, which, as will be seen, are to be of great extent, will be devoted to the historical collections of pictures, contemporary paintings being exhibited elsewhere. The fountain and cascade will be very attractive features, and will show how artistically the French arrange the water displays which ornament so many of their parks, gardens and other public resorts. The cascade is 160 feet wide, falling in several descents to a lake, from which the different parks and shrubberies will be watered. The palace of the Trocadero is, from one pavilion to the other, about 1,330 feet in length, the pavilions at the extremities being connected with the great central rotunda, from the foot of which flows the cascade, by galleries forming segments of a semicircle. In the great hall of the rotunda, an immense organ is to be placed, and concerts will be given on the grandest scale. It will seat 8,000 people. Round the concert room outside, giving access to the boxes, are double galleries, closed from the weather, and affording to promenaders a splendid view of the city. On either side are peristyles opening on the Place du Trocadero on the side of the Bois du Boulogne. Above them are the offices of the managers and committees; they also serve as vestibules to the two great curved galleries that run from the central rotunda to the pavilions. These galleries are in a succession of halls; before each is a light covered portico, running the whole length.

From all parts of Paris will be visible the two immense towers, 200 feet in height, flanking the Trocadero. A flight of seventeen broad steps conducts to the palace, before the portico of which a wide terrace stretches from one extremity to the other. The principal entrance is at the middle, and at each end are two immense domes in iron and glass, surmounted by lanterns and flagstaffs. The gardens stretch on either side of the façade between the palace and the avenues, and contain a number of small buildings, kiosks, model farms, cottages, *cafés*, greenhouses, and the like. The centre is left unoccupied for the better convenience of spectators. *Polytechnic Review*