

THE WOODWORKER

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The Charles H. Hayward Years: 1939-1967





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FOREWORD TO VOLUME IV: THE SHOP & FURNITURE

LIKE the flora and fauna on the Galapagos Islands, the woodworking benches, shop accessories and tools on the islands now known as the United Kingdom and Republic of Ireland developed in unusual and surprising ways.

Thanks to a lack of timber, residents of these islands developed workbenches that used far less timber than those on Continental Europe, yet these benches could perform all the necessary tasks of a joiner or cabinetmaker thanks to the engineering of what we now call a torsion box.

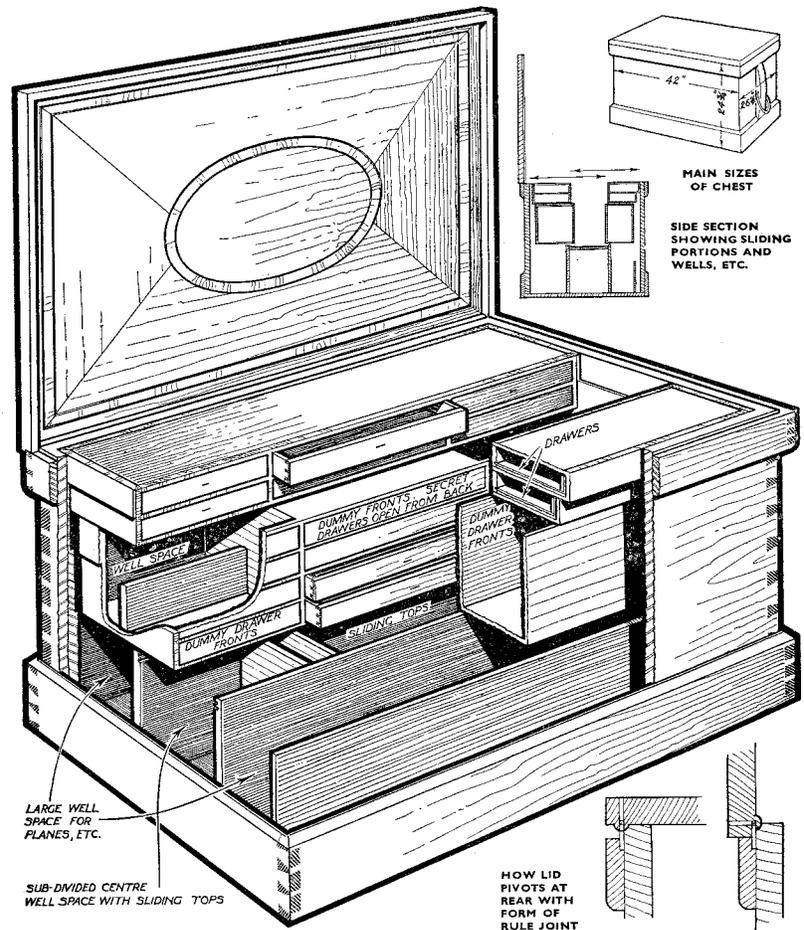
Because of their clever engineering, utility and thrifty nature, these workbenches migrated to other parts of the world that were touched (or taken over) by the British Empire during the 18th, 19th and 20th centuries. So it's not unusual to find these islander workbenches in Canada, the United States and even occasionally in India.

But workbenches are only the beginning of the story. Consider tool chests. When you look at old paintings of woodworkers in Continental Europe, they are commonly shown storing their tools one of three ways: hanging on the wall, in a portable tool tote or in a basket.

For some reason, the residents of the United Kingdom preferred sizable floor chests with sliding trays and sometimes drawers. These chests and trays could be ornately decorated to demonstrate the prowess of the maker, or they could be as plain as a pine coffin.

Why would this island culture prefer tool chests? I can only hazard a guess. Perhaps the wet climate encouraged chests, which absolutely protects tools from the damp (with a little camphor, in particular). Perhaps the structure of

WOODWORKER INSTRUCTION CHART No. 25



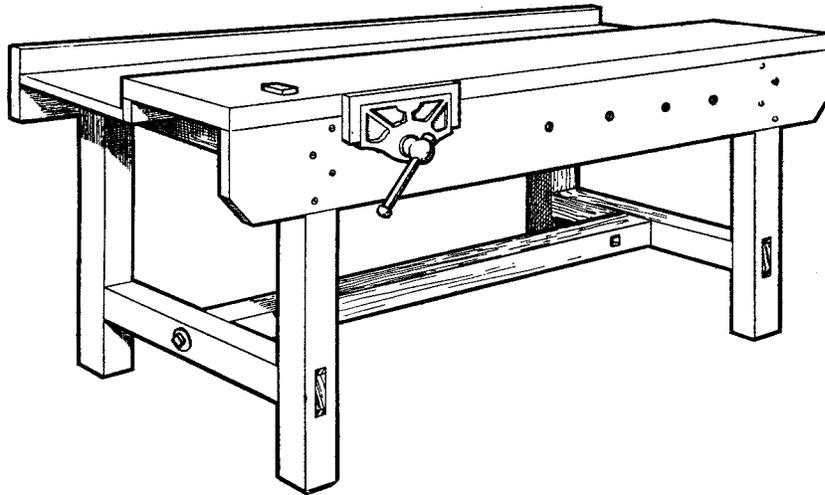
the guilds and woodworking economy in the islands encouraged craftsmen to own their own tools that they needed to protect (and needed to move with haste if they were sacked by the boss).

Or perhaps the incredible expansion of the British Empire in the 18th and 19th centuries created a need for its joiners to be able to pack all their tools (and clothes) into a strong box and sail to a

far corner of the world to set up shop at a far-flung destination.

As a result, tool chests from the United Kingdom and Ireland show up throughout the former holdings of the British Empire and (in particular) tend to litter the antique malls of North America.

(Note: Some Europeans used tool chests, particularly the Dutch and the Vikings. But it's fair to say that the



Europeans were far more fond of tool racks and mobile totes than chests.)

And then there are the tools that are peculiarly British, Scottish, Welsh or Irish. While almost all the Europeans (with the exception of the Dutch) still prefer wooden-frame bowsaws, the islanders of the United Kingdom developed the familiar handsaws and backsaws we use in North America today.

The wooden handplanes from this group of islands have a decidedly different profile than those of the Continent. And let's not forget about the infill plane – a unique tool form from the United Kingdom (perhaps inspired by the Romans, but that's another story).

This list can go on: chisels, mallets, hammers and even nail pullers from the United Kingdom *et al* are quite distinct from those of its neighbors.

And if you think that the woodworking influence of the British Empire and its immediate neighbors extended only to tools, you'd be wrong. Even furniture design and ornament affected the Empire's colonies and its neighbors. Unlike the French, Germans or residents of the Low Countries, the British, Welsh, Scottish and Irish craftsmen were more interested in solid joinery than surface ornament – restraint usually triumphed exuberance. (Yes, some

British forms were ornate, but take a look at comparable French pieces to find out what ornate really means.)

British furniture styles directly affected those in North America and its other colonies. Americans have a “Queen Anne” style of furniture because of Queen Anne (1665-1714). But the British influence was far deeper. Danish Modern – a decidedly European and influential movement – drew its influence from British forms, both directly and indirectly.

Like traditional British furniture, Danish Modern pieces sought structure and form over surface ornament. You have only to look at the sketchbook of Kaare Klint – the father of Danish Modern – to make this connection.

AND THEN THERE WAS CHARLES H. HAYWARD

It is for all the reasons above that I have always loved the work of Charles H. Hayward, the dean of workshop writers in the 20th century. As editor of *The Woodworker*, Hayward was the embodiment of the traditional woodworker from the islands we now call the United Kingdom and Republic of Ireland. He was traditionally trained in shops that emphasized handwork, but he was comfortable with machines. He embraced

the deep cultural heritage of his country's furniture tradition, yet he was part of the movement to overthrow it after World War II (though I don't know how enthusiastic he was about this).

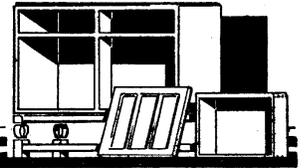
In other words, Hayward and *The Woodworker* in the 20th century were the distillation of the best of the woodworking tradition from this peculiar group of islanders.

And it is for that reason that we have devoted the last 10 years of our lives to bring you this four-volume set of the best articles from *The Woodworker*. This final volume is particularly British/Irish/Welsh/Scottish in that it explores the workbenches, tool chests and furniture forms of these small but hugely influential island countries.

We hope that these volumes will open your mind to the way that these woodworkers approached their work in the 20th century. You might not agree with me that the United Kingdom and Ireland represent the peak of modern mechanical culture, but at the very least you can steal what you will from them (as other cultures have) with the help of these clear and well-illustrated books.

Christopher Schwarz
Fort Mitchell, Ky.
January 2017

WOODWORKER



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Chart titles are in italic.

FITTING UP THE WORKSHOP: THE BENCH

So much depends upon individual circumstances that to lay down any hard and fast rules on the way a workshop should be fitted up would be useless. It depends partly upon the type of workshop one has—whether it is a specially built shed, or just an improvised room in the house; and upon the sort of thing one makes—small models or large furniture, to take two extremes. At the same time, there are certain features which experience has shown to be advisable, and in this series of three articles our contributor endeavours to point out some of them.

THE bench is probably the most important item in the workshop, and at the outset we may discuss briefly any features that are specially desirable. First there is its size. Generally a length of 5ft. is the minimum. Smaller work can be done on a shorter bench, but when it comes to making, say, a wardrobe a fairly large top is essential to enable long rails and similar parts to be planed up. Actually a length of 6ft. is more useful still, but unless the workshop is of a good size it may not be practicable.

For width some 22 ins. is about right, and this can include a tray in which small tools can lie. The height of 2ft. 8 ins. is suitable for the average man, though it can be varied an inch or two either way. A very tall man, for instance, might prefer to have a height of 2 ft. 10 or 11 ins. to save stooping unnecessarily.

One important feature a bench must possess is solidity. It must resist all the stresses to which it is liable to be exposed, and when heavy work such as chopping big mortises with chisel and mallet is done it must be free from all spring.

This means that the underframing must be of stout stuff put together with strong joints, and the top must be thick and heavy. In good professional benches the top may be as much as 4 or 5 ins. thick, but, whilst this is an undoubted advantage, it is not essential for the man who does just occasional evening work. We suggest, however, a minimum

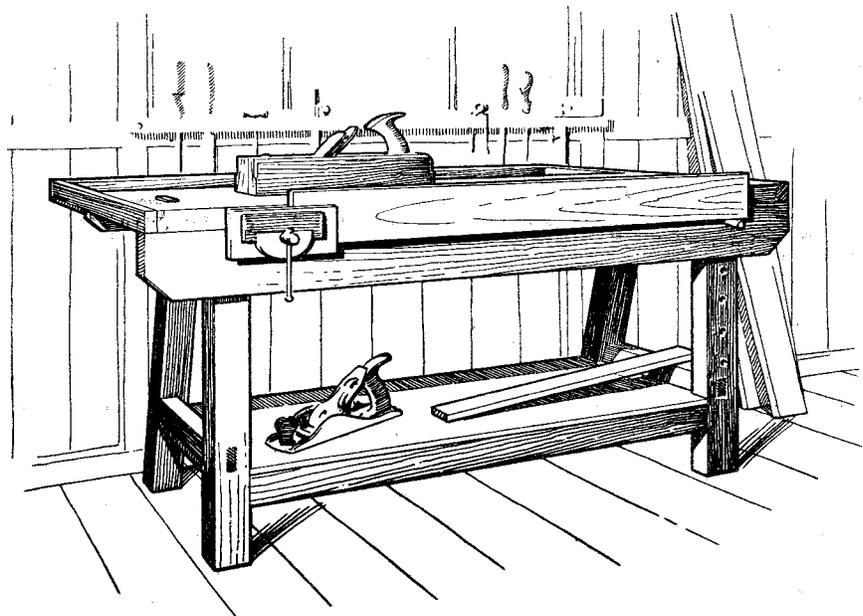


FIG. 1. OF MEDIUM WEIGHT, THIS BENCH IS IDEAL FOR THE HOME WORKSHOP. The suggested sizes are 5 ft. long by 22 ins. deep, and 32 ins. high, though these could be varied within certain limitations. A solid beech top is certainly advisable, and it should be as thick as possible.

of 2 ins. thickness. In any case hardwood should be used, beech preferably. It is not simply that a thick top is not so likely to bend and spring, but that its own weight presents a rigid resistance to

blows. It is like holding a heavy hammer behind a piece of wood whilst a nail is being driven in. Its weight resists the blow.

The heavy framing is an obvious necessity, but, unless carefully designed, a great deal of the strength may be wasted. It is the front edge of the bench that has to take the greatest strain, and this should be well supported, not only with heavy legs, but also with a thick wide rail fitted beneath. This will help to make the top more rigid, and its width

* * *
*Always stiffen the bench
to resist the thrust when
planing*
* * *

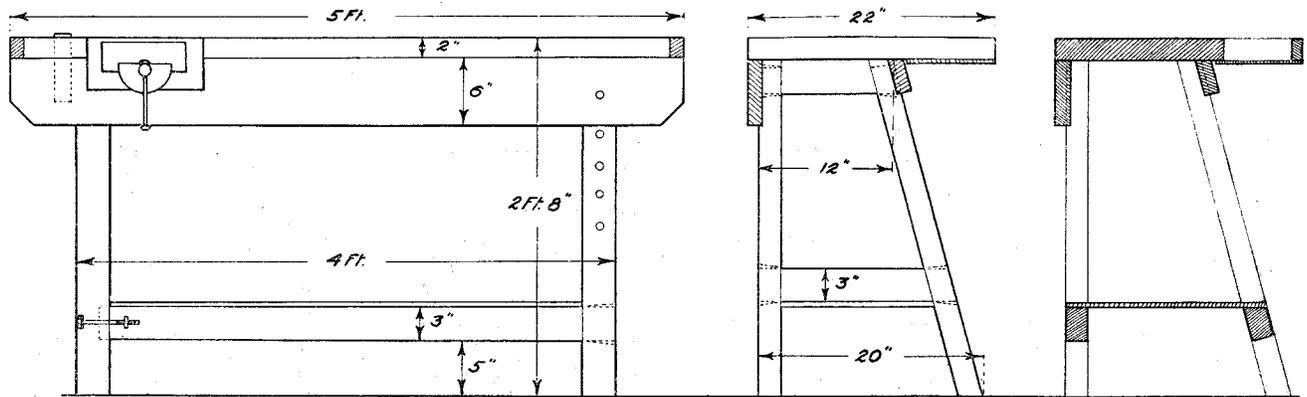


FIG. 2. FRONT AND SIDE ELEVATIONS WITH SIZES. A TALL MAN COULD MAKE IT SLIGHTLY HIGHER

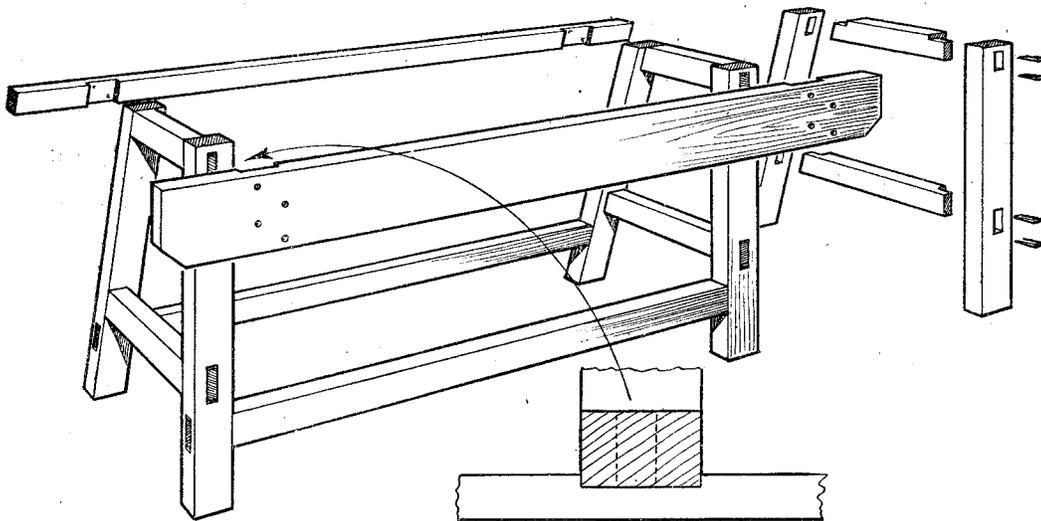


FIG. 3. GENERAL VIEW SHOWING HOW THE PARTS FIT TOGETHER
 Note particularly the wide front top rail with its cross-grooves. The last named fit over the legs tightly and thus help to prevent the bench from racking.

	CUTTING LIST			
	Long ft.	Wide ins.	Thick ins.	
1 Top	4	10	15 1/4	2 Beech
1 Edging	4	10	2 1/8	1 Hardwood
2 Ends	1	10 1/2	2 1/8	1 1/4 "
1 Bottom	5	1/2	8	1/4 Plywood
2 Legs	2	7	3	2 Hardwood
2 "	2	9	3	2 "
1 Rail	5	1/2	6 1/8	1 1/4 "
1 "	5	1/2	3 1/8	1 1/4 "
2 "	4	1/2	3	2 "
2 "	1	2	3	2 "
2 "	1	7	3	2 "
1 Shelf	4	1/2	18	1/2 Plywood
1 Stop	0	6	2	1 1/2 Hardwood
1 Bench vice				

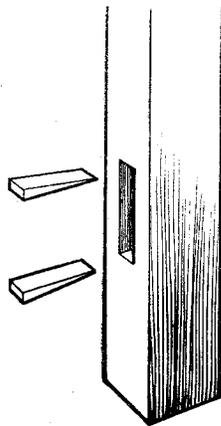


FIG. 4. WEDGED TENON JOINT.
 The wedged tenon makes a satisfactory job, though it is not so strong as that with nut and bolt fixing.

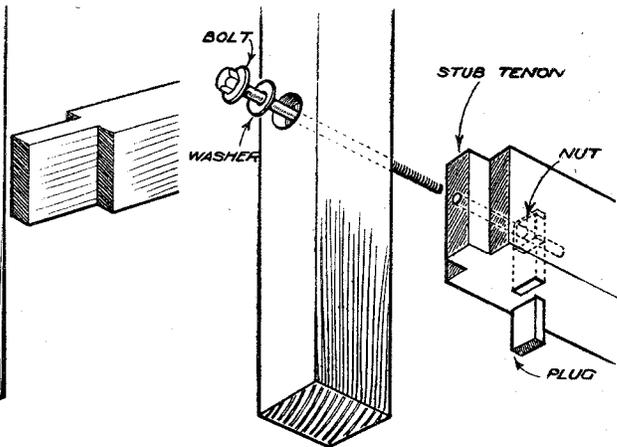


FIG. 5. STUB TENON WITH BOLT
 The wedged tenon makes a satisfactory job, though it is not so strong as that with nut and bolt fixing.

will stiffen the legs against the inevitable stresses in length caused by such jobs as planing. At the extreme back the rigid support is not so essential, and in fact, if there is a tray, it is better to position the top of the legs so that they are under the back edge of the top proper. Stability at the bottom can be obtained by splaying them backwards.

In regard to general design, there is always a temptation for the home woodworker to fit out the lower portion with cupboards and drawers to hold tools. From one point of view there is an undoubted advantage in this. When the workshop is small, one is glad of the space beneath the top to provide accommodation for tools.

As against this a fitted bench is never so successful from the practical point of view. To take just one example, it often happens that a stand of some kind needs to be fixed to the bench with the legs passing beneath the top. This would be obviously impossible with a fitted bench. The provision of a single drawer and a shelf, of course, is no disadvantage in this connection. In fact it should prove very useful.

For similar reasons the fixed bench is generally a mistake. There may be a slight saving in material by fixing it at the back to the garage wall, but this is more than counterbalanced by its awkwardness. Consider the position when a wide table top, or whatever it may be, has to be planed up. There simply is not room for it on the bench. If, however, the bench is movable it is just a matter of pulling it out from the wall, allowing the top to project at the back. One other point in the same connection is that the top must not have any projections of any kind. Some vices are designed to screw at the bench edge, and they stand up above the top. These are a mistake for a permanent bench, because they prevent a wide piece of wood from lying flat.

A 5 FT. BENCH

Fig. 1 shows a useful bench which includes the features mentioned. It has a 2 in. top (this could be increased) with tray at the back, and heavy underframing with strong joints. For the last named an alternative is given. The stronger of the two is the bolted joint which has the additional advantage of taking to pieces enabling the whole to be stacked away. The wedged tenon, however, will make a perfectly strong job – especially if hardwood is used.

Fig. 2 gives the main sizes. Note specially the wide front top rail. Being notched over the legs (see Fig. 3) it prevents the bench from racking from side to side as well as giving good support to the top just where it is needed. The back legs are splayed backwards so that the bench has ample stability, and at the same time give direct support to the thick top.

Assuming that the wedged tenon joints are to be used, the two end frames should be made first, and, to enable the exact slope of the shoulders to be obtained, it is advisable to set out the frame in full size. Allow at least 1/2 in. extra length at the top so that when the wedges are driven in the wood does not split out. Fig. 4 shows the joints in detail. At the top, of course, the tenon must stand down.

Whilst marking out the bottom joints the front and back rails can be marked. Note that these are below the side rails, a 1/2 in. gap being allowed between so that the plywood shelf can be inserted. It will be realised that all joints have to be squared round, and that about 1/4 in. extra at each side has to be allowed, at the outside to enable the wedges to be driven in. Remember that in the back legs the marks for the mortises have to pass through horizontally which means that the adjustable bevel set to the required angle has to be used.

If the bolted joint is being used (it can be used for front and back rails only if desired as these take the greatest strain), stub tenons only are cut as shown in Fig. 5. The bolt head is recessed into the wood, and a hole to take the shank of the bolt is bored right through from outside with the tenon cramped temporarily in position. About 2-1/2 ins. from the shoulder a recess is cut at the underside to enable the nut to be passed upwards opposite the bolt hole.

When assembling, the side frames are put together first. The front and back rails then follow, the shelf being slipped in at the same time. The corners of the shelf must be cut to fit around the legs. The top front and back rails have grooves cut across them to fit over the legs, and these must be a tight fit. They are held with screws as in Fig. 3.

The beech top is 2-1/2 ins. short of the over-all length to enable the 1-1/4 ins. end pieces to be nailed on. The back of the tray fits between these end pieces, and the bottom is screwed or nailed on underneath. The stop can be simply a piece of hardwood about 2 ins. by 1-1/2 ins. in section fitting tightly in a hole cut for the purpose. A hole towards the other end should be bored to enable a bench hold-fast to be fitted. Screws driven upwards from underneath hold the top in position. It can be pocket screwed at the front, but all other screws are put right through the rails, the holes being made full to allow for a certain amount of shrinkage.

Various kinds of bench screws can be fitted. The metal type is usually used nowadays, and is very satisfactory. It needs to be cut into the front rail and is generally screwed on underneath. It may need either to be packed up a trifle, or, in the case of a thick top, to be let in somewhat. The holes in the right hand front leg (Fig. 1) are to enable a peg to be knocked in to support long pieces of wood when being planed.

LIGHT BENCH FOR HOME USE

THIS bench is designed to meet the requirements of the worker who has need of a really satisfactory bench at the minimum of expense. The timbers used are common sizes and can be purchased already planed at the local timber yard. A hardwood, beech or birch for preference, should be used where indicated. Much time and labour may be saved by having the tenons of the leg frames cut at the saw mills; the mortising, however, should present no difficulty. As a level surface is essential for a bench top, the boards should be free from winding, and the front board should be not less than 1-1/2 ins. thick so as to provide a firm surface. The rear boards may be 3/4 in. thick.

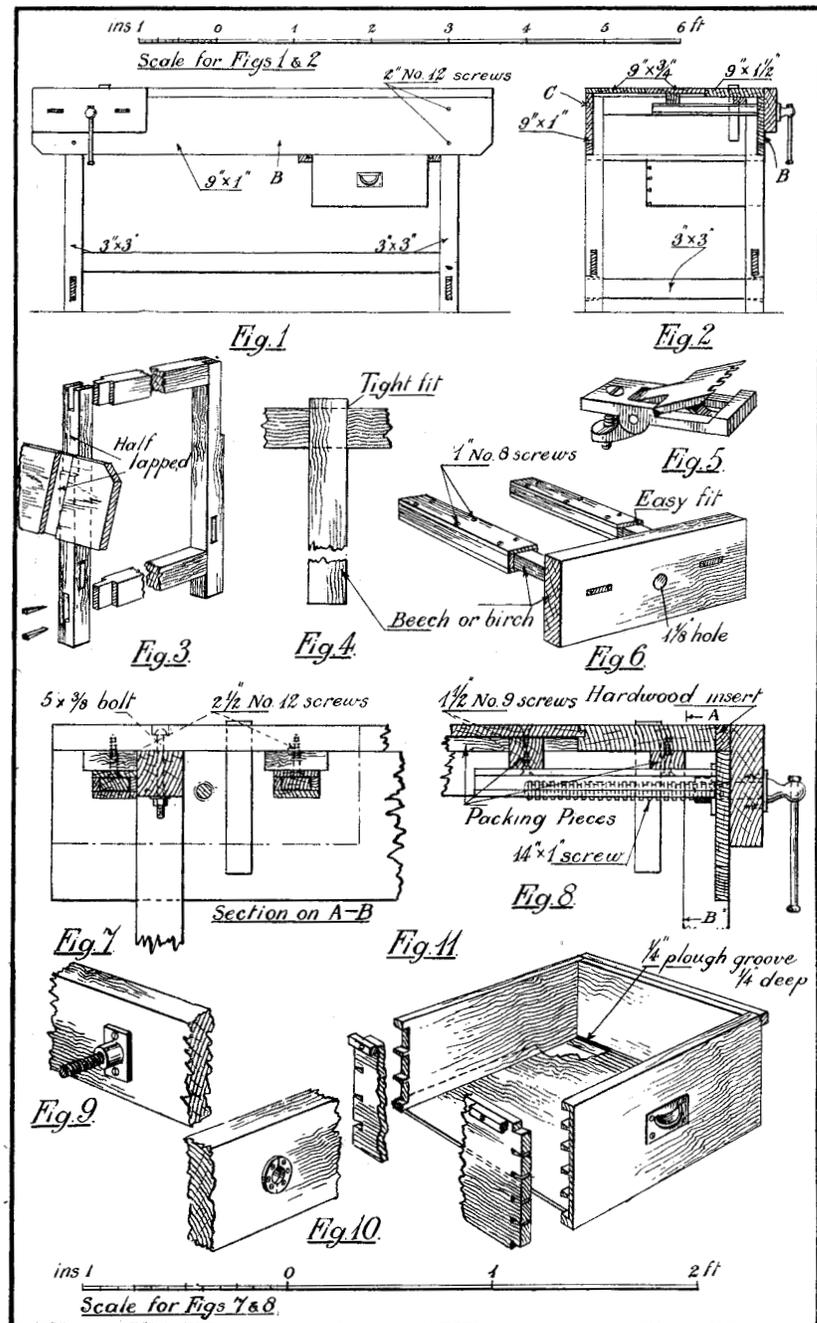
An instantaneous vice has an advantage where time saving is important, but it is hardly worth while where an amateur's bench is concerned. A square thread metal bench screw will be found almost as satisfactory. A suitable size is 14 ins. by 1 in. The metal stop shown in Fig. 5 of the drawings may be purchased from most tool shops. A less expensive stop is the wooden form shown in Fig. 4.

The dimensions of the bench will obviously be determined by the space available, but the height of the bench from the floor is important. This should equal, approximately, the height of the worker's hip.

The Main Framework. Assuming that the leg frames have been prepared and glued up, the apron pieces B and C can be housed, as shown in Fig. 3, to fit over the legs. It is important that this should be done carefully as the rigidity of the bench is dependent on the apron pieces embracing the legs. Before fixing them the 1-1/8 in. hole for the bench screw should be drilled and the holes cut for the runners. The position for these is shown more particularly in Fig. 7. The lower rails are tenoned into the legs, the

tenons passing right through. They are wedged outside. Note that these rails are at a different level to those at the ends, so that the two sets of joints clear each other.

Prior to securing the boards comprising the top of the bench it is necessary either to tongue and groove the two front boards or nail a fillet on the edge of the 1-1/2 in. board for the thinner board



FRONT AND SIDE ELEVATIONS WITH CONSTRUCTION DETAILS

to rest upon. This is advisable in order to retain a level surface. If a wooden stop is to be fitted the hole for this should be mortised before the front board is fixed in place. The 3/4 in. holes to accommodate the bolt heads should be drilled prior to drilling the 1/2 in. holes for the shanks. As thinner boards are employed at the rear of the bench these require to be supported by a packing piece nailed to the top of each leg frame, as shown in Fig. 8. The boards are screwed to these packing pieces with 2 in. No. 12 screws, the holes for the heads being deeply countersunk. To ensure still further a level surface the top should be cleaned off with a trying plane.

Vice Details. At this stage the bench stop can be inserted and the bench put to use in the preparation of the casings for the vice runners. The construction of the casings is shown in Figs. 6 and 7. They are made 3 ins. longer than the bench screw so that if the vice is fully opened there is no danger of its falling. The runners are made from hardwood and should be an easy fit in the casings. Probably the most difficult task in the whole construction is the accurate boring of the vice cheek for the bench screw and the mortising for the tenons of the runners.

* * *

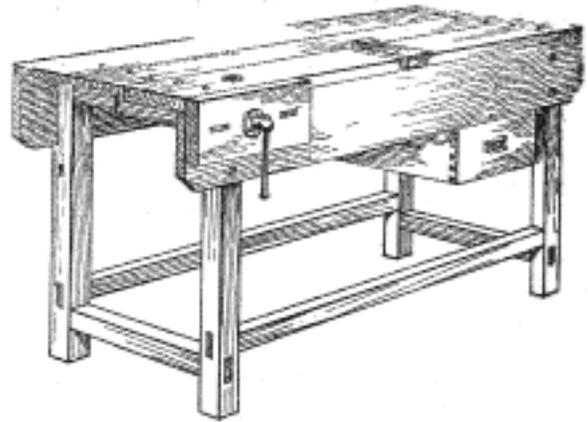
*Never saw against the
bench stop—use a bench
hook.*

* * *

The runners and the bench screw must be parallel and square with the vice cheek otherwise the runners will bind in the casings and it will be impossible to make the vice close. The bench can now be inverted and the casings for the runners screwed into place, packing being inserted to accurately space the casings in relation to the top. Owing to

THE BENCH READY FOR USE

The greatest strain to which a bench is exposed is in the direction in which one planes. It is for this reason that the extra wide apron pieces are used, as this width prevents any racking movement.

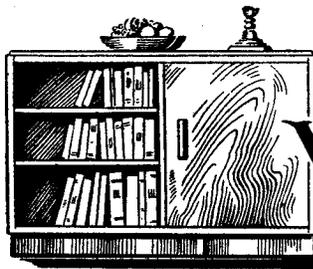


the position of the fixing screws it will be necessary to leave the securing of the lower side of each casing until they are finally fixed into position. The method of securing the bench screw is apparent

from Figs. 9 and 10.

Drawer. The tool drawer shown in the drawings is useful in enabling the bench to be kept clear of tools not in immediate use. See Fig. 11.

CUTTING LIST			
	Length ft. in.	Wide in.	Thick in.
Top	6 2	9	1 1/2
	6 2	9	3/4
	6 2	9	3/4
Leg Frames			
4 Legs	3 0	3	3
2 Top Rails	2 0	3	3
2 Bottom Rails	2 6	3	3
2 Bottom Rails	5 2	3	3
2 Apron Pieces	6 2	9	1
Runner Casings			
2 Tops	1 3	3	1/2
2 Bottoms	1 3	3	1/2
2 Sides	1 3	1 1/8	1/2
2 Vice Runners	1 6	1 3/4	1
Vice Check	1 6 1/2	7 1/4	2
Drawer			
Front	1 7	8 1/2	1
End	1 7	8 1/2	1/2
2 Sides	1 8	8 1/2	1/2
Bottom	1 8	19	1/4 ply
All lengths and widths are full. Thicknesses are net. Fittings: 45 ins. by 3/8 in. bolts with nuts and washers. 16 2 in. No. 12 countersunk screws 24 1 in. No. 8 ditto. 2 2 1/2 in. No. 12 ditto. 4 1 1/2 ins. No. 9 ditto. 14 in. by 1 in. bench screw with fittings and screws. 1 flush handle.			



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WOODWORKER



A STURDY WORKSHOP BENCH

Whatever the hobby or craft the necessity for a good bench to work on is of paramount importance. The examples given have been designed primarily for the woodworker, but with slight modification can be adapted to suit various needs.

THE types of bench tops and underframes shown here will enable readers to assemble the kind most suitable for their own requirements. Fig. 1 shows the well type, a through section of which is given at (A), Fig. 2. At (B) is a cross-section of a flat top bench fixed to a similar underframe. Most heavy work is carried out on the front portion of a bench, and this should be sufficiently thick to absorb shocks, a minimum thickness being 1-1/2 in. As the area around the vice usually becomes worn, the bolting is arranged to allow this section to be

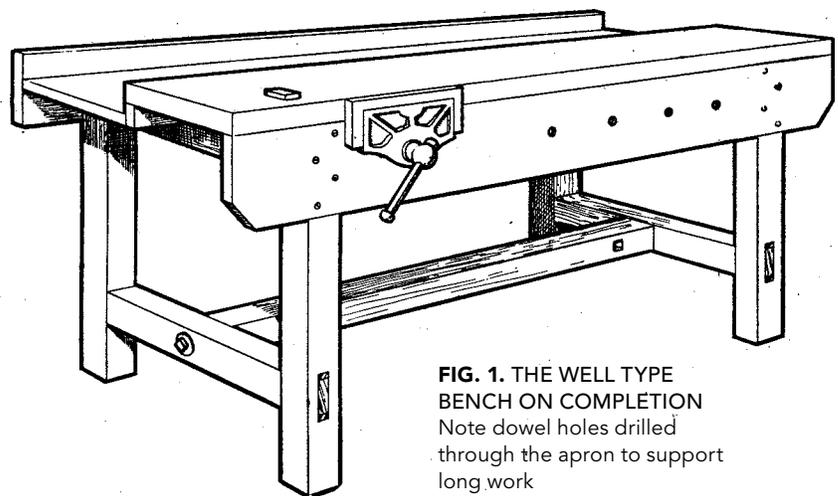


FIG. 1. THE WELL TYPE BENCH ON COMPLETION
Note dowel holes drilled through the apron to support long work

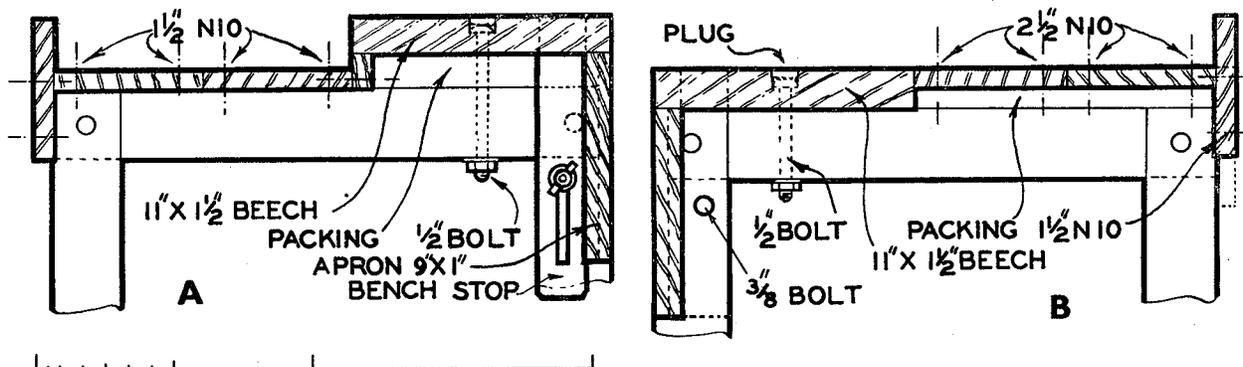


FIG. 2. A SHOWS THE WELL TYPE. B, FLAT TOP.
Apart from packing pieces, timber sizes are the same

turned over or reversed from end to end as required, as shown in Fig. 2. Naturally, the vice and bench stop will need re-housing with each change and the old holes made good.

To counteract racking when planing, the apron Fig. 3 (D), is halved and screwed to the legs. The bottom stretcher rail is tenoned in dry and held in position with bolts (see Fig. 3, D). The advantage of this method is that the bench can be easily dismantled should the occasion arise. If the bench is intended to be over 6 ft. in length and subjected to heavy usage the more rigid form of underframe given in Fig. 3 (C) is recommended. A great deal of labour is saved if timber be bought cut to size. An underframe of 3 in. by 3 in. or 4 in. by 2 in. stuff is quite reliable with a bench top, as in Fig. 2. A bench having a total length from 5 ft. to 6 ft. should suit most needs, but if a greater length is contemplated a thicker top is recommended. The width shown in Fig. 2 is 2 ft. However, if space permits this to be made wider it will prove

an advantage.

Construction. Prepare the end frame members and tenon the lower rail into the leg about 6 in. from the floor. This can be either wedged or doweled as in Fig. 3 (D). The top rail is glued into an open mortise and secured with a $\frac{3}{4}$ in. dowel. It is most important that the frames are square, and a careful check should be made before setting aside. When set the stretcher rail is bolted to the frames, as shown in the sectional view Fig. 3 (D) and apron piece screwed in place. Nail down all necessary packing pieces before securing the top.

Bolt heads should be sunk about $\frac{1}{4}$ in. below the surface and the hole plugged; similarly all screw heads should

be well countersunk to avoid possible damage to work. Finally, the back board is screwed on. This can be fitted out as a tool rack if desired. A suitable stop, shaped and drilled as in Figs. 2 and 3 can be made from almost any hardwood. Toothed metal stops are obtainable, but these are not recommended as they often result in damage to tools and work.

The Vice. A useful vice for most work is one having an opening of 7 in. with jaws of the same width. This is obtainable with a plain screw action or quick release as shown in Fig. 4. Whichever type is chosen, it is advisable to recess the back jaw and screw on a hardwood check to fit flush with the apron piece.

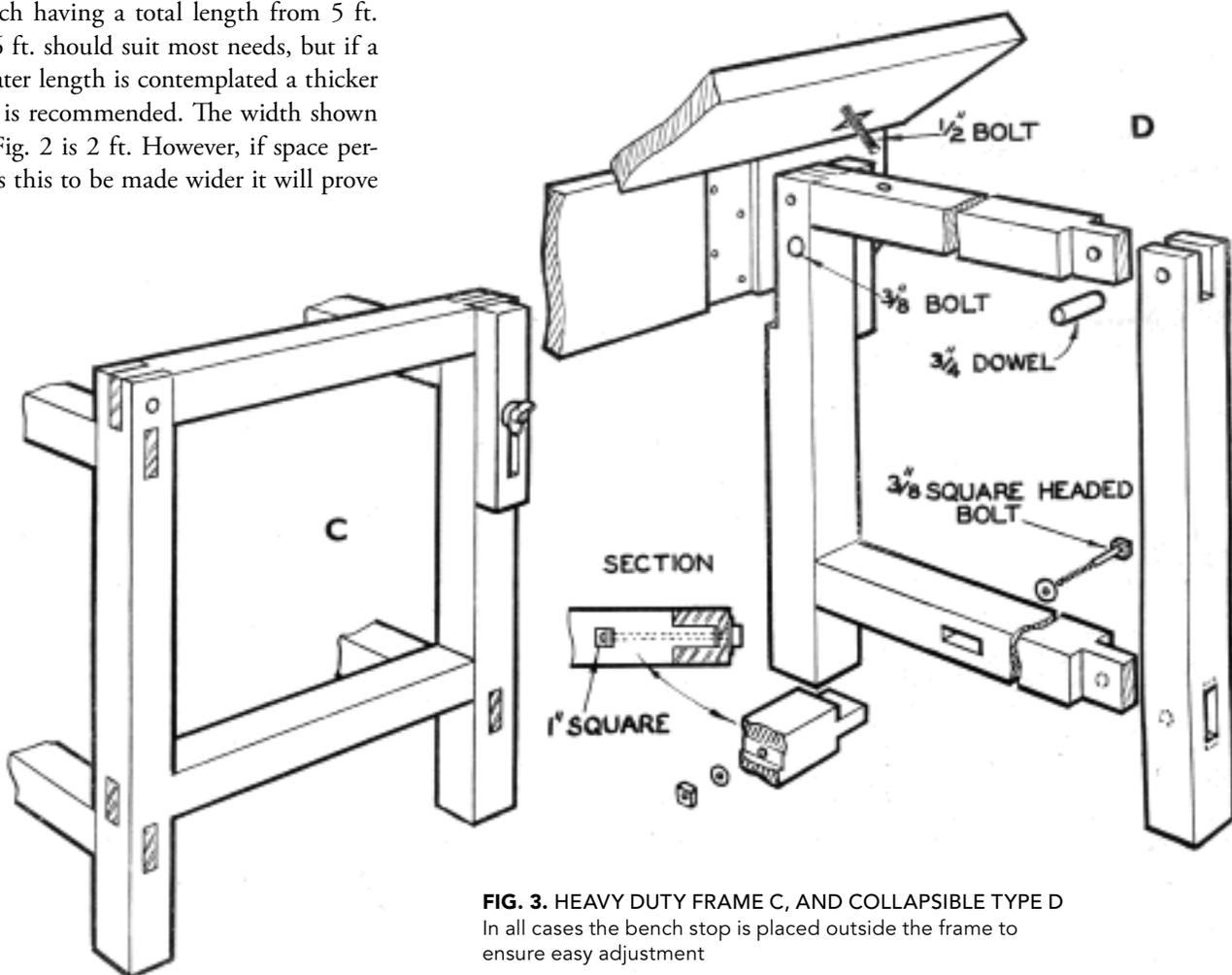


FIG. 3. HEAVY DUTY FRAME C, AND COLLAPSIBLE TYPE D
In all cases the bench stop is placed outside the frame to ensure easy adjustment

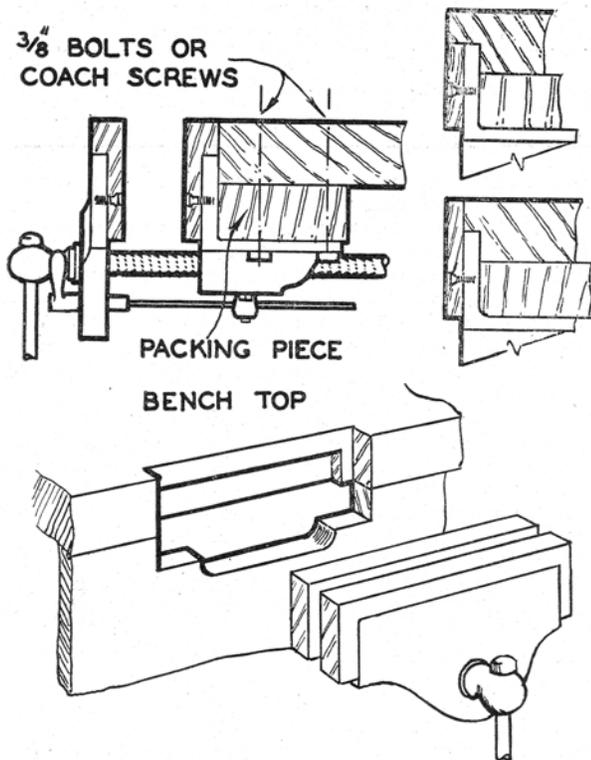


FIG. 4. FIXING THE VICE THE THROUGH SECTIONS SHOW HOW THE VICE IS ATTACHED TO THE BENCH AND METHODS OF ENCLOSING THE BACK CHECK

CUTTING LIST

	Length ft. in.	Wide in.	Thick in.
4 Legs	2 9	3	3
4 Rails	2 2	3	3
1 Stretcher Rail	5 0	3	3
1 Apron Piece	6 0	9	1
1 Board (Beech)	6 0	11	1 1/2
3 Boards (Deal)	6 0	7	3/4
1 Bench Stop	0 12	2	1 1/2

As it is recommended that all timber be bought panned to size, finished sizes have been given. Add 1/2 in. to the length and 1/4 in. to width if bought rough. Metal fittings are obtainable from most ironmongers.

One of the examples given in Fig. 4 would be quite satisfactory. Before cutting an opening in the apron piece it is suggested that a cardboard template be made to ascertain exactly where the aperture should be made. When the opening has been made and the vice placed in position, coach screws or bolts are inserted to hold it as in Fig. 4.

A series of holes drilled through the apron level with the vice screw into which short pieces of dowelling can be inserted will prove beneficial when planing long pieces and will support the work.

YOUR BENCH

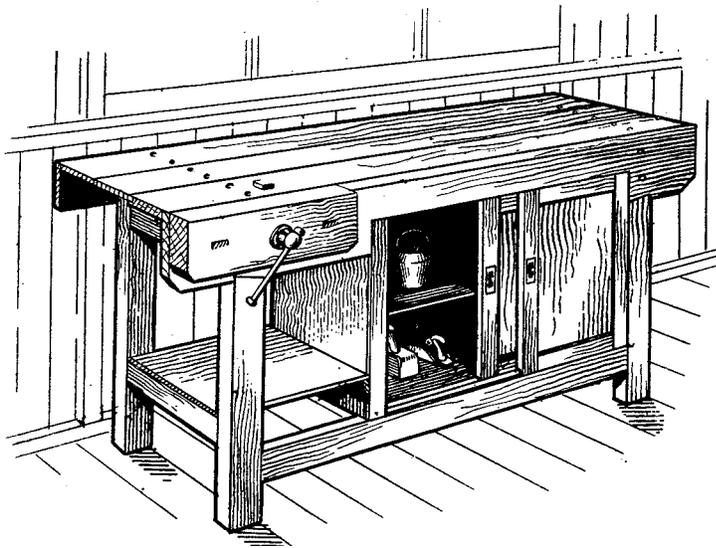
To do good work orderliness is essential. Tools not in immediate use should not litter the bench, but should be kept in a rack or cupboard. As it is useful to have the cupboard near at hand the space under the bench can be usefully employed for the purpose if suitably enclosed. It is important, however, that a bench should be rigid, especially in its length, and the fitting of a cupboard should not adversely affect this rigidity. In the bench described, the apron pieces A, on which the longitudinal rigidity of the bench depends, are retained, but the front apron is cut away in order to give greater access to the cupboard.

THE leg frames are formed of 3 in. by 3 in. stuff, but 4 in. by 2 in. will do equally well. The construction of the frames is shown in Fig. 3, and it will be noted that the lower end rails are arranged so that the lower surface of each rail is flush with the top surface of

each side rail. This arrangement provides for the fixing of the floor of the cupboard. If the joints are carefully made no further strengthening by the use of bolts or dowels is necessary. When the frames have been put together they can be cut away as shown at *b*. Fig. 3, to receive the

apron pieces, which are correspondingly housed in order to form a half-lap joint.

The Bench Top. This comprises three 9 in. boards, and it will be seen on referring to Fig. 2 that the front board is thicker than the other two. This board should not be less than 1-1/2 ins. thick,



IDEAL FORM OF BENCH FOR THE HOME WOODWORKER.

This makes a good rigid bench and gives excellent accommodation for tools in the cupboard beneath. Sizes are 5 ft. long, 2 ft. 3 ins., deep, 2 ft. 9 ins. high.

whilst the other boards can be 3/4 in. This construction saves expense, but at the same time ensures that a firm surface is provided towards the front of the bench, where most of the work is done.

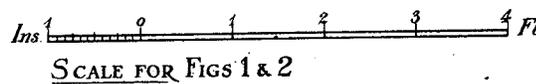
The middle board should either be tongued into the front board or be supported on a fillet nailed to the back edge of the front board. Before securing the top to the leg frames, it will be necessary to nail packing pieces, one on each leg frame, in order to make up the difference in thickness of the front and rear boards comprising the top. The top may be either bolted or screwed to the leg frames, the heads of the bolts being recessed. If screws are used the heads should be deeply countersunk.

Apron Pieces. These comprise 9 ins. by 7/8 in. boards. They are housed to fit over the legs as shown in Fig. 4, so that a flush surface is obtained at the front and rear of the bench. With regard to the front apron piece, the worker will probably find it easier to form the recess by preparing a piece of stuff 4-1/2 ins. wide and gluing two pieces c and d to the lower edge. Before assembling the front apron piece a 1-1/8 in. hole should be bored for the bench screw, also the

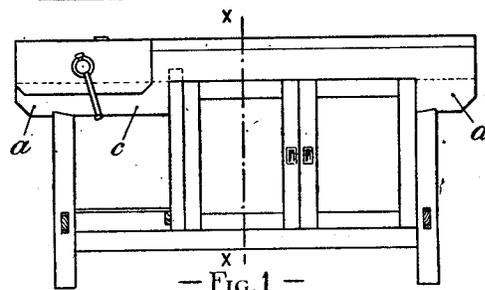
mortises for the vice runners should be made. In fixing the position of these holes, the thickness of the front top board should be taken into account.

The apron pieces are screwed to the leg frames, the heads of the screws being deeply countersunk. If the bench is to be fitted with a wooden stop, the hole for this fitting should be made prior to the fixing of the bench top.

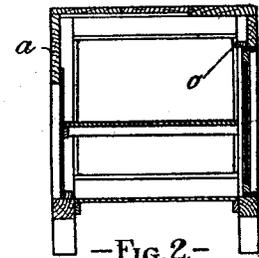
Vice Details. The vice cheek should be made of a hardwood—beech or birch for preference. Tenoned into the cheek are runners e which should also be made of a hardwood. The runners slide freely in the casings which are screwed to the underside of the bench top. Considerable care should be exercised in fitting the casings otherwise the runners will



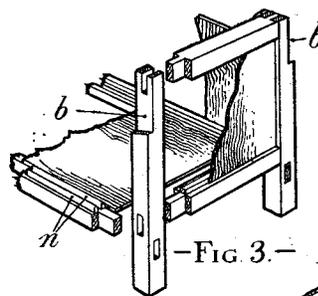
SCALE FOR FIGS 1 & 2



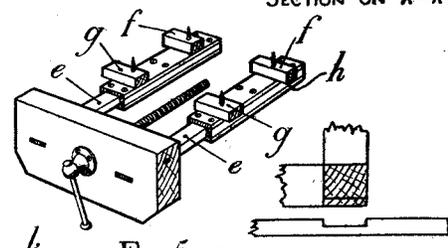
-FIG. 1-



-FIG. 2.-
SECTION ON X-X

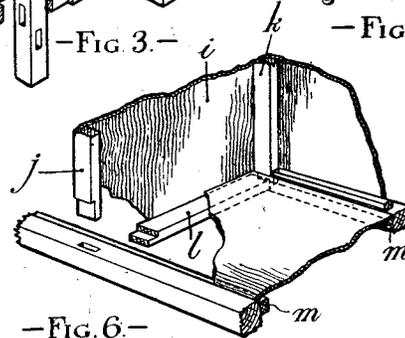


-FIG. 3.-

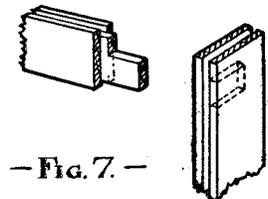


-FIG. 5.-

-FIG. 4.-



-FIG. 6.-



-FIG. 7.-

FRONT ELEVATION, SIDE SECTION, AND GENERAL DETAILS OF CONSTRUCTION

tend to bend when the vice is in use.

Referring to Fig. 5, it will be seen that the casings are spaced from the bench top by blocks *f* and *g*. The blocks *f* are made slightly thicker than the blocks *g* in order to allow for the difference in thickness of the bench top. In fixing the casings the covers *h* should be fixed last of all; this will enable the fixing screws to be screwed through from underneath. Obviously the heads of the screws should be well countersunk.

The Cupboard. In order to provide a support for the end *i* of the cupboard, also the back, it is necessary to provide uprights *j* and *k*, Fig. 6. The upright *j* is flush with the inside of the near rail. The lower joints of these uprights will be apparent from Fig. 6 of the drawings.

The upper end of upright *j* is lapped into the front apron piece as shown by dotted lines in Fig. 1. The upright *k* is carried up to the underside of the bench and is nailed to the rear apron piece.

The floor of the cupboard at the left-hand end is supported by a rail *l*, and at the front and rear by fillets *m*. At the right-hand end the floor can be nailed to the underside of the rail of the end frame. Other fillets are arranged as shown in Figs. 3 and 6, for the attachment of the cupboard sides and back. Birch plywood, 3/16 in. thick, should prove satisfactory for the sides and back, whilst 1/4 in. plywood should serve for the floor.

Undoubtedly, 3/4 in. ply would be the most suitable material for the doors,

but if this is not procurable the doors can be framed. The stiles and rails are stub-tenoned together as shown in Fig. 7. After the doors are put together they are ploughed at the top and bottom in order that they may slide on the guides *n*, Figs. 2 and 3. It will be found necessary to provide a strip *o* so that sufficient width is available for the fixing of the top guide.

It may happen that a piece of work to be held in the vice is of such a shape that it projects inward at its lower end. It is therefore inadvisable to include in the cupboard space that part of the bench immediately below the vice. A hole should be bored through the top at the tail to enable a holdfast to be used.

THE IDEAL BENCH

The man who contemplates making a bench to take the place of an improvised work table cannot do better than that shown in Fig. 1. It is the finest type of bench ever evolved, and is a real joy to use. The provision of several stops at the front of the bench and one movable with the tail vice enables work of different size to be readily clamped. The tail vice also provides greater rigidity as, for example, when work is being sawn in the vice. The well is useful in that it is not necessary to clear the bench of the smaller tools during work. It should be just deep enough for small tools to lie below the surface of the bench.

IF you have not the material by you at present to make this bench it is well worth keeping the design by you for use in happier times.

Dimensions. The height is probably the most important consideration, and you can decide this in accordance with your own height. In practice 2 ft. 6 ins. is the minimum, and it could be increased by 2 ins. or even 3 ins. for extra tall men. The other sizes can be decided by the timber available. The planing board (a) however should not be less than 1-1/2 ins. thick. The dimensions given are

intended to serve as a guide.

Material. A hardwood such as beech or birch should be used for the vice jaws and other parts subject to wear.

The rest can be made from good quality deal. If it is decided to follow the dimensions given, standard metal vice screws should be used. The employment of wood bench screws will require some modification in design.

Construction. The four legs are tenoned into the top and bottom rails, the latter also serving as feet. Leg (c) adjacent the tail vice, will require stub

tenoning into its associated rail in order that the tail vice runner (*d*) shall not be obstructed. The longitudinal rails (*e* and *f*) are furnished with long tenons which are wedged to the legs.

The mortise for each wedge should be so positioned that the wedge will clamp the leg tightly against the shoulder of the rail tenon. Allowance should also be made for future tightening. The member (*b*), after notching for the stops, is glued and screwed to the planing board. It will be noted that the member (*b*) and also the planing board is cut away at the

tail end in order to receive the front jaw of the tail vice.

The well bottom board (*g*) is tongued and grooved into the planing board. The end members (*b* and *i*) are also tongued and grooved into the ends of the bench top. As the member (*i*) also serves as a vice jaw, it is similar in depth to the tail vice, but is reduced towards the rear. At its front end it is notched to receive the tail vice runner. In order that the front vice jaws should be similar in size and also to provide for the bench screw, it is necessary to pack up the member (*b*) as shown at (*j*). Each vice runner is fitted with a guide (*k* and *l*) respectively. When screwing the guides in place, a slip of veneer can be temporarily inserted between each runner and its guide in order to space the parts and prevent the runners binding.

The top is secured to the leg frames by bolts through the planing board, the heads being well recessed, and by screws through the well bottom.

A wood stop has the advantage that there is no danger of inadvertently

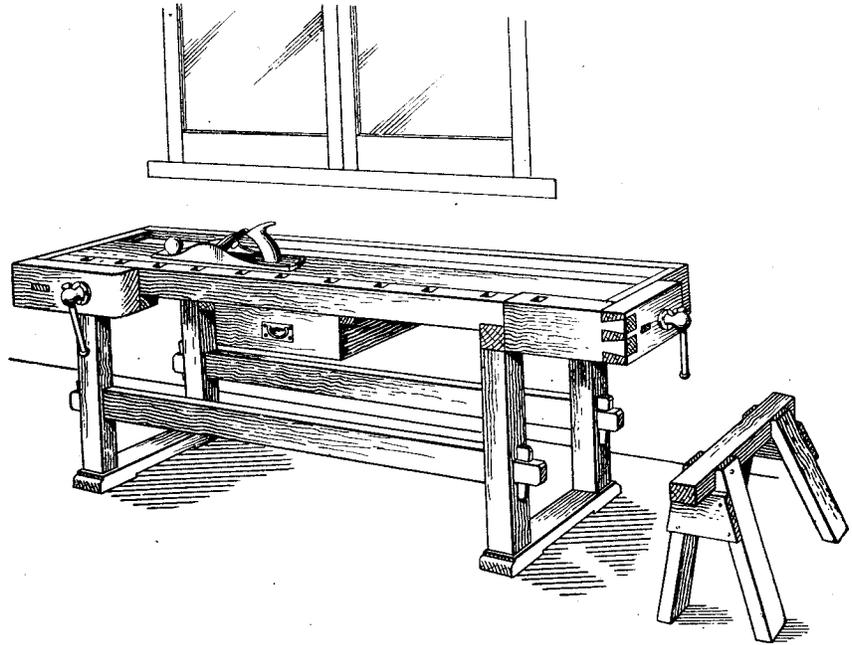


FIG. 1. BENCH WITH TWO VICES, MULTI-STOP POSITIONS AND TOOL TRAY
The tail vice is specially useful for holding work of any length still whilst being worked. It comes in handy also for cramping up doors, etc. Length can be anything from 4 ft. upwards.

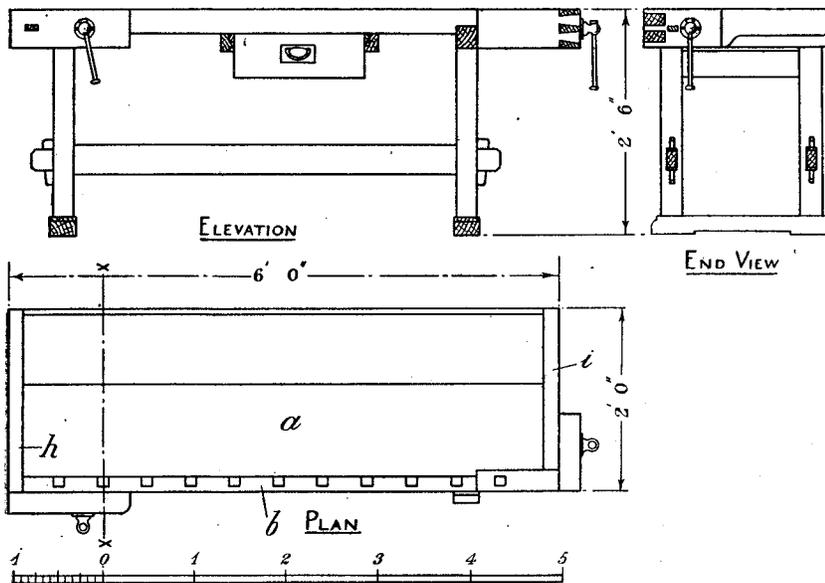
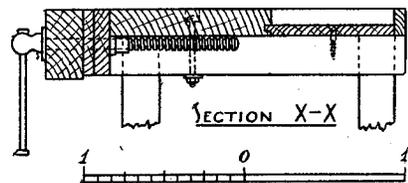


FIG. 2. FRONT AND END ELEVATIONS, PLAN, AND ENLARGED SECTION
Sizes and details may have to be adapted in accordance with the materials available.



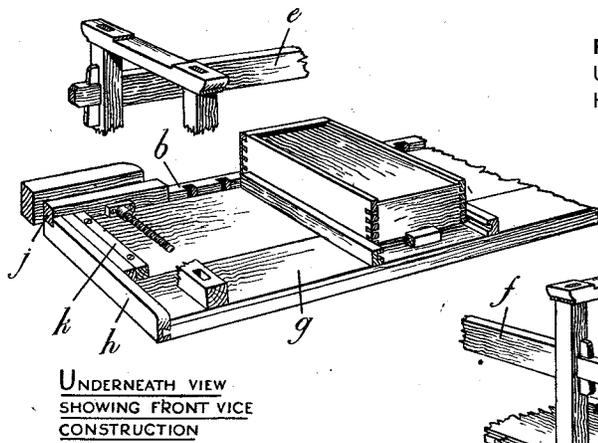
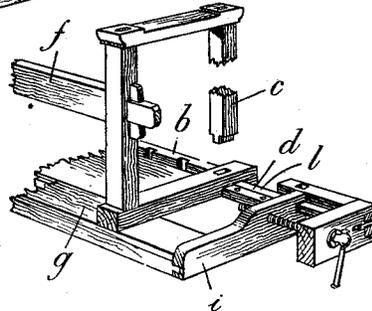


FIG. 3. BENCH TURNED UPSIDE DOWN SHOWING HEAD VICE AND DRAWER

UNDERNEATH VIEW SHOWING FRONT VICE CONSTRUCTION



UNDERNEATH VIEW SHOWING TAIL VICE CONSTRUCTION

FIG. 4. (RIGHT) HOW THE TAIL VICE IS FITTED

Note how the stand is made with wedged joints.



CABINET WORKBENCH FOR KITCHEN OR WORKSHOP

Many home craftsmen today are obliged to use whatever means are available to serve as a bench, and those who have a room for their especial use can count themselves as being fortunate. If the Work has to be done in a living-room or kitchen there is little space for a bench proper, and its strictly utilitarian appearance is out of place. But, if the Workbench is made as an article of furniture, this objection is no longer valid. It can then be used for storing tools or even as a sideboard, the top, of course being specially made to serve as a bench.

IN the cabinet workbench shown in Figs. 1 and 2 the lid is made sufficiently deep to accommodate handsaws, since these tools take up considerable space. It is impracticable permanently to fix a vice, but this difficulty can be overcome by using a small vice (Fig. 3). This can be easily removed when the bench is not required for use and stowed in one of the drawers. A shelf is shown, but this could be superseded by racks for the chisels, etc.

It is intended that the cabinet workbench should be placed slightly away

from a wall so that the lid, when opened, is inclined backwards. It is advisable, however, to provide the two buttons shown to prevent any accidental falling forward of the lid.

General Features of Construction.

The cabinet will have to be of rather more sturdy construction than is customary, since such operations as planing will tend to rack it. Therefore the legs and bottom rails should not be less than 1-7/8 in. square, or formed from stuff equivalent in cross section. The necessary rigidity will be helped by rebating

scarring the plane iron by accidental contact with the stop. The stops for the bench described should be made of hardwood. They should be made a tight fit in the notches and square hole in the tail vice jaw, and made sufficiently long so that they may be knocked up from under the bench.

If a drawer is to be fitted, it will be necessary to arrange the grooves in the drawer runners so that the drawer will slide freely and clear of the front member (b).

the back legs and securing the plywood back in the rebate, other fixings being obtained by pinning to the back frame members. As the bench top must absorb blows during work, it should not be less than 1-1/2 in. thick—at least, the front board of the top should be this thickness. The board or boards towards the back can be thinner. The front of the cabinet should obviously be flush without protruding knobs or handles.

Dimensions and Materials. Suitable sizes are indicated in Fig. 4, but these can be varied according to

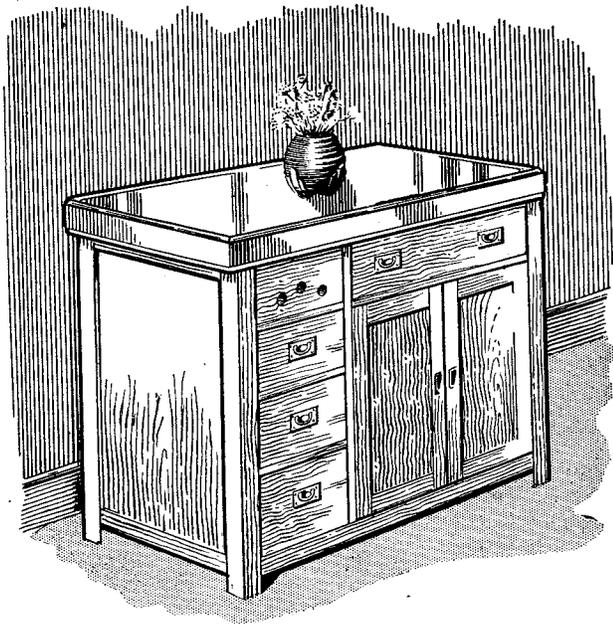


FIG. 1. THE WORKBENCH CLOSED AS A PIECE OF FURNITURE

This gives a good idea of how attractive the bench looks when work is not in progress. If possible a hardwood should be used for show parts and those subjected to wear

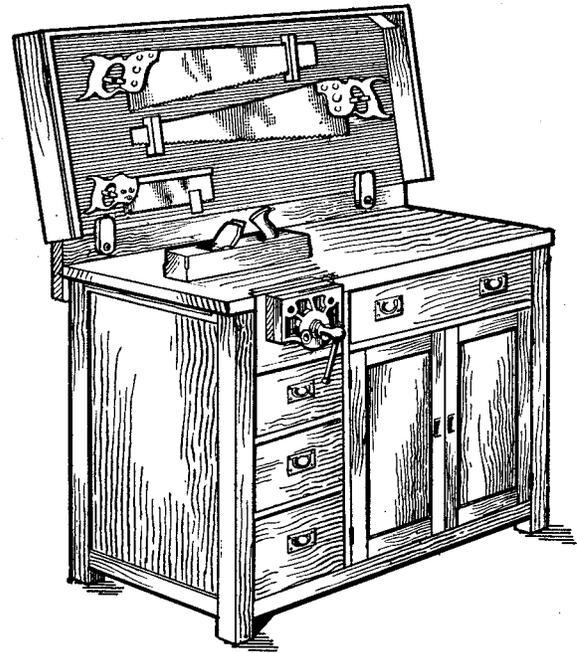


FIG. 2. BENCH WITH LID OPENED AND VICE FIXED

The arrangements for holding tools can be adapted to suit your own kit

requirements. The height given for the bench top is about right for a worker of average height. If possible, a hardwood such as oak should be used for the carcass, but the bench top should be made of deal for the purpose previously given.

Construction of Carcase. The rails (A, Figs. 5 and 6) are ploughed on their back edges to receive a short tenon on one end on each of the drawer runners (B), the other end of each runner being half-lapped into the back rails (C).

This construction is a little more elaborate than usual, but it ensures that corresponding runners are level with each

other and also enables a good fixing to be made.

The guides (D) fit into the space between the runners and the panels and are glued and pinned to the runners before assembly.

The division between the rest of drawers and the cupboard is shown in Fig. 7. In order to hide the edge of the plywood partition from the front, the

upright (E) is rebated, the partition otherwise being pinned to the face of members (F and G) and kicker (H). The top rails (I) are dovetailed into the top of the legs for

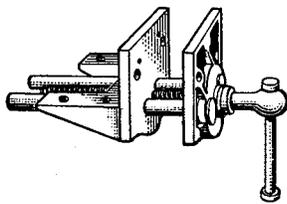


FIG. 3 (LEFT). THE 6 IN. VICE SUITABLE FOR THE BENCH

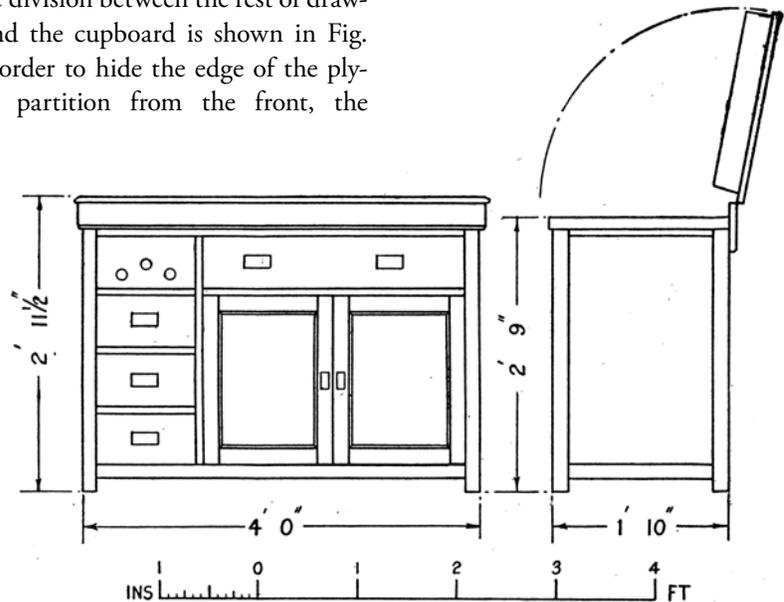


FIG. 4. FRONT AND SIDE ELEVATIONS WITH MAIN DIMENSIONS

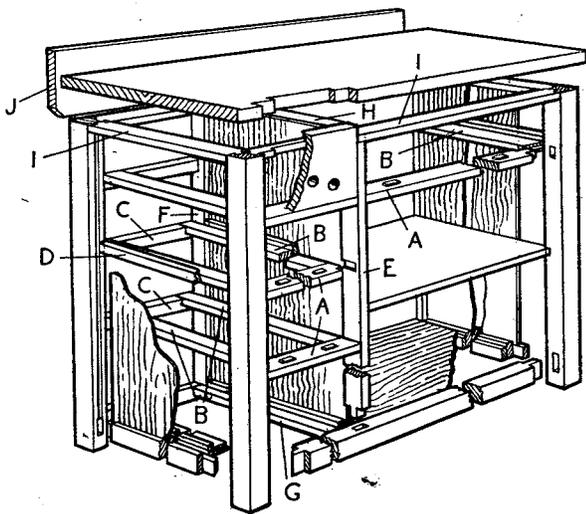


FIG. 5. CUT-AWAY VIEW SHOWING CONSTRUCTION

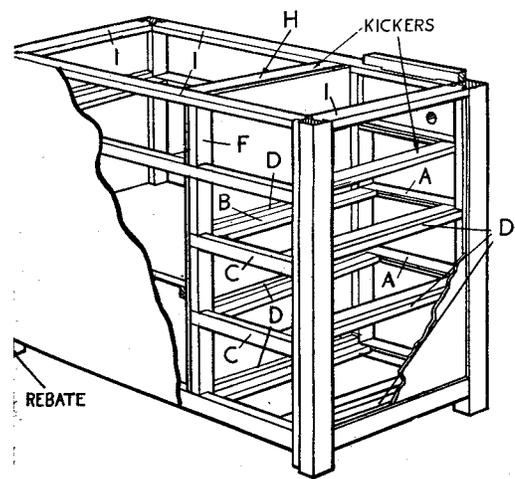


FIG. 6. BACK VIEW SHOWING SET-IN OF RAILS

the end panels the groove can be continued through the entire length of each leg and filled in where the legs are exposed below the bottom rails.

Fitting the Vice. This must be fixed so that it does not interfere with the lid's closing down and hiding the edge of the bench top. It is therefore necessary to fix the inner cheek of the vice to a piece of stuff that is the counterpart of one of the fronts of the side drawers (Fig. 9). This

is bored to take the guides and screw of the vice and is glued and pinned into place. As this piece of stuff also serves as one of the vice jaws, it is necessary that it should be hardwood.

In order that the top of the vice should be level with the bench top, it is necessary to cut away the latter as shown in Fig. 4. The rigid fixing of the vice is effected by a packing piece (Fig. 9) fixed to the underside of the bench top. It is as

well to make up a hardwood cheek for the other vice jaw.

Bench Top. As allowance should be made for shrinkage, it is advisable to secure it to the top rails (I) by means of buttons (Figs. 10 and 12). Alternatively, the fixing can be effected by screws through the rails (I), which are slotted to receive the screws. If buttons are used, they should not project below the lower surface of the rails, otherwise they will interfere with the opening of the larger drawer. The hanging rail (J) for the lid must be securely fixed. It therefore projects below the level of the bench in order that a fixing can be obtained to the legs as well as the back edge of the bench top, and also to take the thrust when the lid is lifted.

Lid. The side and ends are mitred together and glue blocks inserted in the corners (Figs. 10 and 11). These blocks are of such length that when the lid is closed down, it rests upon them so that it hides the edge of the bench. It is as well slightly to bevel the back edges of the ends to assure that the weight of the lid is taken by the blocks and no thrust is exerted on the hanging rail. The top is secured by screws inserted obliquely through the side and ends.

Assembly. The upright (E) is fixed to the bottom front rail and stop housed

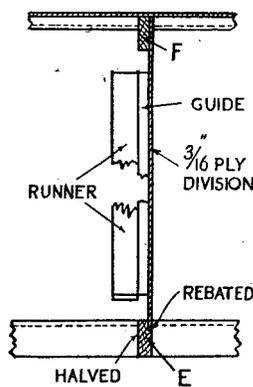


FIG. 7. DIVISION SECTION

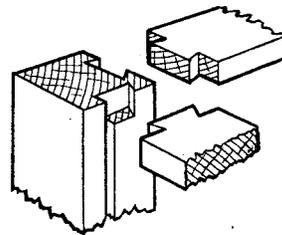


FIG. 8. HOW TOP RAILS ARE JOINTED TO LEGS

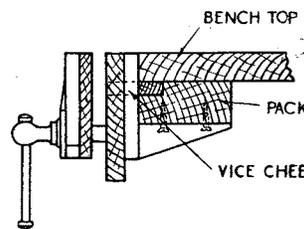


FIG. 9. SECTION THROUGH VISE

into the front top rail (I). The upper drawer rail (A) is then glued in place, being half-lapped to the upright (E). The front legs can now be attached and the short drawer rails pushed in from the back, these being stop housed into the left-hand leg and the upright (E). At this stage, the panel forming the inner vice cheek can be fitted and glued and pinned in place. The back frame can be assembled in the same order, but in this case the back rails are lapped into the upright (F) and secured to the adjacent leg by bare-faced tenons.

On the completion of the assembly of the front and rear frames, the front frame is laid flat and the bottom end rails fixed and the runners and kickers placed in position. This done, the back frame is brought up and the end panels inserted, these being retained by fixing the top end rails (I). Before fixing the cupboard bottom, and also the shelf, it is as well to attach the bench top, since by so doing, more space will be available for handling the screwdriver. Care should be taken to see that the buttons

fixing the top on the cupboard side do not obstruct the drawer. It is also better to fix the vice at this stage.

It will be found more satisfactory to hang the lid to the hanging rail prior to attaching the latter, as it will then be easier to ensure that the lid is level and is positioned so as to clear the edges of the bench top. The holes for the fixing screws in the hanging rail will have previously been bored.

Drawers and

Doors. It is not considered necessary to describe their construction as this is normal.

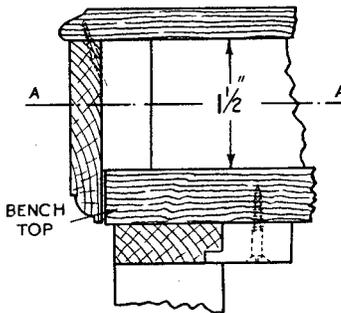


FIG. 10. HOW LID COVERS EDGE OF BENCH TOP

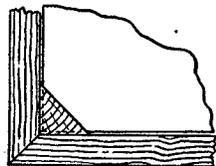


FIG. 11. SECTION ON A-A

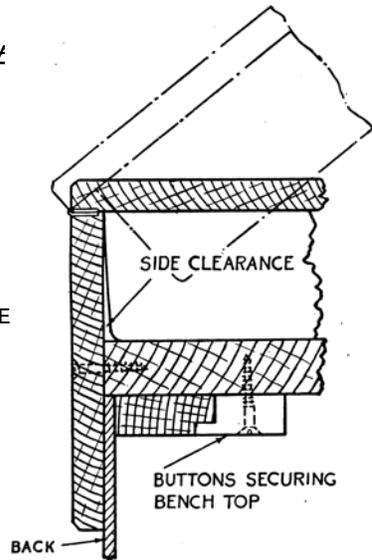


FIG. 12. HINGEING OF LID

CUTTING LIST

	Length ft. in.	Wide ft./in.	Thick in.
4 Legs	2 9	1 7/8	1 7/8
2 Bottom Rails	4 0	1 7/8	1 7/8
2 Bottom End Rails	1 10	1 7/8	1 7/8
(I) 2 Top Rails	4 0	1 7/8	3/4
(I) 2 Top End Rails	1 10	1 7/8	3/4
(A) 1 Drawer Rails	4 0	1 7/8	3/4
1 Back Rail	4 0	1 7/8	3/4
(E) 1 Upright	2 6	1 7/8	3/4
(F) 1 Upright	2 6	1 7/8	9/16
(A) 2 Drawer Rails	1 2	1 7/8	3/4
(C) 2 Bearers	1 2	1 7/8	3/4
(B) 8 Runners	1 8	1 1/2	3/4
(D) 8 Guides	1 6	1 1/8	3/8
(G) 1 Rail	1 10	1 7/8	3/4
(H) 1 Rail	1 10	1 7/8	3/4
1 Vice Panel	1 1	9	3/4
2 Panels (plywood)	2 6	1 7	1/4
1 Back	3 11	2 6	3/16
1 Cupboard			
Bottom (plywood)	2 10	1 8	1/4
1 Drawer Front	2 9	7	5/8
2 Drawer Sides	1 9	7	3/8
1 Drawer End	2 9	7	3/8
1 Drawer Bottom			
(plywood)	2 9	1 9	3/16
3 Drawer Fronts	1 1	7	5/8
6 Drawer Sides	1 9	7	3/8
6 Drawer Ends	1 1	7	3/8
3 Drawer Bottoms			
(plywood)	1 1	1 9	3/16
1 Partition	2 6	1 9	3/16
1 Bench Top	4 2	1 10	1 1/2
		Boards to make up width given	
1 Hanging Rail	4 2	6	3/4
1 Top	4 3	1 10	5/8
		Boards to make up width given	
1 Front	4 2	4	5/8
2 Ends	1 11	4	5/8
4 Door Stiles	1 10	2	3/4
4 Rails	1 4	2	3/4
2 Panels (plywood)	1 6	1 1	3/16
1 Shelf (plywood)	2 9	1 8	3/8
Small Parts Extra			

Note- Widths and thicknesses are net; lengths are full.