

**WORKING INSTRUCTIONS**  
**for**  
**C1 RANGE**

**of Cam Type Wire Straightening  
and Cutting Machines**

---

**A. Hudson Forge and Engineering Co., Ltd.**

**Foundry Street, Birds Royd,**

**BRIGHOUSE**

Remove all anti-rust from working surfaces with the use of paraffin, and see that all dust particles which may have stuck to the anti-rust have been removed from the carriage sliding surfaces, or seize up may occur. Make sure that all bearings are greased. All ball races will have been packed with grease at the works so they will not want much more adding. The spinner bearings require very little grease due to the high rotational speed (perhaps one shot per day). If too much grease has been pumped in, then the bearing will overheat resulting in eventual failure of the bearing. If the spinner bearings start to exude grease in operation, it is because of them being overfull.

**Cam Oil Bath.** Add  $\frac{3}{4}$ -1 gall. of 140 Gear Oil with tacky additive similar to J. W. Miller's "Par-gear 140" with 8 oz. ( $\frac{1}{4}$  kilo) tin of Molybdenum di sulphide oil additive, to the cam oil bath — to the marks in the tray. Grease the slide shaft on which the carriages slide and also the top of the bed — through the grease nipples on the carriages. These parts need abundant lubrication and should be re-greased every coil change at least.

The Flywheel bearing also needs abundant greasing although it runs on self lubricating bushes.

Be sure that the surface of the cut-off key and cut-off cam are well greased or oiled.

Oil carriage lever pin daily i.e. pin supporting lever on which the large tension springs pull.

Use only high quality high pressure oils and greases to get the best results.

The machine should be secured to the floor by foundation bolts. Be sure that the machine has been levelled in both directions and pack the feet of every leg if the floor is uneven. Do not bolt down any leg which has nothing solid under it. This only leads to trouble of some sort such as overheated bearings, vibration, etc.

Before connecting electrical supply, remove belts from motor and try the direction of rotation to ensure it runs in the correct direction i.e. viewed from the spinner end, the cam shaft should run **clockwise**. This is most important as damage will occur if the machine runs the wrong way.

### To Thread the Wire through the Machine

It is usual to roughly straighten a length of wire by hand, approx. the length of the machine. Thread this through the spinner, seeing that the dies are clear of the wire, and pull right through into the cut off portion. One Gripper will be in the released position and the other in the grip position. Unscrew the round nut removing pressure from the Spring of the Gripper which is in the grip position; lift up the gripper, putting the wire underneath. Tighten down on the spring, thus supplying pressure to grip the wire again.

### To Straighten the Wire

Screw down the Spinner Dies until they touch the wire, making a straight line as it passes through the spinner. Lock up all screws on the spinner. Try for straightness. Care must be taken when starting a new coil until all the initial bends and kinks have passed through the cut-off, otherwise a stoppage may occur. If after a few lengths have passed through the wire is still bowed, tighten up the pressure on the middle three dies slightly, giving a definite kink on the wire in the spinner. Try again for straightness. ~~Repeat until straight.~~ Straightening wire requires experience both of the wire and machine, usually several attempts may be necessary before the required straightness is attained. It often helps the machine to pass the wire through an oily rag or paraffin rag before entrance to the spinner, although this would not apply to rod.

### The Cut-off

The cut off on this type of machine is by two cylindrical dies, to give a good cut. The first die should just clear the wire, whilst the second die should be bored larger to allow for clearance after cut off. If repeated stoppage occurs after cut off, a bigger clearance die at the back is required. This clearance depends to a large extent upon the wire. The position of the moving die holder can be adjusted by a screw arrangement underneath it to ensure alignment of the two cut off dies.

### Length of Cut-Off

This machine can be set to cut any length from zero up to 20 feet.

#### Lengths up to 5" Cut-off key in fixed position

The maximum draw per Cam is 5". Use the cut off cam with the double pawl. Set the small cut-off key along the cut-off lever and fix it by screwing up the stud provided. The machine now cuts every draw of each cam. For a length of say 4.5" turn the machine until the roller follower is on the rest position of the Cam; i.e. the carriage concerned is as near the Cut-Off as it can go. Set a length of 4.5" from the edge of the carriage to its stop by means of moving the stop. Repeat for the other carriage. The machine will now cut 4.5" length.

#### Lengths between 5" and 10". Cut-off key in fixed position.

Remove the double pawl cam and replace by the single pawl cam. With the cut off key still along Cut Off Lever, the machine cuts after a draw of both cams after one revolution of the Cam Shaft. Thus, with the same set up as above, the machine will cut 2 x 4.5" which equals 9" lengths.

#### Lengths between 10" and 20" (12 pegs)

See that all the pegs are in the Worm Wheel. Unfix the cut off key from along the cut off lever and fix the spring to it. The cut off key is pushed in position by the key trip. This, in turn, is worked from the pegs in the Worm Wheel. The distance between two consecutive pegs is equivalent to two revolutions of the Cam Shaft; i.e. two draws of each cam. Thus, for a length of 18.5" set the stops as described previously to a distance of  $4\frac{5}{8}$ " (18.5 divided by 4) from the carriages. This will give the required lengths.

#### Lengths between 20" and 40"

Remove every other peg from the worm wheel. This makes the distance between two consecutive pegs to four revolutions of the cam shaft; i.e. four draws of each cam. Thus for a length of 33" set the stops to 33 divided by 8 =  $4\frac{1}{8}$ ".

#### Lengths between 40" and 60"

Remove a further two pegs from the worm wheel and space out the remainder evenly. This makes the distance between two consecutive pegs equivalent to six revolutions of the cam shaft; i.e. six draws of each cam. Thus for a length of say 49", set the stops to 49 divided by 12 which equals  $4\frac{1}{12}$ ".

#### Lengths between 60" and 80"

Remove a further peg and space out the remainder evenly. This makes the distance between two consecutive pegs equivalent to 8 revolutions of the cam shaft; i.e. 8 draws of each cam. Thus for a length of say 78", set the stops to 78 divided by 16 =  $4\frac{7}{8}$ ".

#### Lengths between 80" and 120"

Remove a further peg and space the remaining two opposite each other. This makes the distance between two consecutive pegs equivalent to 12 revs. of the cam shaft; i.e. 12 draws of each cam. Thus for a length of say 94", set the stops to 94 divided by 24 =  $3\frac{11}{12}$ ".

#### Lengths between 120" and 240"

Remove a further peg, leaving one peg only. The distance between two consecutive strikes of this peg is equivalent to 24 revolutions of the cam shaft. i.e. 24 draws of each cam. Thus for a length of 12' (144") set the stops to 144 divided by 48 = 3".

#### Slip

If discrepancies occur in length, it is usual to tighten down on the gripper springs. If this is not sufficient put the **double pawl cam** on the shaft so as to cut every draw of each cam. We thus find out which carriage is slipping. Tighten down on the spring of this carriage until no slip occurs. If the diameter of the wire is below the maximum, use packing plates under the grip pads, and only use the heel screw for fine adjustment.

#### Marking or Bruising of the Wire

If soft wire or non-ferrous coated wire is being straightened, the Stellite dies tend to mark or bruise the wire. The only way to avoid this is to use soft dies such as cast iron, phosphor bronze, brass or nylon etc. If, after a long run on a small gauge wire, a larger gauge is passed through the machine, scratching of the wire surface may occur. The groove in the spinner dies must then be ground out with a slitting disc in order to remove the mark left by the smaller wire.

#### Cut off Dies

If these get blunt, they may be re-sharpened by grinding back the front face.

### **Main Cams**

These are specially hard faced to give 600 Brinell Hardness. The fingers which operate on these cams to cause the gripping have a working surface against the cams of 400 Brinell, hence the fingers will wear before the cams.

When wear does take place, the fingers can be built up with an electrode to give 400 Brinell Hardness. Quasi Arc Duriod No. 2 is one such electrode. After building up, the fingers should be ground off correctly. This is most important, and if not done the machine will not pull accurate lengths.

### **A SUGGESTED OILING AND GREASING PROCEDURE FOR HUDSON FORGE MACHINERY**

1. The bed and carriage shaft should be wiped clean and re-greased before a new coil of wire is passed through the machine.

2. The carriage finger pins to be greased and the carriage return lever oiled daily.

3. The cut-off lever, peg wheel, flywheel and carriage stop shaft greased every 3 to 4 days.

4. Spinner, pulley shaft and cam shaft, one or two shots of grease weekly.

NOTE:—It is important that the spinner does not become too full of grease as overheating may occur.

5. Oil trays to be drained, cleaned and re-filled, depending on how dirty the oil becomes due to the wire scale.

6. The gear wheel and pinion should be cleaned and re-greased regularly.