

If the part to be cast is just a slab or disc, or something equally simple, then the die can easily be opened when the metal forced in has cooled, so that the casting can be taken out.

But just look at the cab and chassis of your Big Bedford, and you will soon realise that the maker could not just pull apart the two halves of the die in which this is made while the casting is in it. The reason for this is that there are recesses or undercuts on the casting, into which parts of the die fit, so that the two sections cannot be separated from each other, and the casting taken out, unless something is done to allow for this.

And something of course is done. In these cases the die is not actually made in just two sections. One of the sections has parts that slide out sideways when the two sections are pulled apart, to clear the casting and permit its ejection from the mould.

How this is arranged can be seen at a glance from the accompanying picture of the two parts of the die that produces the Big Bedford chassis. When these are placed face to face, metal injected into the space between the two sections forms the casting that you can see pictured in the same illustration. Above and below this space in the right-hand die are two sections designed to slide out sideways when the die is opened after casting. In each of these side jaws or slides two holes are bored, and into them fit the angled dowels, or spigots, opposite them that can be seen in the

left-hand section. These slope outward at such an angle that the side jaws slide outward as the mould opens, far enough to take them clear of the casting.

With this particular model there are actually three sliding sections, the third being an end jaw or slide shown on the left of the moving half die, with the corresponding dowel on the right of the fixed half die.

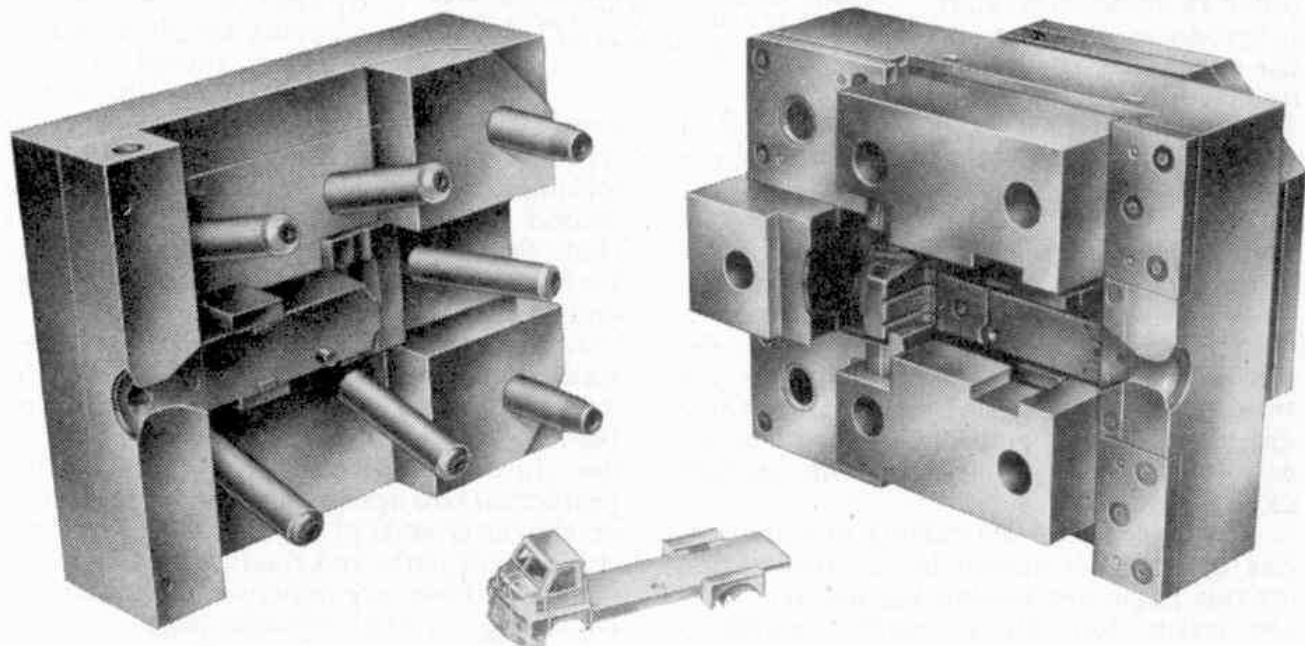
Suppose that a die, such as the one illustrated, has been made from tough steel, by careful machining, filing and polishing, and it is now to be used for actual die casting. For this the two sections of the die are mounted in a die casting machine. One of them is bolted to the fixed platen of the machine. The other is mounted on the moving platen, also part of the machine. This platen can be moved horizontally to close the

two half dies, as of course it must do for casting.

This is clearly shown in the fine illustration on the opposite page, in which an operator is seen lifting out a casting of the Big Bedford cab and chassis that has just been made. One of the two sections of the die can be seen mounted in position; that is the fixed one. The other slides in from the right at the movement of a lever that brings the two half dies together. A plunger operated by compressed air then forces molten metal from the cylinder into the die, where it fills the space between the two sections.

The metal solidifies almost immediately,

At the foot of the page are seen the two halves of the die in which the Big Bedford cab and chassis section is cast. In front of the dies is an actual casting from them.





chilled by the large mass of metal in the die, which is cooled by water flowing through openings bored through it. The rubber tubes through which the cooling water circulates through the die can be seen in the illustration on page 474. On opening the die by sliding the moving part outward the casting is ejected. Although no longer molten, the metal of course is still hot—so the operator takes the greatest care to lift out the casting only with tongs or pliers.

It does not take long to produce a casting, but that is because time and labour have been freely devoted to making the die, which must be accurate to the finest limits in order to make sure that it produces castings of the exact size, shape and quality required for Dinky Toys. In the die casting machine special care too has to be taken to ensure that the two sections of the die are exactly in line, so that they fit together perfectly while casting is in progress. To make sure of this there are guide pillars at right angles to the faces of the die sections that are to meet, with holes in the moving part of the die into which these pillars slide. In the die from which the Big Bedford is made there are two of these guide pillars, which can easily be distinguished in the picture of its sections.

The bays of the die casting department, one of which is shown in the illustration on this page, are fascinating places. They are warm, too, for to each machine is

**One of the die casting bays at the Speke Works of Meccano Ltd. is seen in the illustration at the head of this page.**

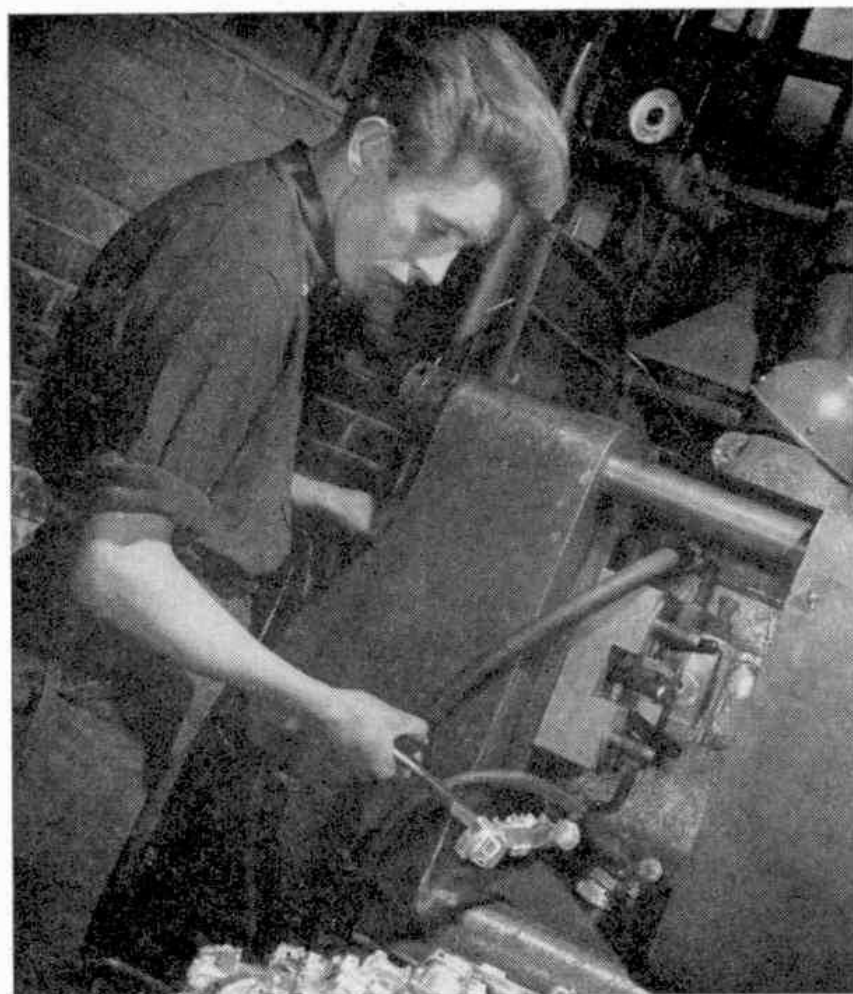
attached a "pot," which in spite of its name is made of cast iron, that holds the molten metal from which Dinky Toys are cast. It is heated by pressure gas flames, blue like those of a Bunsen burner, that keep the metal molten, and the supply is renewed from time to time by putting in the pot another ingot of metal. This replaces the metal used as the casting process continues.

The operation of a die-casting machine is generally controlled by the use of two levers, which are interlocked to prevent metal being forced through the nozzle when the dies are apart.

When the first lever is operated, the slide carrying the moving half of the mould travels forward till it is in

contact with the fixed half of the mould. At this point the interlock is operated automatically to permit movement of the second lever, which actuates the plunger that forces metal into the mould. The plunger is then raised, the mould is opened and the casting ejected.

Actually rather more than the casting wanted comes out, for attached to it is the "runner", which is metal from the opening through which the molten metal enters the die. In the die illustrated on page 475 the position of this opening can be distinguished on the outer ends of the two sections. How this is dealt with, and the further treatment of Dinky Toys, are explained in the article beginning on the opposite page.



Die casting the cab and chassis section of the Big Bedford Lorry, Dinky Toys No. 522.

THERE is no need for me to introduce Dinky Toys to you. Practically everybody in Great Britain knows them, as do millions in other parts of the world, for there can never have been toys that have had so much fascination for their owners.

Why Dinky Toys have sold in millions for many years past is easy to find. A mere glance at any one of them is sufficient to show that they are well made and beautifully finished, and it is now well established that a Dinky Toy is almost indestructible. Its enamel may suffer a little from really harsh treatment, but the toy itself will retain its shape, even if its owner jumps on it or hits it with a hammer—provided of course that he does not use a steam hammer or a giant hydraulic press, or exerts the power of a Samson!

So there are two reasons for being interested in how Dinky Toys are made. One is the attractions of the toys

themselves; the other is the high quality that is given to them in the making. A few of you may have visited the Meccano Works at Binns Road here in Liverpool and have seen some at least of the processes involved; for the rest, I must try to let you picture their production, with the aid of illustrations that show actual work in the new Dinky Toys factory at Speke, on the outskirts of Liverpool, and incidentally, not far from the airport from which holiday makers fly to the Isle of Man and to Dublin.

Suppose we start with a fairly simple Dinky Toy—the Big Bedford Lorry, Dinky Toys No. 522. Those of you who have this model will have noticed that it is in two main parts, the cab and chassis on the one hand, and the body on the other,

with of course the wheels, axles and cab base in addition. Both the cab and chassis and the body are die cast, which means that they are made by forcing molten metal into a mould, or die, that gives the metal the required shape when it cools and solidifies.

This sounds simple. You just make a mould of the right shape, pour in the molten metal, let the mass cool, and

there you are!

Actually the whole process is far from being as simple as that. To begin with, the

## How Dinky Toys are Cast

By the Editor

die must be made with the utmost accuracy in order to give a product that is of exactly the right shape and size. This means careful and patient work on the part of the toolmaker who is responsible for the production of the die. In the second place, the die requires the utmost care in design. In general, it is made in two main sections, which can be slid together so that between them is the space that the molten metal is to fill.