May 26, 1942. S. C. RODESS 2,284,449

VISE JAW ATTACHMENT

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Fig. 1

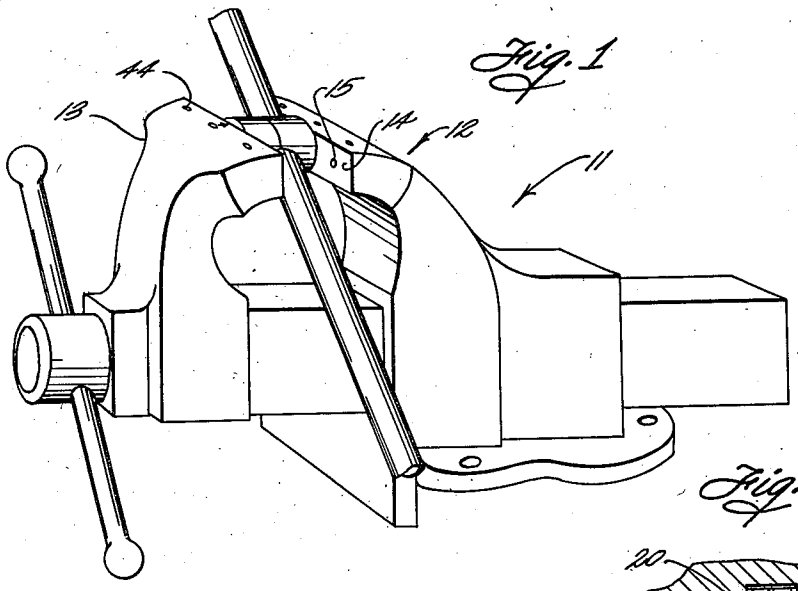


Fig. 2

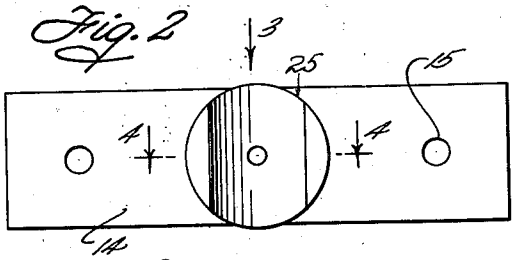


Fig. 3

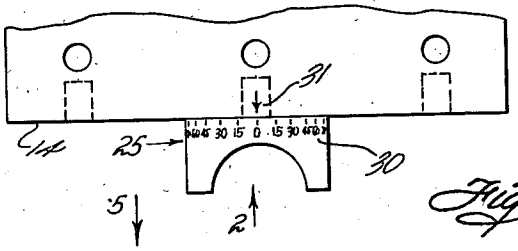


Fig. 4

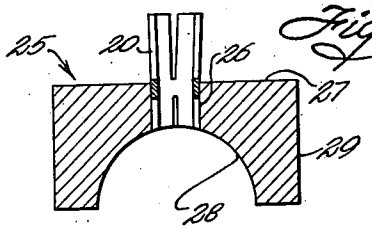


Fig. 7

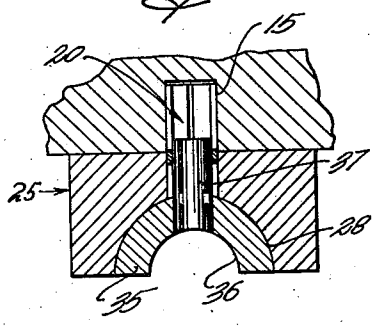


Fig. 5

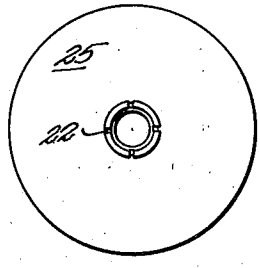
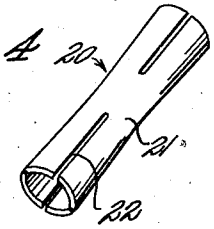


Fig. 6



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Fig. 8

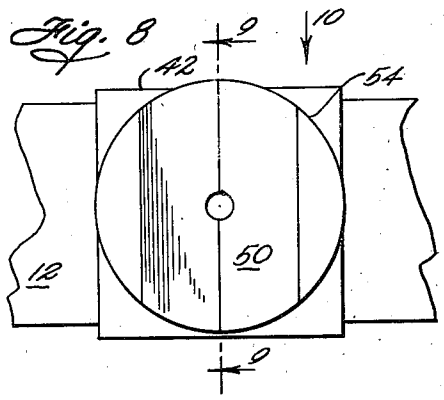


Fig. 9

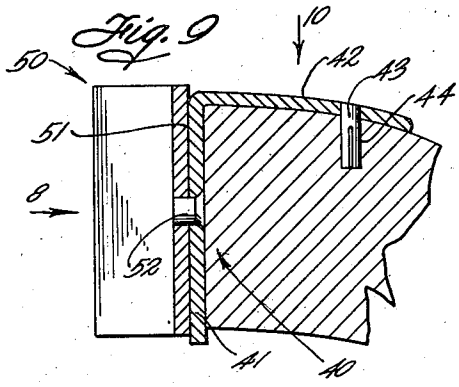


Fig. 10

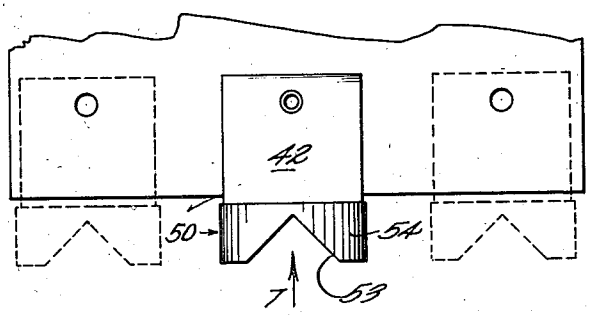


Fig. 12

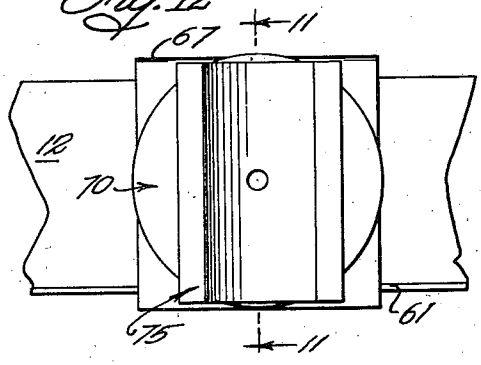


Fig. 11

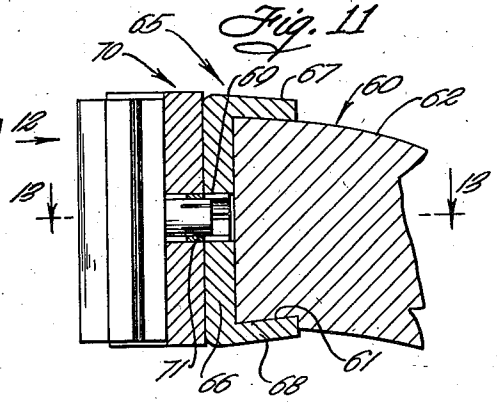
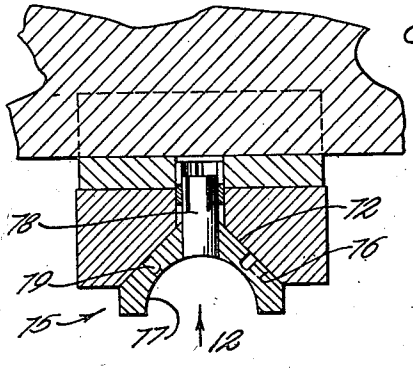


Fig. 13



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Fig. 14

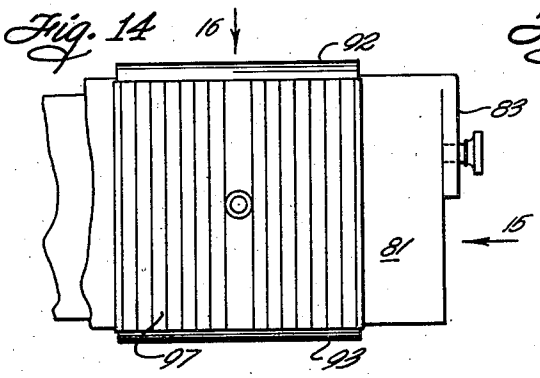


Fig. 15

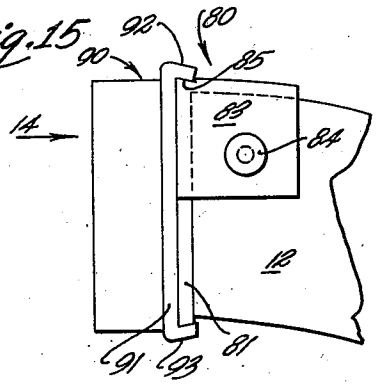


Fig. 16

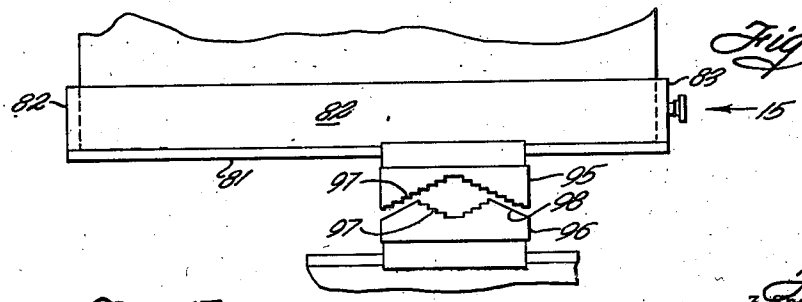


Fig. 17

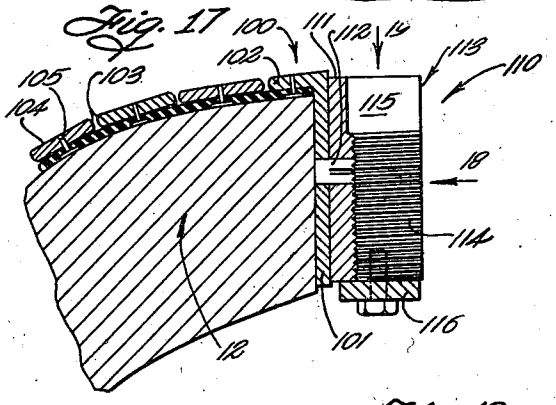


Fig. 18

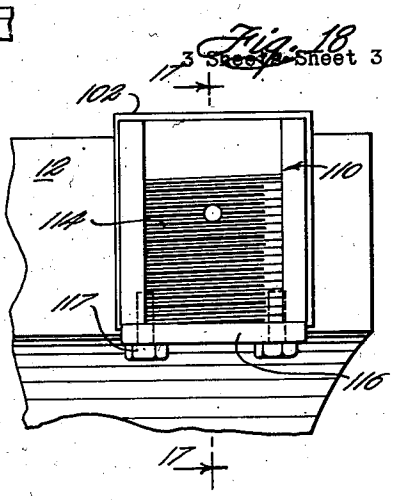
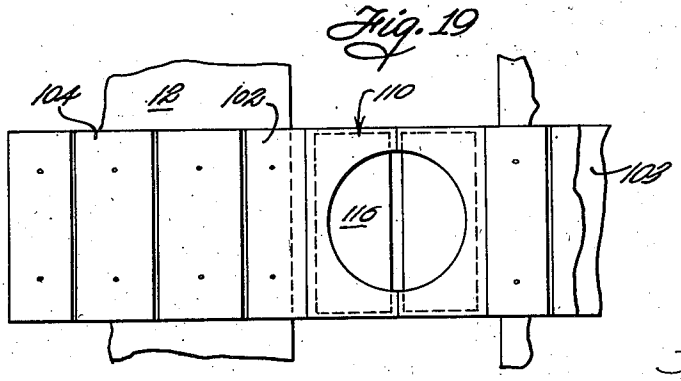


Fig. 19



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Patented May 26, 1942

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UNITED STATES PATENT OFFICE

2,284,449

VISE JAW ATTACHMENT

Samuel C. Rodess, Huntington Park, Calif.

Application August 23, 1939, Serial No. 291,519

2 Claims. (Cl. 81—39)

My invention relates to constructional features adapted for use with an attachment to the jaws of vises by which different types of articles or objects on which work is to be done may be readily secured to such attachments. My invention is illustrated mainly as applied to machinists devices but it is to be understood that the various jaw attachments and the clamping means for the articles of the so-called work to be manipulated may be applied to a large range of other types of vises.

Many vises are made have the ordinary and conventional gripping jaws in which objects to be operated upon are clamped between such jaws and in addition one or more sets of auxiliary jaws are mounted as part of the permanent equipment of the vise, many of these being of the character of pipe gripping jaws and the like, however, these additional jaws complicate the construction of a vise making them more expensive and also inconvenient for handling a large run of work. Hence by far the large majority of vises especially the machinists type, are of the simple type having a single pair of jaws, one jaw being attached to a fixed structure securable to a work bench or the like and the other jaw being on a movable member which may be adjusted to and from the fixed jaw and hence clamp articles or tools between the two jaws.

A main object and feature of my invention is a construction of various implements whereby without materially or radically changing the present jaw construction as used in a large number of vises of the machinists type, I may accommodate these to handle various articles on which work is to be done or tools to be held between the vise jaws, thus by using my attachments with the various clamps, I may handle a large number of articles and tools which now require the use of special additional jaws of vise. For instance, my various jaw attachments and article clamps may grip such articles as rough pipes, finished round work in which the surface must be protected from damage, screw threaded articles, etc. Further, by my invention the article clamps may be rotatable relative to the jaws of the vise and hence position the article or tools in the most convenient position for operations carried on by the workmen. Therefore a main characteristic of my invention is the incorporation with the pair of jaws of a vise of jaw attachments with work clamps mounted to swivel or rotate on axes transverse to the face of the vise jaws. For sake of convenience and as usually used, the face of the vise jaws are usually vertical or substantially so, therefore by my invention the auxiliary jaws and clamps for the work may be considered as rotating on a horizontal axis.

In view of the fact that vises particularly of the machinists type are made with jaws extending through a large range of size and also configuration, it is necessary to have the attachments so constructed as to be suitable for these various ranges of size and contour and shape of the jaws, hence in one form of my invention I form complementary pairs of socket recesses in the faces of the opposing vise jaws. There may be one or more pairs of these recesses to accommodate different positions of the swivel jaw attachments. My invention further includes the jaw attachments or work clamps having a pivoting or swivel connection with the sockets of the vise jaws. These are made in such a manner that the attachments and work clamps are gripped and thus restrained from accidental dislodgment from the faces of the vise jaws. A feature of this detail is employing swivel pintles of an expanding type such as split resilient material tubes, the splits running longitudinally so that the tubes may be slightly compressed or reduced in diameter for fitting either in the sockets of the jaws or in corresponding apertures in the jaw attachment or work clamp. The expansion action then retains the jaw attachments or work clamps on the face of the vise jaws with their rotational mounting so that the articles or work gripped may be rotated on the horizontal axis above designated.

My invention also comprehends another means of attaching the work clamps to vise jaws, for instance by using face plates which are removably attached to the vise jaws. In one construction the vise jaws may have a series of vertical recesses positioned along the upper side of the jaws in contradistinction to the sockets on the face of the jaws, then an angular face plate having a vertical face to engage the vertical face of the vise jaw and a laterally extending arm is attached to the vise jaw by a pin extending into the recesses on the top of the vise jaw. These pins are preferably of an expansible type formed of a longitudinally split tube and the arm is either shaped or bendable to conform to the curvature of the particular jaw of the vise with which it is to be used. Hence by this construction each of the jaws is provided with a removable face plate and the tool clamps are rotatably and preferably removably connected to the face plate, thus having the tool clamps rotate on axes at right angles to the face of the vise jaws.

My invention comprehends further a face plate slidably mounted on the vise jaws by being made in the form of a dove-tailed channel with flanges engaging the upper and lower edges of the jaws of the vise. In such case the jaws are under-cut to accommodate the dove-tail shape of the channel. Such channels are therefore slipped into place from one end of the vise jaws and to the face plates of the channels are attached various types of clamps for the work mounted in a rotational manner preferably by expansible pins engaging in complementary recesses or sockets, thus providing the rotational mounting transverse to the face of the vise jaws. As a modification of the dove-tail channel face plate attachment to the vise jaws and to accommodate such construction without making the corresponding under-cut of the vise jaws I provide an auxiliary support which may be fitted over the top of the vise jaws and have an auxiliary face plate, this being secured by set screws or the like extending through end plates, then the auxiliary face plate has undercut edges engaging the upper and lower flanges of a face plate channel. The particular article clamps then being rotationally mounted on the channel face plate.

My invention also includes the construction of readily fitted face plates which may be considered as having a flexible arm to extend over the top of a vise jaw, such arm being made of a flexible belt having weights attached thereto as by rivets. Such weights are sufficient to hold the face plate on a vise jaw and also to support the clamps for the various articles or work to be held in the vise, these special clamps being rotatable on the face plates by the pin and socket connections.

Manifestly with the use of the vise jaws to support the article or work clamps or when such clamps are attached to a removable face plate, it is necessary to provide a considerable variety of such clamps, therefore my invention includes these clamps as having certain characteristics such as being provided with a pivotal mounting by which the clamps may be rotated either directly on the face of the vise jaws or on the face plates, such construction being developed through complementary sockets and preferably expansible tubular pins however in some cases the article clamps are connected to the removable face plates by riveted pivots.

Certain of the work clamps of my invention have definite characteristics as for instance a clamp designed for round work having a finished surface in which a half circle jaw is provided with grooves on the back allowing a slight expansion to fit the round finished surface of the particular article and thus between two complementary jaws to firmly hold round work which has a finished surface that is not marred by such type of jaw face. Another construction includes a split threaded jaw assembly in which when the two jaws or clamps are held in place by the vise jaws the threaded end of a pipe may be threaded into such jaws and extend downwardly to a removable end bar. This forms an abutment giving a firm resistance to the threading or other torque stresses on a pipe or threaded bar. The loosening of the end bar and opening of the vise jaws thus permits ready removal of the article gripped by such threaded clamps or jaws.

My invention is illustrated in connection with the accompanying drawings, in which:

Fig. 1 illustrates in perspective a typical machinists device showing one form of attaching the auxiliary jaws or clamps.

Fig. 2 is a face view of one of the jaw faces with a clamp mounted therein taken in the direction of the arrow **2** of Fig. 3.

Fig. 3 is a plan of one of the jaws taken in the direction of the arrow **3** of Fig. 2.

Fig. 4 is a section on the line **4—4** of Fig. 2 in the direction of the arrows.

Fig. 5 is a rear elevation of the detachable jaw or clamp taken in the direction of the arrow **5** of Fig. 4.

Fig. 6 is a perspective view of the expansible pintle used in attaching the tool.

Fig. 7 is a section similar to Fig. 4 illustrating an additional round work clamp fitted in the jaw attachment.

Fig. 8 is a front elevation taken in the direction of the arrow **8** of Fig. 9 of a modified construction using a removable face plate with the attachment pivotally mounted on such face plate.

Fig. 9 is a vertical section on the line **9—9** of Fig. 8 in the direction of the arrows.

Fig. 10 is a plan view taken in the direction of the arrow **10** of Fig. 8 or 9.

Fig. 11 is a vertical section taken on the line **11—11** of Fig. 2 of a further modification with the face plate attached by a dove-tail connection to the vise jaw and with the jaw attachment swivelly mounted on the face plate.

Fig. 12 is an elevation taken in the direction of the arrow **12** of Fig. 11.

Fig. 13 is a horizontal section on the line **13—13** of Fig. 11 illustrating the expanding jaw attachment for gripping round work.

Fig. 14 is a face elevation taken in the direction of the arrow **14** of Fig. 15 of a removable face plate attached by set screws to the jaws of the vise with a sliding face plate support for the rotational tool.

Fig. 15 is an end elevation taken in the direction of the arrow **15** of Fig. 14.

Fig. 16 is a plan taken in the direction of the arrow **16** of Fig. 14.

Fig. 17 is a section on the line **17—17** of Fig. 18 in the direction of the arrow showing a face plate held by a flexible weight on the vise jaw and illustrating another type of work clamp.

Fig. 18 is an elevation taken in the direction of the arrow **18** of Fig. 17.

Fig. 19 is a plan taken in the direction of the arrow **19** of Fig. 17 but illustrating two jaw assemblies.

Referring first to the construction of Figs. 1 through 7, in Fig. 1 there is illustrated a machinists vise **11** which has the characteristics of a fixed jaw **12** and a movable jaw **13**. Each of these jaws is similar and each jaw has a jaw face indicated at **14**. In the particular construction of the jaw attachments illustrated in connection with Fig. 1, the complementary jaw faces each have socket recesses **15** of which there are three shown to position the attachments in different locations. These recesses are preferably made by drilling cylindrical holes in the face of the vise jaws and as the vice jaws are frequently separate renewable metal elements, these can be made during the period of manufacture before the vise jaws are hardened. The purpose of the recesses is to accommodate pintle pins designated **20**, note Fig. 6. These are preferably similar for a large variety of jaw attachments being constructed of a tube **21** with longitudinal splits **22**. One type of a jaw attachment designed for gripping round work is indicated by the numeral **25**. This has

a bore 26 with a split pintle 20 fitted therein. The attachment has a flat rear face 27 to fit flat against the face 14 of the vise jaw, with the pintle fitted in the recess 15 and being held by the expansion action of the split pintle. It is therefore apparent that the attachment for holding the work may be secured in any one of the sockets 15 and rotatable thus on a horizontal axis. Complementary attachments are secured in diametrically opposite sockets. In the particular illustration the work gripping face 28 is illustrated as a substantially half cylinder extending transversely across the jaw attachment or work clamping tool. This is to grip round articles such as shown in Fig. 1 in which care must be taken not to mar the surface, therefore the semi-cylindrical face 28 must be of the proper radius. In order to facilitate turning the work clamp at various angles, the periphery 29 is a cylinder and has degree graduations 30 thereon, these being alignable with a zero pointer 31 on the jaws of the vise. Where it is necessary to decrease the radius of the work engaging faces 28, this is done by an insert jaw attachment 35 which has an outer cylindrical shaped face complementary to that of the curve 28 and an inner cylindrical face 36 designed for the proper sizes of the article gripped. Attached to this insert there is an expansible pintle 37 formed of a split tube and this fits inside the tubular pintle 20 which secures the main jaw attachment to the face of the vise.

In the construction of Figs. 8, 9 and 10 use is made of an angle plate attachment 40 which has a face plate 41 to fit snugly against the face of the jaw and is provided with a curved arm 42 at the top either shaped or bendable to engage the upper surface of the vise jaw. This arm is provided with a split pin 43 which may engage in any one of a series of vertical sockets or recesses 44 on the upper face of the vise jaw, these recesses being parallel to the face of the jaw. By this construction the complete pairs of face plates are readily attached to the jaw vise at pairs of opposite sockets 44 and then may be used for a variety of work gripping tools attached thereto.

For instance, I illustrate in Figs. 8, 9 and 10 one form of work gripping auxiliary jaws designated 50. These have a base 51 connected by a pintle connection 52 which in such cases is shown as a type of rivet mounting the attachment on the face plate 41 in such a manner that it may rotate. The attachment is provided with as illustrated, converging V type of surfaces 53 and is shown as having a cylindrical periphery 54. By this construction it will be seen that with the pairs of jaws a considerable variety of work may be attached to the particular jaw attachment and any one of these jaw attachments may be readily mounted on vise jaws by means of the face plate and arm support as designated by the numeral 40.

In the construction of Figs. 11, 12 and 13, the vise jaws indicated at 60 are modified by having a dove-tail undercut 61 on the underside of the jaw to operate with the conventional curved upper surface 62 for attaching a channel 65 slidable on and off the jaws from either of the end edges. This channel has a face plate 66, an upper flange 67 and a lower flange 68, these flanges being bent towards each other forming in effect a dove-tail channel to engage respectively on the upper surface 62 and the lower undercut surface 61 of the vise jaw. The face plate is provided with a socket 69 and thus such socket functions in the same manner as the socket recesses 15 cut directly in the face of the vise jaws and may be utilized in a similar manner to the face plate 41 for mounting clamps or other devices to grip the work. In this instance I illustrate a jaw attachment 70 quite similar to the jaw 50 of Figs. 8, 9 and 10, this being provided with the tubular pintle 71 engaging in the socket recesses 69 and permitting rotation of the jaw or clamp. Such jaw is illustrated as provided with a V type of face 72 which may be utilized to engage different types of work, however in either of these types where it is desired to grip round work of a certain size, I utilize the supplementary jaws 75. This has surfaces 76 complementary to the surface 72, the outer surface 77 is substantially a semi-circle, the split pintle 78 is utilized for attachment in the hollow pintle 71 and extending from the back face there are notches 79 running the length of the supplementary jaw. This allows for a slight spreading to accommodate the article gripped between a pair of the supplementary jaws. There is sufficient yield at the notches 79 to accomplish such purpose. It is manifest therefore that these notches may be utilized on any type of jaw where it is desired to have a slight distortion.

In Figs. 14, 15 and 16 I illustrate a further form of the dove-tail connection of the jaw attachments as the undercut vise jaws such as 60 should be made during the manufacture of the vise, it being somewhat expensive to form the undercut groove 61 in a finished vise, therefore I utilize a face plate holder 80 which has a face plate 81 to feed against the face of the vise jaw 12. This has a top plate 82 extending over the top of the jaw and two end flanges 82 and 83 which extend downwardly at the end faces of the jaw, there being a slight clearance so that a set screw 84 is utilized to fasten the face plate holder 80 in position. The upper and lower edges of the face plate 81 have beveled or undercut upper and lower surfaces 85. The face plate general assembly 90 has a face plate 91 with upper and lower flanges 92 and 93 bent to form a dove-tail type of channel fitting on the edges 85, therefore this face plate assembly may be inserted from either of the ends 82 or 83 and may be utilized for mounting any type of the auxiliary clamps or jaws.

The same type of face plate channel assemblies are placed on both of the jaws of the vise. In this case however I illustrate two complementary jaws 95 and 96, both rotatably mounted on the face plate by the expandible pintles. The jaw 95 has a V shaped stepped face 97, the jaw 96 has a smaller but complementary V shaped step face 97 and also a beveled smooth face 98 corresponding to the slope of the steps 97. This may be utilized for gripping various types of work holders.

For a great deal of the type of work done by the use of vises, it is not necessary to have the face plate rigidly attached to the jaw of the vise. Such an arrangement is shown in connection with Figs. 17, 18 and 19 in which the face plate assembly 100 has a face plate 101 and a short arm 102 fitting over the top of the vise jaw 12. Preferably to the underside of the arm 102 there is secured by riveting or the like a flexible belt 103 formed of leather, rubber or suitable material and this has a series of weights 104 secured thereto by rivets 105. The belt or strap thus conforms to the curvature of the upper face of the vise jaws and the weights are thus sufficient to retain the face plate 101 in the desired position on the face of the jaws. Such face

plate 101 has a socket recess in which any of the removable auxiliary clamps may be pivoted. Manifestly it is necessary to have two sets of the weighted and strapped type of face plate assembly but as the thrust gripping work is directly at right angles to the face of the vise jaws, these face plates are retained in accurate position although they are not fastened positively into the jaws of the vise.

One of my types of work holders for a threaded pipe is indicated in Figs. 17, 18 and 19 and designated 110. This employs for each half section an auxiliary jaw block 111 with the expandible pintle 112. This has a semi-cylindrical gripping face 113 of which the lower part 114 is screw threaded and the upper part 115 has a smooth surface. An end bar 116 is attached to each jaw block by set screws 117. In the operation of this type of supplementary jaws, the two semi-circular parts are aligned and clamped edge to edge by the clamping action of the two vise jaws, the two end bars having been snugly adjusted, then with this type a pipe or bar to be threaded or having other work done thereon is threaded into the socket formed by the two halves of the supplementary jaw assembly. For instance a pipe or bar may be threaded downwardly until it comes to a positive stop against the two end bars 116, then the portion of the pipe or bar extending beyond the jaws may be threaded or have other work done thereon. The end bar prevents the pipe or round bar from being threaded to a greater distance in the threaded jaws although in fact when forming threads of the same direction of turn, the pipe tends to become more tightly gripped in the threaded jaws. In quickly releasing the pipe or other article from these jaws the vise jaws are moved apart and the end bars 116 slightly loosened by loosening the set screws 117 whence the pipe may be readily disengaged from the threaded jaws. The upper smooth surfaced portion 115 is preferably slightly greater in diameter than the lower screw threaded part 114 thereby forming in effect a slight shoulder at the top of the threads, hence when it is desired to grip a long threaded work such as a pipe or a rod, the end bars 116 may be removed, the jaws moving together and the work holders aligned, then the long threaded article may be threaded in the work holders until it reaches the limit of the unthreaded part 115. This construction with long work extending beyond both ends of the work holders 110 prevents such article from rotating when it is threaded or other work is done on it. This of course only applies when the turning or torque stresses as in threading would tend to thread the article tighter into the work holder clamps, however this is usually the case as when threads are to be cut they are usually in the same direction as the portion gripped by the threads 114, therefore for a long article separating the vise jaws allows ready freeing and removal of the article from the threads 114.

With all of the types of work clamps whether these are secured directly to the face of the vise jaws or to a removable face plate, it is to be understood that the pintles may be readily removed from the various types of work clamps and hence these may be used in many other instances in a machine shop. For instance the two halves of the clamp may be placed on a work bench and used to support the articles on which work is to be done or for many other purposes in which it is now customary to have special tools, therefore where it is desired to use the work clamps for purposes other than as illustrated attached to the vise jaws, it is necessary that a removable pintle be utilized instead of a rivet connection.

Various changes may be made in the details of the construction without departing from the spirit or scope of the invention as defined by the appended claims.

I claim:

1. In a jaw attachment, a block having a V shaped groove, a work clamping jaw having complementary converging V shaped faces to engage with the faces of the block, means to attach the jaw to the block, there being longitudinal grooves in the faces of the jaw, the jaw having a semi-cylindrical surface to engage cylindrical work whereby when such work is pressed tightly against the jaw the notches may yield to accommodate the cylindrical surface of the jaw to the surface of the work.

2. In a vise having a pair of jaws with parallel plane faces, a face plate with means temporarily attaching same to the jaws, each plate fitting on a jaw face, a pair of work gripping devices each having a semi-cylindrical outer surface, expandible removable pintle means pivotally connecting each face plate and work gripping device, the axis of such surface being at right angles to the axis of the pintle whereby the two work engaging devices when in contact form substantially a cylinder for gripping cylindrical work with its axis at right angles to the pintles, face plates having a socket and the pintle comprising a tubular longitudinally partially split pintle tube fitted therein and a split expandible pintle fitted in the tube, the expandible pintle being attached to the work gripping devices.

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