

# Screws & screwdrivers: what you need to know

**Years ago, if you were in electronic servicing, you only needed two types of screwdriver, flat bladed and Phillips head. If you're still trying to get by with these two types, you stand a good chance of butchering screws and your screwdrivers.**

By LEO SIMPSON

"Use the right tool for the job". That's always been a good rule to work by and it still is. In this article we give you the good oil on all the different types of screw fastener in use today.

If you want to service electronic equipment these days, you must have the right screwdrivers to gain access to the innards. If you don't have the right screwdrivers you

can be stymied before you start. And if you attempt to undo screws with the wrong screwdriver, you stand the chance of butchering the screw heads or the screwdriver, or both.

If you haven't worried about this problem up till now, we'll give you a good example of screw types that can cause problems.

If a screw has a cross-type head

it is a Phillips type, right? Not necessarily. In fact, probably 50% or more of the cross-head screws used in today's electronic equipment are Pozidriv. The difference is very important.

Superficially, Phillips and Pozidriv (pronounced "pozy drive") screws look the same. But a Philips screwdriver won't fit properly into a Pozidriv screw. If the screw is really tight, you stand a good chance of butchering the head. On the other hand, if the screw head is case-hardened, as many are these days for use with power screwdrivers, you may break the flutes off the screwdriver tip.

Compared to a Phillips head screwdriver, a Pozidriv type of the same point size (we'll explain that



As a starter kit with interchangeable screwdriver bits, it would be hard to go past this set made by Vessel of Japan and sold by Colliers Tools. It has bits for slotted, Phillips and hex head screws

later) looks blunter and heavier and the fluting is more complex. Where the Phillips type has just four tapered flutes to fit the screw head, the Pozidriv type has a subsidiary flute in between each pair of main flutes.

Another feature of the Pozidriv head is that the flutes are not tapered whereas they are on the Phillips type. You can see the differences in one of the photos.

The net effect of these differences in profile is to give a screw and driver combination which can take more torque before "cam out" occurs. In other words, you can apply more twisting force to the screw.

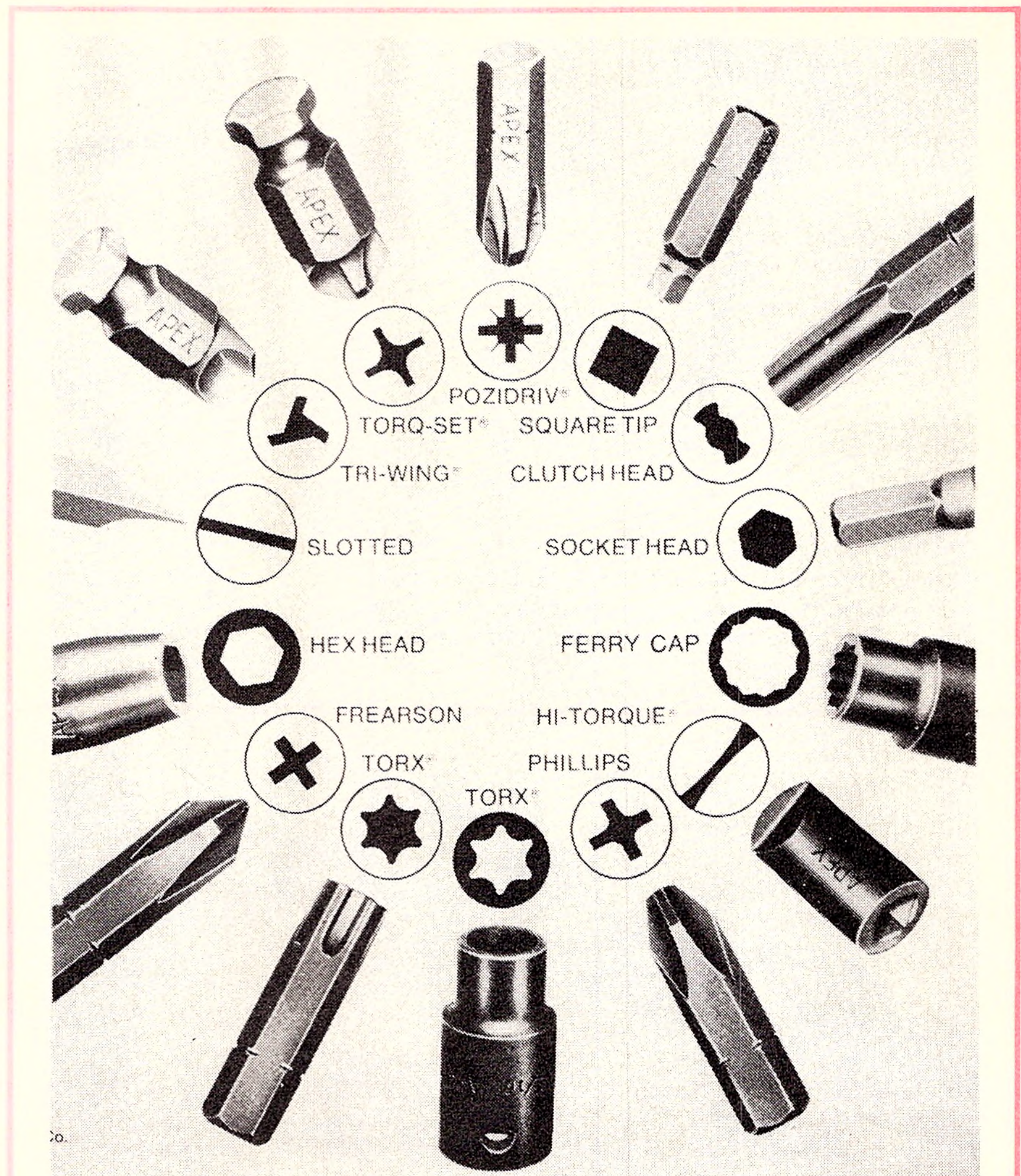
Photographs in this article show the subtle differences between Pozidriv and Phillips screwdrivers but how do you recognise the screws themselves? Again, the differences are fairly subtle but once you know what to look for, they are easily recognisable.

Look at the diagram at right. The Pozidriv screw has a more complicated crosshead design with a "star" pressed into the head, at 45 degrees to the main cross. The star runs into the cavity of the screwhead and actually accommodates the subsidiary flutes in the screwdriver head.

Now that you know how to identify Phillips and Pozidriv screws, have a look at the crosshead screws on some of your appliances and electrical equipment. Look for that little star shape over the main cross — that's a Pozidriv.

Now take a Phillips head screwdriver and see how it mates with the Pozidriv screw. It does so very poorly. You will see that there is a poor match between the flutes on the Phillips screwdriver and the internal driving faces of the Pozidriv screw.

It is because of this poor match that screws and screwdrivers are liable to be damaged. The moral of this is that you must use the right type of screwdriver. But it goes fur-



This diagram shows some but not all the screw types now being used in electronic and electrical equipment. Not shown are types such as Oval and Drive screws and tamperproof Torx, which has a pin in the centre. The Tri-wing type is very common in domestic electrical appliances.

ther than this; you must also use the right size.

### Point sizes

Phillips and Pozidriv screwdrivers are sold in point sizes. Phillips come in sizes 0 to 4 while Pozidriv comes in point sizes 1 to 4. To be properly equipped for electronics work, you need at least point sizes 0 to 3 for Phillips and sizes 1 to 4 for Pozidriv. Phillips point size 4 is mainly used on cars and trucks.

Just to confuse the issue, there is another type of screw which is almost exactly the same as the Pozidriv type, known as Supadriv. Thankfully, Pozidriv and Supadriv are compatible. Pozidriv screwdrivers are available from most

large hardware stores and tool supply outlets.

### Another crosshead

Another crosshead style of screw and screwdriver is the Frearson type, as made by Reed and Prince (USA). This is not compatible with either Phillips or Pozidriv. Inevitably, you run the same risk of damaging the screw or driver if you use the wrong type.

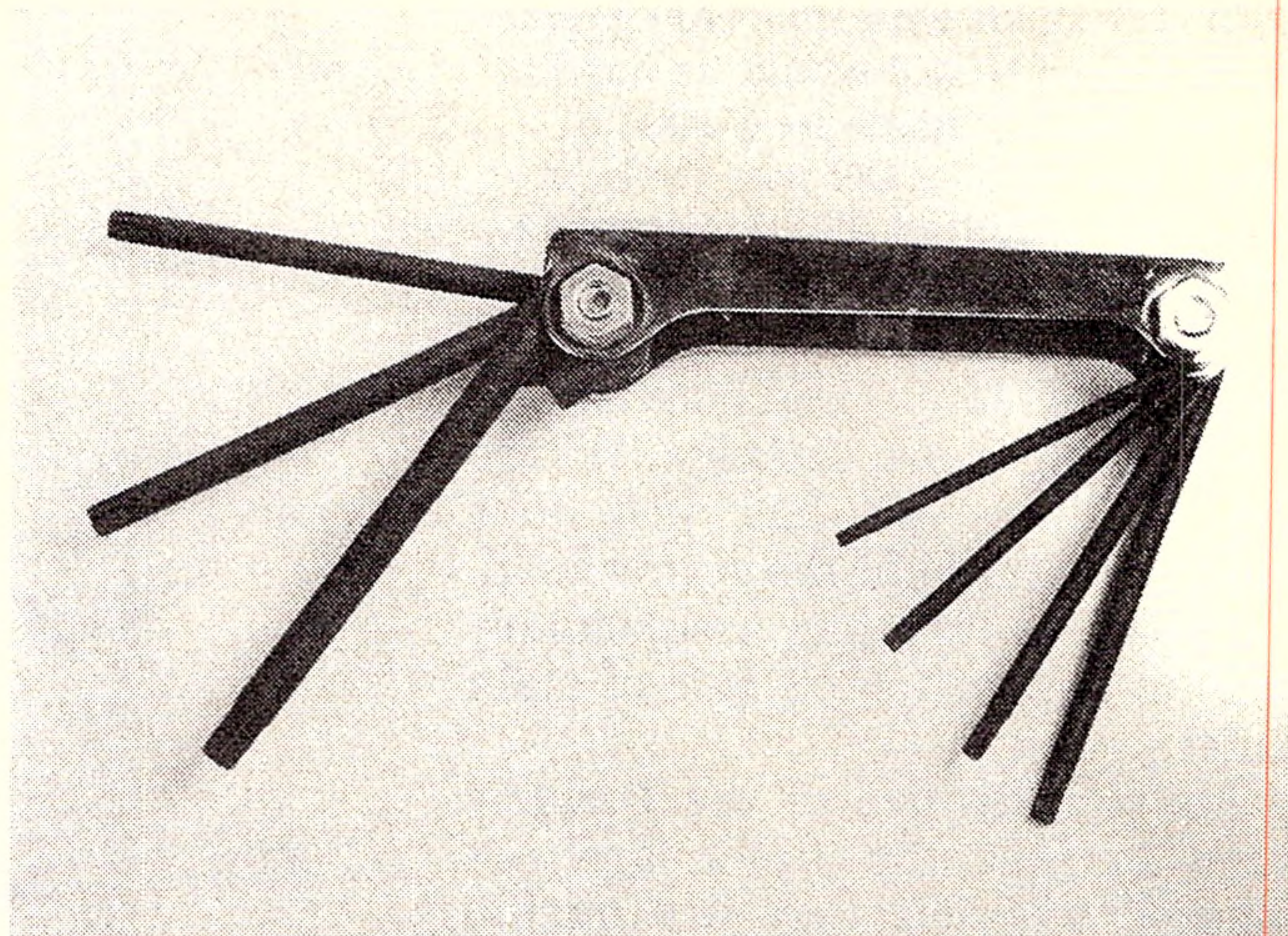
The Frearson screw head pattern is much more angular than the Phillips pattern. The screwdrivers are not designated by point sizes but by blade diameter; eg, 3/16-inch, 1/4-inch, 5/16-inch etc.

Frearson head screwdrivers are usually only available from specialist tool suppliers.





At left is a T-handled Torx screwdriver from Arista which is needed if you wish to gain access to an Apple Macintosh. The other small Torx drivers are from Geoff Wood Electronics.



This handy Torx set includes sizes T10, T15, T20, T25, T27, T30 and T40. It is available from Bowthorpe Australia. Phone (02) 525 2133.



This diagram highlights the design of the Torx screw and screwdriver bit. Don't try to undo Torx screws with Allen keys as you will damage both screw and driver.

screws are used in industry and in cars, particularly those of European origin. As well as using the sizes listed above they also use T40, T45, T50 and T55. There are also outside male versions of Torx screws and they require Torx wrenches which look similar to a ring spanner.

As an even further obstacle to the home handyman or service technician, some appliance manufacturers are using a tamperproof version of Torx screws. These have a pin to stop a normal Torx screwdriver from being used. Again, specialist tool outlets can supply the bits to order.

### Allen and hex screws

These are widely used and fortunately Allen and hex drivers are readily available. However there is another driver for Allen screws which can be useful, the ball head driver. This fits into standard Allen screws and is handy when you need to drive at an angle.

### Spintites and nutdrivers

If you want to get inside an IBM PC or Tandy computer you need a nutdriver of the appropriate size to fit the Spintite screws. While the Spintite screw design does include a screwdriver slot, it is very shallow and difficult to use with a conventional blade screwdriver. Again, you don't want to butcher the screws so use the correct nutdriver.

Alternatively, use the correct

### Tri-wing screwdrivers

Tri-wing screws are very commonly used in electrical appliances such as powerboards made by Kambrook and frypan controllers made by Sunbeam. They look a little like Phillips head screws except that they have three flutes (or blades) instead of four.

Unlike the Phillips/Pozidriv incompatibility there is absolutely no other driver which will fit and undo a Tri-wing screw. Either you have the correct driver or you don't start on the job. They are available from specialist tool suppliers.

### Torx screwdrivers

Torx screws and screwdrivers are yet another revolting development. They are used in quite a lot of electrical appliances and in com-

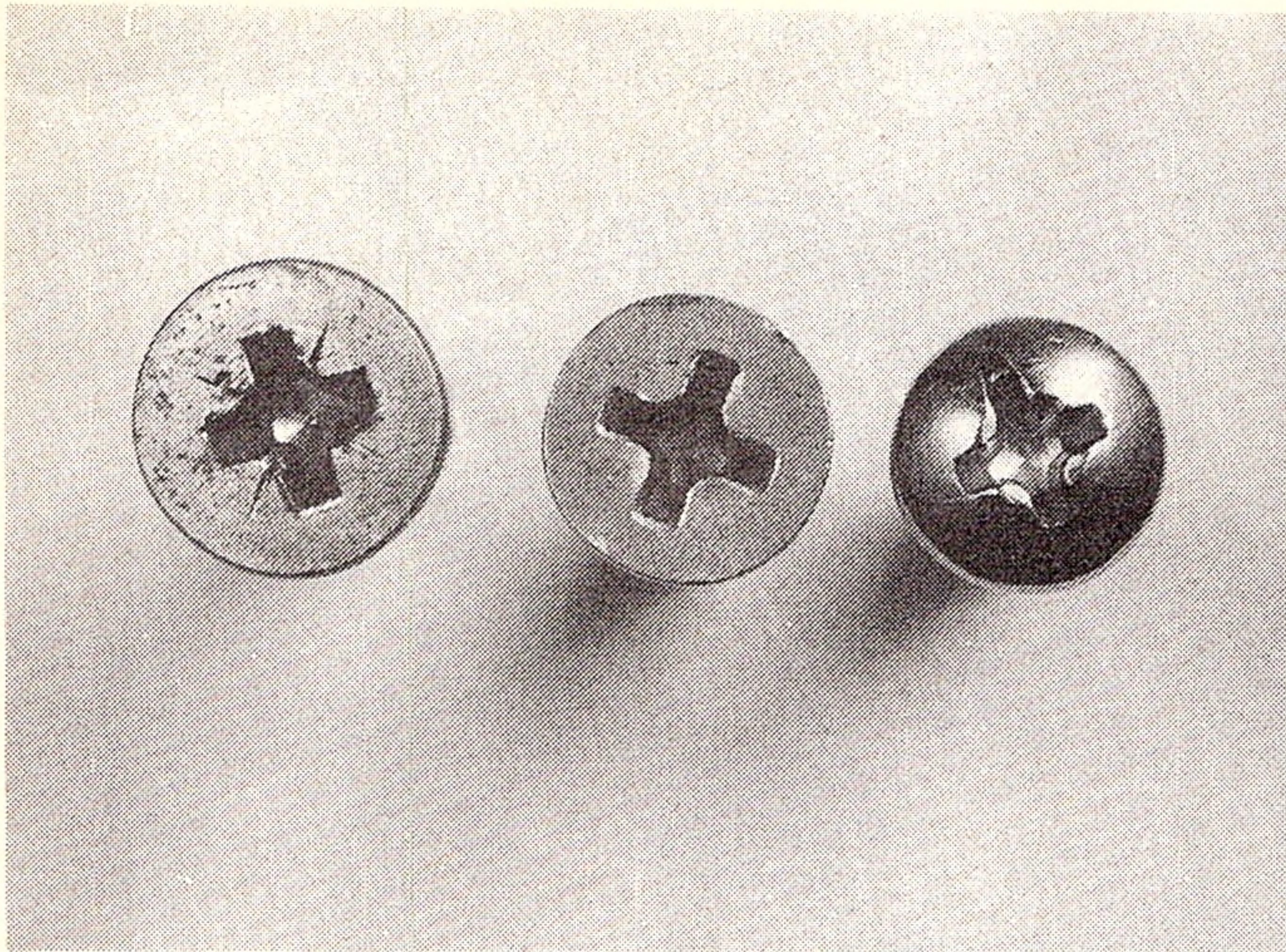
puters, such as the Apple Macintosh. At first sight, a Torx screw looks a little like an Allen key but Allen or hex drivers do not fit properly and if you try to use them you again run the risk of damaging both screw and driver.

In effect, the tip of a Torx screwdriver is a male spline which fits into the socket of the screwhead. They come in five common sizes: T15, T20, T25, T27 and T30.

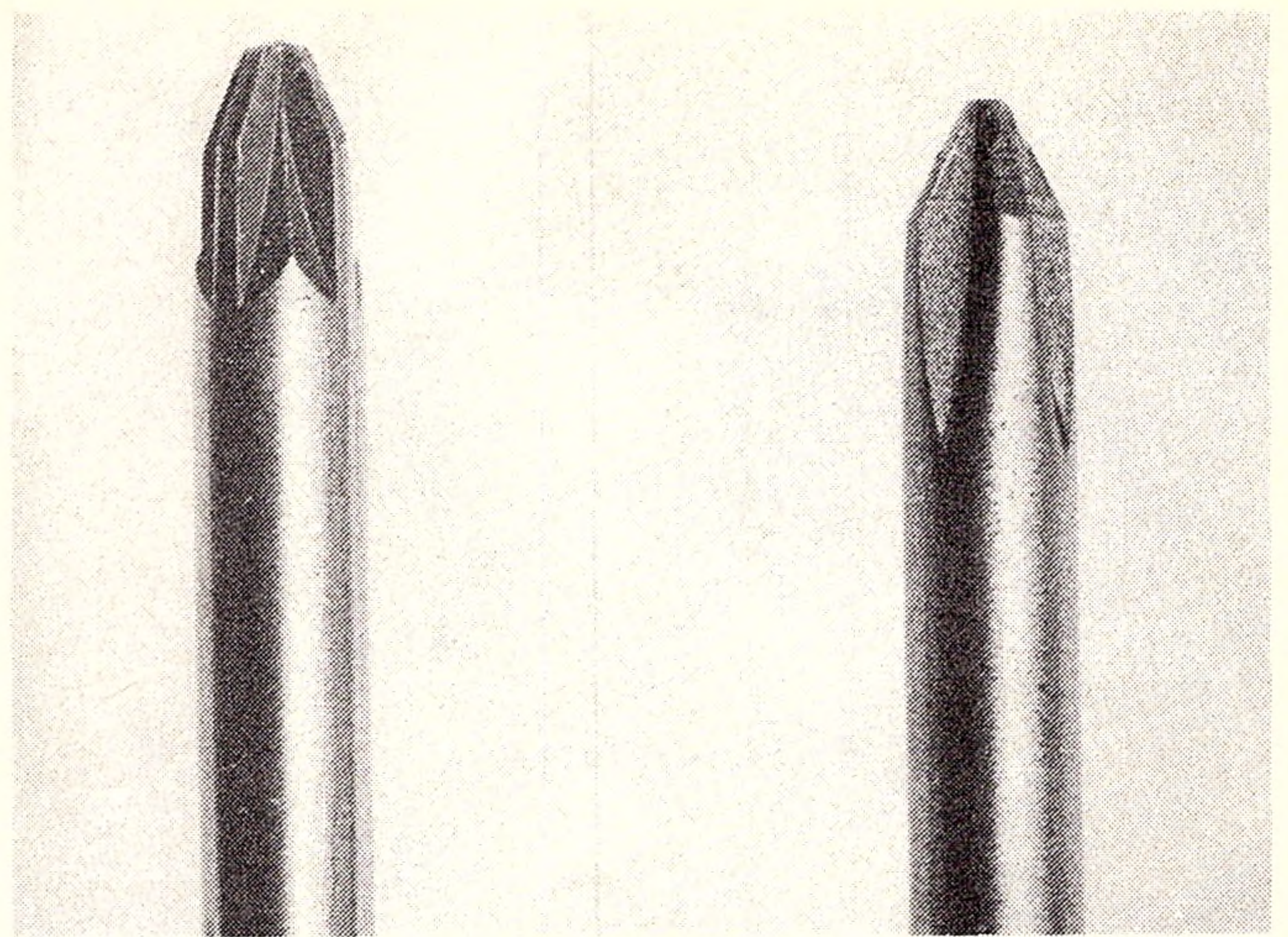
Incidentally, if you want to take an Apple Macintosh apart you need a Torx screwdriver with a shaft about 15cm long. Arista are now stocking a suitable unit. Apart from that, specialist tool suppliers do supply Torx screwdrivers or bits for magnetic holders in hand or power screwdrivers.

A much bigger range of Torx





This photo highlights the differences between crosshead screws. From left: Pozidriv, Frearson and Phillips. Note the "star" pressed into the head on the Pozidriv screw.



This close-up shows the difference between Pozidriv (left) and Phillips (right) screwdrivers. Note the extra flutes on the Pozidriv type.

size box spanner (available in sets with 1/4-inch socket drive).

### Oval and drive screws

These are screws with no slot or socket at all. Oval head screws are used in places such as the power supply of IBM PC computers while drive screws are used in appliances where the manufacturer is deliberately preventing an access for service. In fact, when you see appliances fitted with these screws you should be forewarned — the manufacturer has no intention of servicing the unit. It's a disposable product.

However, where there is a will there is a way, to be sure. Oval head screws can generally be removed with a good pair of pliers. They should be replaced with Phillips or slot head screws which can be easily removed in the future.

Drive screws can usually only be removed by butchery. The way to do it is to cut a slot in the screw head using a small abrasive disc in a Dremel Moto-tool or Arlec Super-tool. Then you can use a conventional screwdriver to remove the screws which should immediately be tossed in the bin.

### Other special screws

There is a number of other screw types which are used in specialised equipment. These include Ferry cap and the clutch head. The Ferry head screwdriver looks like a conventional box spanner. Clutch head

screws have a butterfly-shaped socket. If you are lucky you can sometimes remove clutch head screws with an ordinary screwdriver but this is against the odds.

Clutch head screws are normally driven in very tightly (which is why they are used) and hence you do need the correct drivers to work with them. Again, specialist tool suppliers do stock them. They normally come in seven sizes, 3/32-inch to 3/8-inch.

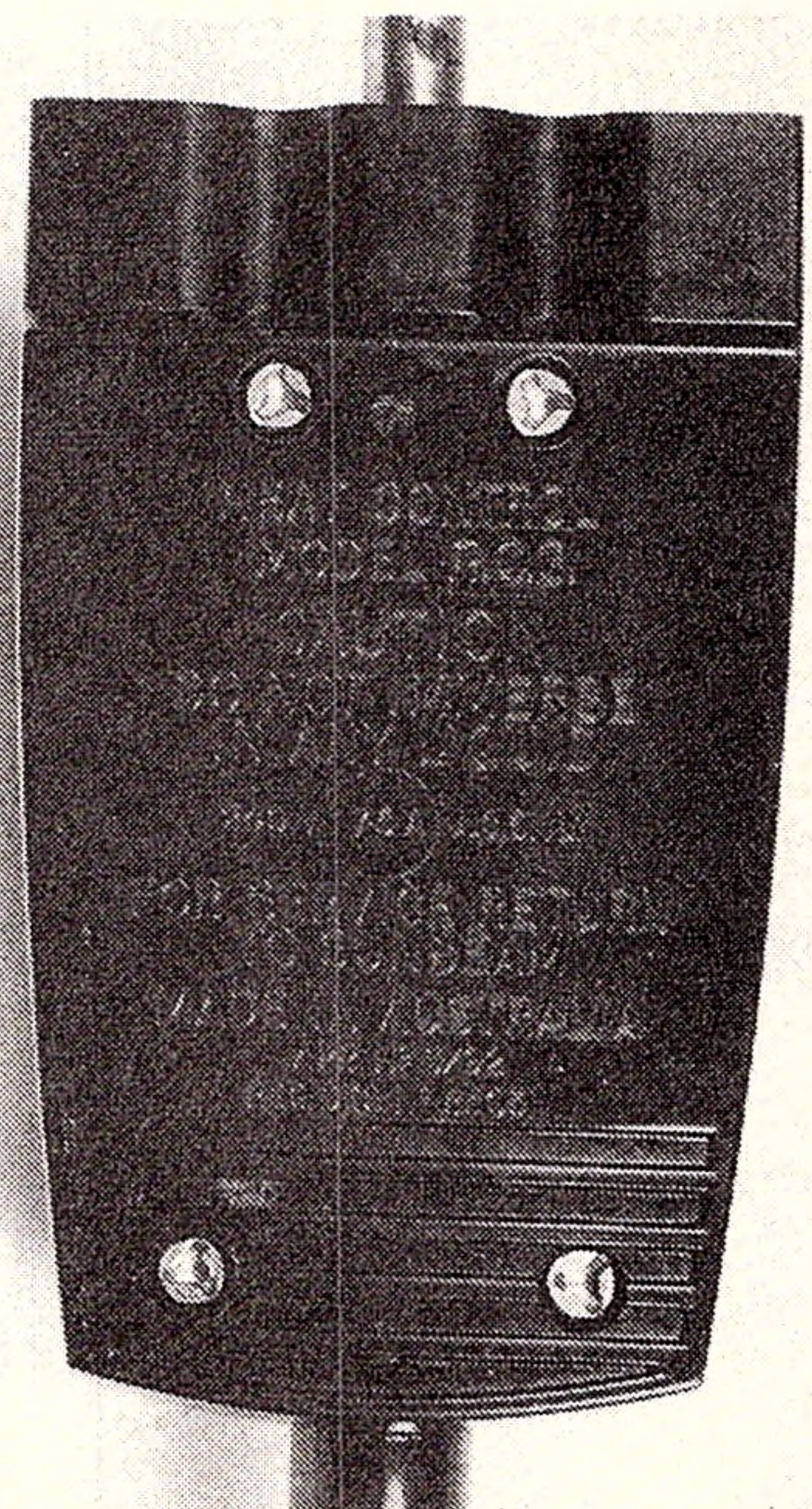
### ISO screws

ISO screws are a reversal of the trend to make screws impossible to remove. They are a combination Phillips and slot head screw. They are widely used in Japanese electronic equipment and in electrical fittings such as circuit breakers. They are a good idea.

### Dressing of screwdrivers

All screwdrivers wear with use. With flat bladed screwdrivers you can dress them to the correct profile if you have a grindstone. On the other hand, all the other screwdrivers such as Phillips or Pozidriv, cannot be redressed. Once they are visibly worn they should be tossed out.

This brings us to another facet of screwdrivers. If you are using air or electrically powered screwdrivers, it is useful to know that screwdriver bits can be obtained with three degrees of hardness. For production applications, the hard-



A common problem of access: this Sunbeam frypan controller uses Tri-wing screws. They are impossible to undo with any normal screwdriver.

ness of the bit should be matched to the type of screw in use.

For standard soft screws, there are standard hardness bits. For heat-treated screws and those intended for use with impact screwdrivers, use screwdriver bits with intermediate hardness. These have been specially tempered to cope with the high stress of impact use.

For driving sheet metal or case hardened screws, use the degree of hardness specified by the manufacturers of the bits. Your tool supplier can help with this information. 