THE SERVICE MECHANIC, No. 5 . . . . . by L. W. JOHNSON

CORD DRIVES

DETAILS FOR REPLACING AND REPAIRING THE CORD-DRIVE MECHANISM USED IN THE FOLLOWING MURPHY RECEIVERS: A3—B31—AD32 A34—A36.

THERE are about as many designs of flexible tuning drives as there are types of receivers, and an amazing amount of ingenuity has been put into some of them—yards and yards of cord, going backwards and forwards around guide wheels and drive wheels, and sometimes the added attraction of two pointers on one drive cord, moving up and down tuning scales in opposite directions.

Fortunately, although the actual details of design may vary so widely, most of these drives are basically similar, and the skilled serviceman needs very few instructions to enable him to fit a replacement cord to any particular type.

The most vital information required is: (*a*) the length of cord, and (*b*) the route it takes. In some cases additional information—as for example, the best setting for the variable condenser and the "stop" mechanism—is definitely helpful. It is therefore proposed to give, in this article and the next, a very brief summary of the vital data for every type of drive used in our receivers. Even in cases where the drive mechanism has already been described in the service manuals, it is felt that the information given in the more compact form will be most helpful.

First, however, a few notes for the benefit of those who are not experts in the subtle art of cord replacement. It must always be remembered that a drive cord is subject to quite a lot of wear and tear. It is therefore essential that strong and durable material should be used. Woven cords are generally more durable, when used for this job, than twisted types, and fishing line of the correct gauge is very suitable. The gauge, incidentally, is as important as the strength, and the cord previously fitted can generally be taken as a guide on this point. If a heavier or lighter gauge is used, trouble is likely to be experienced with cords dropping off pulleys, or overlapping, causing uneven or slipping drives.

The chief difficulty when fitting a new cord is in preventing it slipping off

Fig. 1

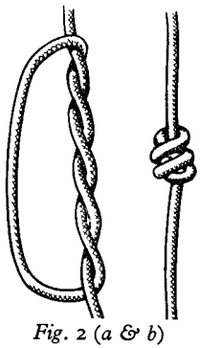
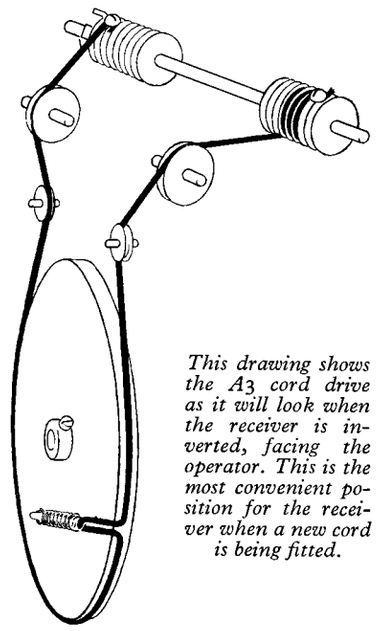


Fig. 2 (a & b)



This drawing shows the A3 cord drive as it will look when the receiver is inverted, facing the operator. This is the most convenient position for the receiver when a new cord is being fitted.

the guide pulleys or drive wheels before the operation is completed. This difficulty is increased if attempts are made to keep the cord under tension whilst it is being fitted. It is generally possible to arrange for the tension to be applied after the fitting operation has been completed, and this method should be adopted whenever possible. The procedure, then, is to anchor the cord at one end; to run it around the pulleys as instructed, keeping it just free from slack but not under tension; then to secure the two ends; and finally, to adjust or fit the tension spring to give the right tension.

The ends of the cord must be very securely fixed. Probably the most common form of fixing is a knot, tied around the end of the tension spring. A very simple and satisfactory knot for this purpose is made by tying two half hitches, as shown in Fig. 1. In quite a number of drives, the cord is secured by passing it through a hole, and then knotting it. A difficulty which sometimes arises here is that the ordinary single knot is not large enough to prevent the cord slipping back through the hole. A double knot (one tied over another) is quite satisfactory, but it is rather difficult to tie, particularly when one is preoccupied with the problem of preventing the cord falling off the pulleys. A simpler method is to use a single compound knot as shown in Fig. 2. The end of the cord is threaded through the loop three or four times, as shown in the sketch "A," and when it is pulled tight it forms a nice, large, compact "blob" on the cord (Fig. 2B), which will not pull through, even when the hole is on the large side.

Now, for the details of the various types of drive, starting with the A3 receiver, the first of our models to present a drive problem to the serviceman.

Drive for the A3 Receiver

Preliminary Adjustments.—See that calibration is correct. If nesessary, adjust the position of the tuning drum on the condenser spindle. Adjust the condenser to minimum capacity (just off the condenser stops).

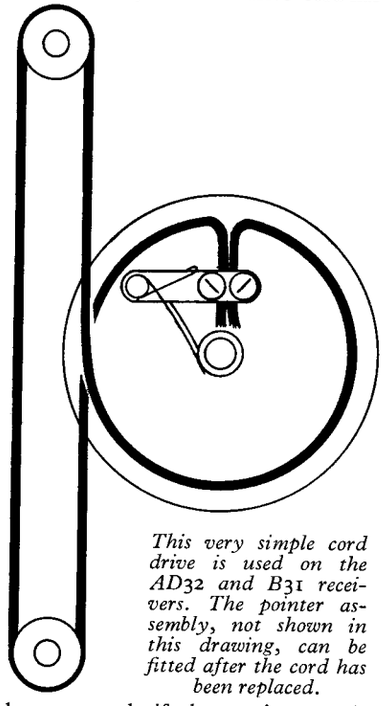
Slacken the drive wheels on the tuning control spindle (held by set-screws). Turn the tuning control spindle anti-clockwise, until the stop mechanism operates. Fix the drive wheels on the spindle, so that the screws for holding the cord are aligned at "twelve o'clock." These wheels must be so placed on the spindle that they will hold stop mechanism plates together, and also prevent backwards and forwards movement of the spindle.

Fitting.—The length of cord required is twenty-six inches (cut to approximately twenty-four inches when fitted). Start from the front drive wheel; make three-and-a-half turns, clockwise, round the wheel; follow over the guide pulleys; loop into the hole in the tuning drum (spring fitted at this point); continue round the drum and guide pulleys to the back drive wheel. Allow enough slack in the loop inside tuning drum to allow the tension spring to fall about a quarter of an inch short of its fixing lug. Ease the spring over the lug with a small screwdriver, *after the ends of the cord have been fixed.*

B31 and AD32 Receivers

Preliminary.—See that the stops on the drive wheel come into operation at the maximum and minimum capacity points of the variable condenser. Adjust the drive wheel on the condenser spindle if necessary.

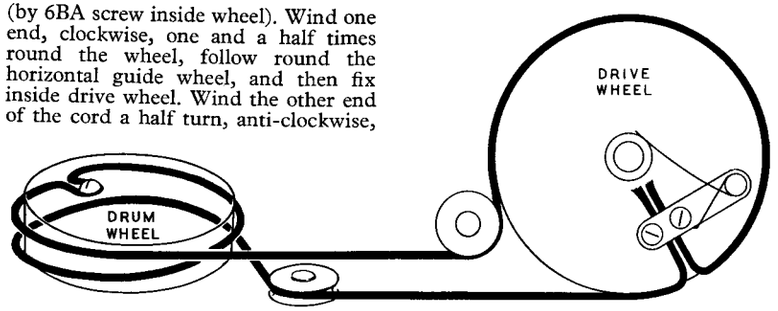
Fitting.—The length of cord required is twenty-six inches. Fit one end of cord through the fixing device (about 1 inch projecting). Wind clockwise round the drive wheel, anti-clockwise round guide wheel at the top of the tuning scale, then round wheel at the bottom; then wind clockwise again round drive wheel, through the hole and fixing device. Partially tighten the fixing screws, slide the tension arm up the two ends of cord, to give the required tension, then tighten it fully. Cut the spare ends of cord. The pointer can be fitted, after the drive cord has been secured, if the tension on the drive is eased by lifting the tension arm.



This very simple cord drive is used on the AD32 and B31 receivers. The pointer assembly, not shown in this drawing, can be fitted after the cord has been replaced.

A34 and A36 Receivers

The length of cord is twenty-seven inches. Start by screwing the centre point of the cord to the drum wheel (by 6BA screw inside wheel). Wind one end, clockwise, one and a half times round the wheel, follow round the horizontal guide wheel, and then fix inside drive wheel. Wind the other end of the cord a half turn, anti-clockwise,



round the drum wheel, pass round the vertical guide wheel, and then round the drive wheel. The tension spring may be eased off the bush of the drive wheel while the cord is being clamped. The position of the tuning drum and condenser vanes can be adjusted after the cord drive is fitted.

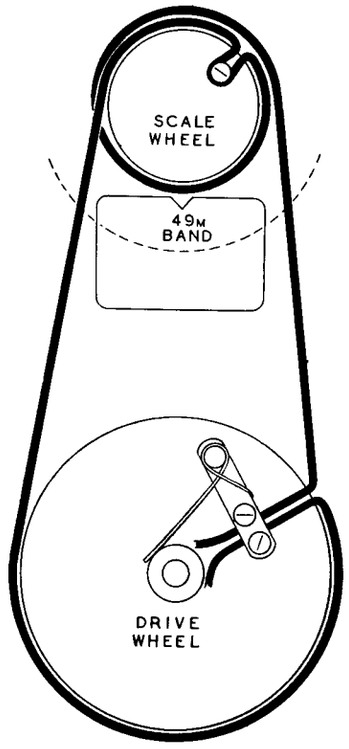
The variable condenser should be at maximum and minimum capacity respectively, when the two stops on the drive wheel come into operation. There are two set-screws holding the drive wheel to the condenser spindle, and both must be slackened when the adjustment is made. The cursor should register with the highest and lowest markings on the tuning scale when the drive wheel reaches the stops at the respective ends of its travel.

A36 Receiver S.W. Drive

Preliminary.—Adjust the drive wheel on the condenser spindle so that the stop positions correspond with the maximum and minimum settings of the variable condenser. Adjust the "click mechanism" spring so that it drops into the last notch in the drive wheel when the drive wheel is turned fully anti-clockwise.

Fitting the Cord.—Secure the centre point of a twenty-five inch length of cord inside the scale wheel (by 6BA screw). Wind one end of the cord a quarter turn, anti-clockwise, round the scale wheel, then round drive wheel. Wind the other end one and a quarter times round scale wheel. Take both ends through the hole in the drive wheel, and slide them through the fixing clamp. The tension spring may be eased off the drive wheel bush for this operation. Adjust the position of the scale wheel by pulling the ends of the cord, until the 49M Band mark on the scale registers with the pointer.

Finally, tighten the clamping screws, refit the tension spring, and check that the "click" positions correspond with the dial calibration.



THE SERVICE MECHANIC, No. 6 . . . . by L. W. JOHNSON

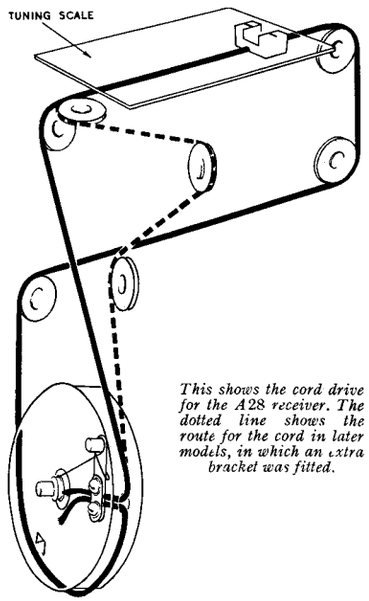
The seven diagrams reproduced below cover the cord drive mechanisms used in Murphy Receivers:

A28 — A48 — A50
A52 — A70

MORE CORD DRIVES

ALTHOUGH seven more cord drives are covered in this second article on the subject, yet another instalment will be necessary to complete the range. The fact that so much prominence is being given to cord drives in this series of articles may create the impression that they are a major item in the service department's programme; this is, in fact, far from being the case.

Of the large number of A3 receivers



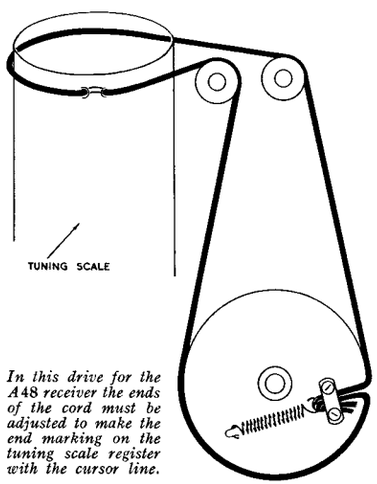
This shows the cord drive for the A28 receiver. The dotted line shows the route for the cord in later models, in which an extra bracket was fitted.

which are still in use, and which have been in continuous use for twelve or thirteen years, many are working quite satisfactorily with the original cords which were fitted during manufacture.

After the A3, there came a period of two or three years, during which a direct mechanical tuning drive system was used; but although there has not been sufficient time for the later cord drives to be given the same life test as the A3, there is every reason to believe that they will be equally reliable. This is not meant to suggest that cord drives should last for ever but, taken as a whole, they should be a very small part of the serviceman's problem, provided that they are *well designed and properly assembled*.

The system of testing adopted in the factory ensures that every drive—and, for that matter, every other assembly—is checked at least twice to see that it has been properly fitted; but the retail serviceman often has to act as his own chassis tester and final tester. He should pay particular attention to these duties.

When he has finished fitting a drive cord, he must become critical of his efforts as a service mechanic. First, he must check the tension on the cord, to see that it is sufficient to keep the drive taut and free from back-lash, even if the cord stretches a fraction of an inch in use. It must not, on the other hand, be too tight, as this will impose an undue strain on the cord, the spring, and the drive and condenser bearings. He must see that the cord is securely clamped or knotted at both ends. Then, turning the tuning control from end to end of its travel, he must see that the drive works freely, and that the cord does not overlap or rub during this operation. Then, finally, a check must be made to see that the calibration is accurate, and that the stops operate properly. If he checks all these points carefully, there should be no second visits on account of tuning drive mechanisms.



In this drive for the A48 receiver the ends of the cord must be adjusted to make the end marking on the tuning scale register with the cursor line.

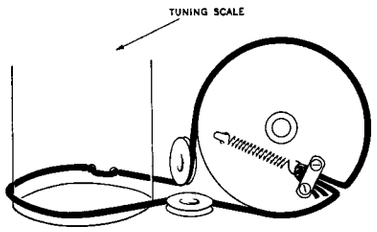
A38, A40, A46 Drives

Before dealing with the drives illustrated in this article, there are three types which have not been illustrated, but which must be mentioned. The drives for the A38 and A40 are basically the same as those for the A34 and A36, the only difference being that extra guide wheels are used to take the drive through a right-angle. The drawing for the A34, published last month, will therefore serve as a general guide for the A38 and A40 models.

The A46 drive is identical with the one illustrated last month for the B31 and AD32, with the exception of the clamping device and tension spring.

Drive for the A28 Receiver

The first drive to be described in detail this month is for the A28 receiver,

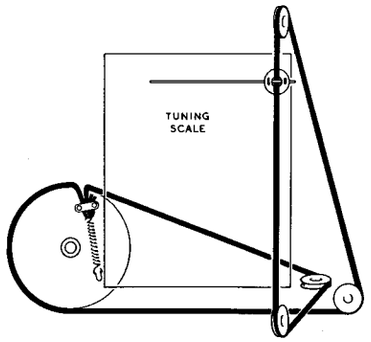


to which a modification was made during manufacture. In the first drive the lengths of cord on each side of the cursor were unequal. Any stretching or shrinking in the cord—being proportional to the length—therefore tended to alter calibration. The calibration errors introduced in this way were actually very small indeed, but to avoid them altogether, an extra bracket was mounted on the condenser assembly. This bracket took up an extra eight inches of cord, so equalizing the length on either side of the cursor.

The drawing (col. 1) shows, in full lines, the route for the cord when old type brackets are fitted, while the dotted line indicates the route taken when the extra bracket is fitted.

Fitting the Cord

For the old type drive, thirty-four inches of cord are required. Fix the cursor on the cord so that there are thirteen inches in the forward direction and twenty inches in the backward

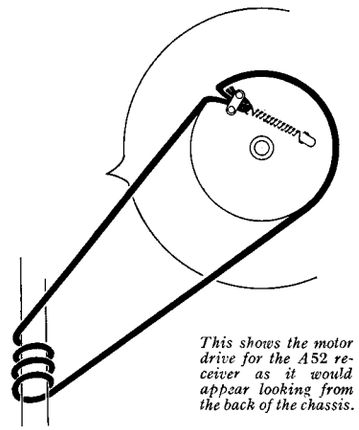


direction. With the later type brackets, forty-two inches of cord are required, twenty-one on each side of the cursor. The above lengths of cord should allow an inch over at each end, which can be cut off after fixing. Before cutting them, they should be adjusted to make the cursor register with the top marking on the scale, when the drive wheel is turned anti-clockwise until it reaches the stop.

The A48 and A50 Receivers

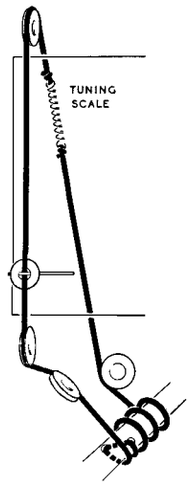
Although the drives for these two receivers are very similar, the A48 operates at the top of the tuning drum, while the A50 operates at the bottom. The A48 requires approximately twenty-eight inches of cord, and the A50 about four inches less.

The usual instructions about the setting of the drive wheel apply; that is, the stops should operate when the condenser is at maximum and minimum capacity. The drive is most accessible in the A48 when it is set to the minimum capacity position, and in the A50 when in the maximum capacity position. Having adjusted the condenser, thread the cord through the two holes in the tuning



This shows the motor drive for the A52 receiver as it would appear looking from the back of the chassis.

drum. The two ends should be of equal length. Wind it round the guide wheels and through the hole in the drive wheel, then adjust the ends to make the end of the medium wave scale register with the cursor line (the bottom end of the scale for the A48 and the top end for the A50). Finally, secure the ends and fit the tension spring over the fixing lug.



The pointer on this short-wave drive for the A52 receiver is fitted after the cord has been secured.

The A52 Receiver

There are three cord drives on the A52 receiver, requiring altogether some nine feet of cord. *The MW, LW Tuning Drive*, although incorporating a rather elaborate system of guide wheels, is the simplest of the three. Forty-eight inches of cord are required, and the drawing shows the route quite clearly. The pointer can be fitted—to register with the top marking on the dial when the condenser is at maximum capacity—after the cord has been fitted.

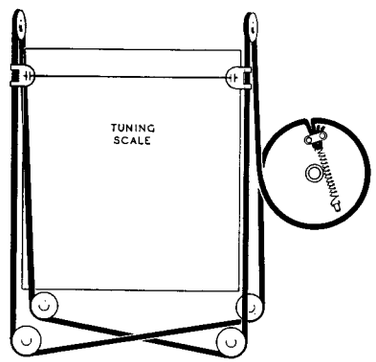
The Short-wave Tuning Drive is different from the drives so far described, in that the tension spring forms part of the cord circuit, and the required tension is produced when tying the cord to the spring.

The drawing shows the drive as it is when the S.W. tuning spindle is turned fully clockwise. Thirty inches of cord are required, and the first operation is to pass it through the hole in the spindle. This hole is rather small, but with a little patience the cord can be persuaded to go through it. Pull it through until the lengths of the ends are ten and twenty inches respectively. Wind the cord as shown in the drawing; then tie it to the tension spring at the back of the scale. The length of the ends of the cord should be adjusted to bring the tension spring to just below the top guide wheel, and it should be tied to produce a good tension on the spring.

The Motor Drive is drawn as it will appear when looking from the back of the chassis. Thirty inches of cord are required, and the method of fitting is obvious from the drawing.

The A70 Receiver

Although the cord drive for this receiver looks a rather elaborate affair, it is one of the simplest to fit. Fifty



inches of cord are required. To make the drive most accessible, turn the drive wheel fully anti-clockwise. The cord is placed round the guide wheel and fastened. Then the tension spring is fitted over the fixing lug; finally, the pointer is fitted on the cord to register with the top markings on the tuning scale.

★ THE SERVICEMECHANIC No. 7 *by* L. W. Johnson ★

MORE CORD DRIVES

The final selection of cord-drive mechanisms described here are those of the A76 — B81 — B89 — A90 — A96 — A92 — B93 — and AD94.

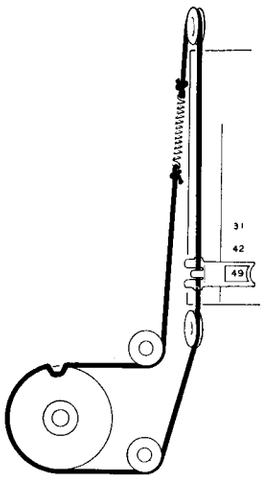


Fig 1.—*The A76 short-wave drive*

THIS is the last article in the series dealing with cord drives, and it covers all the more recent models. Most of these have drives designed for use with light weight cords, and a reminder about the use of the right weight of cord is therefore indicated.

It is fairly obvious that a heavier cord may take up so much space, on a drive wheel or pulley designed for thinner material, that there will be a tendency for it to ride off the track. It is rather less obvious, but none the less true, that thicker cord takes considerably more energy to drive it. A drive which works quite freely when the correct gauge of cord is fitted, may become stiff and difficult to operate if a heavier gauge is used. In cases where the cord takes a very roundabout circuit, as for example, in the A92, the drive may become so heavy as to cause the slow motion device to slip.

The A76 Receiver

The two drives in the A76 receiver use heavy gauge cord. The short-wave drive takes twenty-eight inches and is tied directly to the tension spring, as in the case of the "52" drive described in an earlier article.

Set the S.W. switch fully clockwise, and thread the cord through the holes in drive wheel with eight inches projecting in a clockwise direction, and twenty inches in an anti-clockwise direction. Tie the short end to the tension spring; take the two ends over the guide wheels and tie the second end of the cord to the tension spring to give the correct tension. The indicator bracket can be fitted after the cord has been secured.

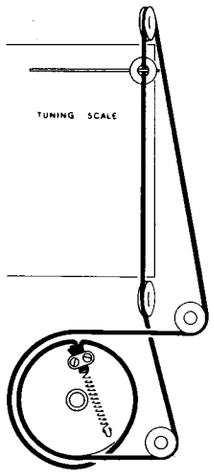


Fig. 2.—*The A76 MW/LW drive*

Approximately forty inches of cord are required for the main tuning drive and, in this case, the tension spring can be fitted over the fixing lug after the cord has been fitted, the pointer bracket being fitted at the correct point on the dial after the drive is completed.

The B81 Portable Receiver

The B81 has a very simple drive system. It takes only twelve inches of light gauge cord. Although the drive wheel has a fixing lug for the tension spring, the method later adopted in production was to tie the cord to the ends of the spring so that it was strained round the bush in the drive wheel. Small metal clamps were used to secure the ends of the cord, but if a little extra cord is allowed, the ends can be tied in the ordinary way.

The B89 Receiver

The designers of the B89 cord drive had their little bit of fun in fitting an extra guide pulley, which made the cord run more or less back on itself; otherwise it is quite a simple drive, requiring about forty-eight inches of light gauge cord. The pointer is fitted after the drive is completed.

The A90 and A96 Receivers

The A90 and A96 receivers employed an extremely simple drive system using approximately thirty inches of light gauge drive cord. As in many of the other drives, the pointer is attached after the cord has been fitted, and the pointer assembly can be eased along the cord to make it line up with the top marking on the dial when the variable condenser is fully in mesh.

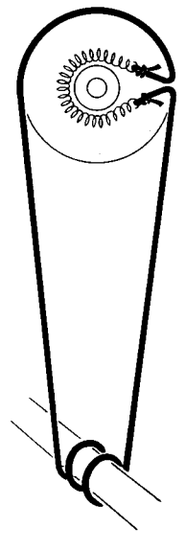


Fig. 3.—*The simple B81 drive*

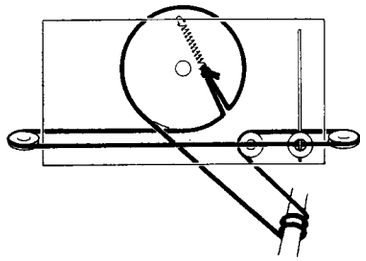


Fig. 4.—*The B89 cord drive*

There is also a short-wave drive mechanism on these models, but this mechanism is so extremely simple that a diagram was felt to be unnecessary. One end of the transmission chain is fitted on to a fixing lug on the outside of the drive wheel. The chain is then taken over the sprocket behind the vernier scale, round the drive wheel and on to the tension spring inside the wheel. If the chain is found to cause electrical noise on short-waves, a *little* light oil applied to the chain should cure the trouble.

The A92 Receiver

After their marked restraint in designing the A90 drives, the designers really let themselves go on the A92 model. Seven guide wheels and sixty-seven inches of light gauge cord running around, across, up, down, across, up, down, and around. But for all that, the "92" drive is quite simple to fit and very reliable in operation. The route for the cord is quite clear from the drawing and should present no difficulty.

The cursor, which is made of glass and must be handled with great care, is attached after the cord has been fitted; if attempts are made to thread it through between the dial and the cord, the dial is almost sure to be damaged. It is much simpler and safer to remove the dial, fit the cursor in approximately the right position, then finally adjust the position on the cords after the dial has been refitted.

The B93 and AD94

The B93 and AD94 drives are very similar and will be described together, although there are separate drawings for each. Thirty inches of light-gauge cord are required. A single turn is shown around the drive spindle in each case, but in the B93, where the cord is wound directly on to the spindle, it may be found that two turns have been fitted to avoid any possibility of slipping. The extra turn should not be necessary if the correct tension is applied to the tension spring and there is always the possibility that the turns may ride over one another, causing an uneven drive. Certainly if *more* than two turns are fitted round the spindle, trouble of this type will occur.

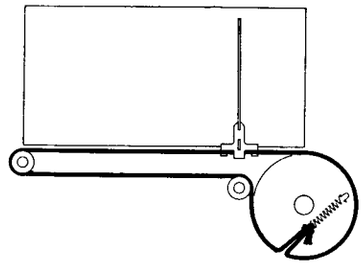


Fig. 5.—*The A90 and A96 drives*

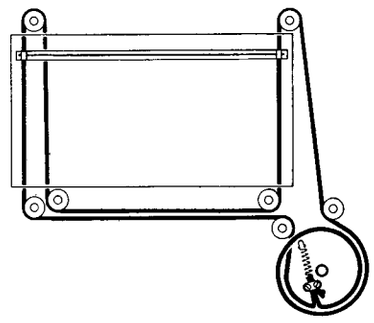


Fig. 6.—*Drive of the A92 Receiver*

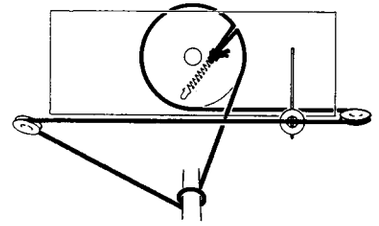


Fig. 7.—*Cord drive of the B93*

* * *

In preparing these notes on drive mechanisms, I have naturally picked up all the hints and tips I could from the people in the service works who are regularly engaged on these jobs, but in order to be sure of describing the best method for the *retail serviceman* to adopt, I have replaced some twenty or so drives of widely varying types myself. In doing this, I have been impressed by the ease and speed with which most of these drives can be repaired. Some of the most complicated in appearance are, in fact, the easiest to replace; and nobody should regard the replacement of a cord drive—at least, in the case of Murphy Receivers—as a major operation.

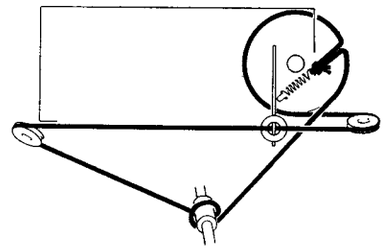


Fig. 8.—*The AD94 drive mechanism*