YLSK-08 型电脑数控卷簧机

YLSK-08 CNC Spring Coiling Machine

Operation Manual

使用说明书

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一、本机用途：

本电脑机是由一个控制器和二个伺服系统构成,主要用于制造左、右旋圆柱形压缩弹簧、变形拉力簧及两端拼圈弹簧,特别是对制造细长形油封弹簧,选择 YLSK-08 型电脑数控弹簧机是最理想设备。

本机主要提供二绕圈顶杆系统。但如果需要可装备成单顶杆系统，可加工带尾巴形弹簧及其它种类的弹簧如扭簧等。

本机传动系统为 CNC 控制，精密度高，主要部位采用高耐磨性材料，精密耐磨性轴承，精心制造装配而成，生产能力大，通用性强，调机快而且容易，是理想的弹簧制造业之生产利器。

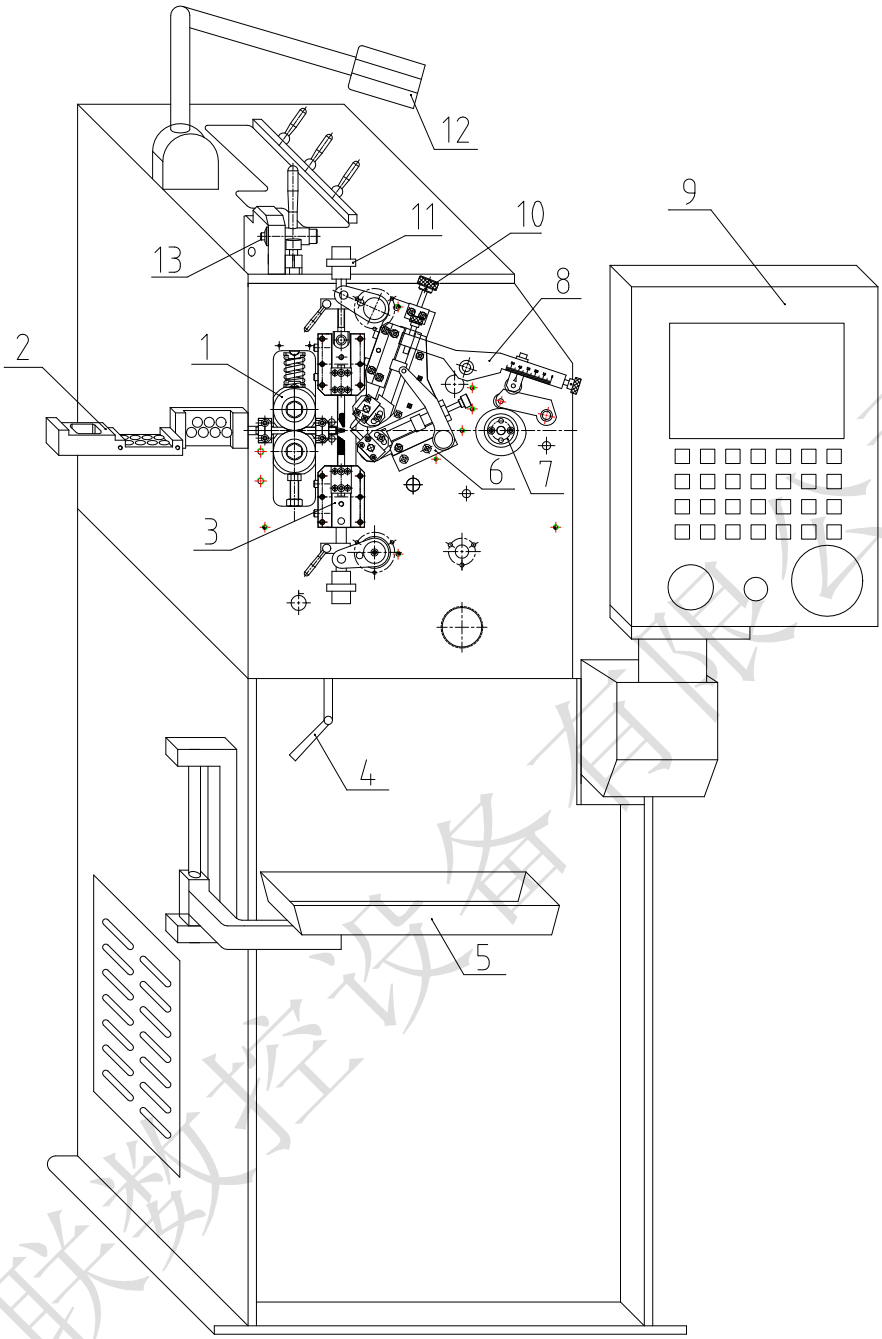
一、 技术参数：

名称	规格	单位
加工线径	Φ0.15～Φ0.8	mm
最大弹簧外径	Φ18	mm
最大送线长度	10000	mm
每分钟生产量	500(max)	件/min
伺服电机功率	2×0.75	kw
绕圈方向	左/右	
机器重量	350	kg
机械尺寸	610×820×1580	mm

二、 机器的组成部分

图一、为机器外观简图

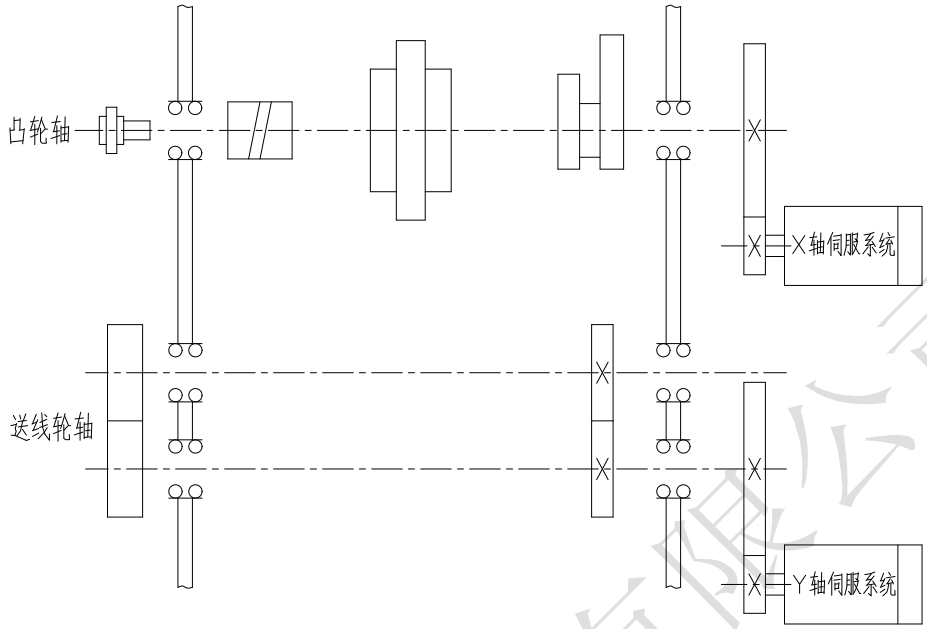
图二、为传动原理图



1、送线轮
2、校直架
3、切料刀架
4、芯轴刀锁紧手柄
5、托盘
6、变径刀架
7、变径凸轮
8、变径微调摇臂
9、控制器
10、弹簧直径调整螺杆
11、切料滑块调整螺母
12、照明灯
13、送线轮压紧装置

（图一）机器外观简图

本机由二轴控制：送线 Y 轴和凸轮 X 轴, 详细说明请看操作手册：



（图二）传动原理

三、 本机安装：

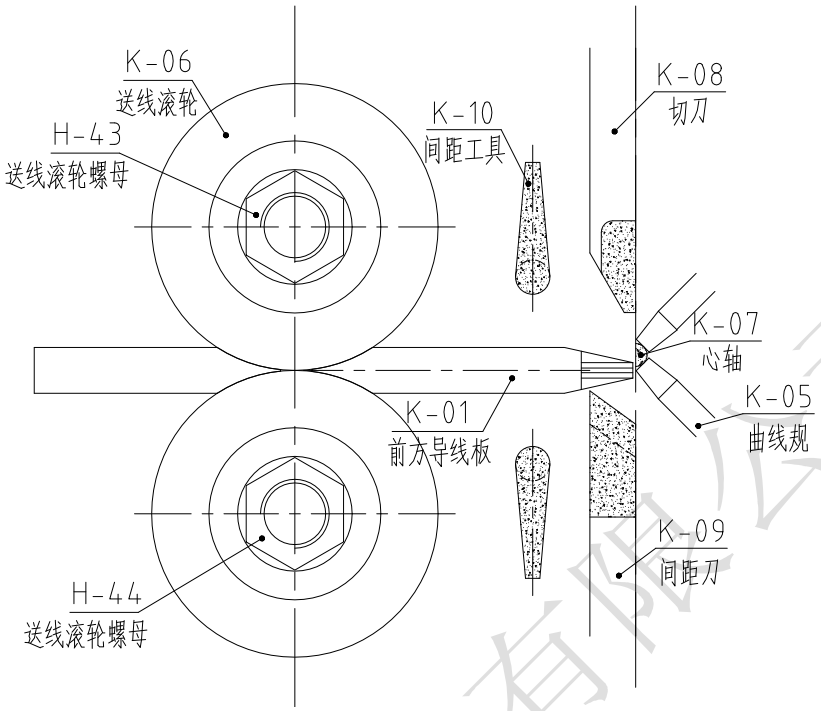
本机在出厂时已全部装配完成并经试车、加工样件，安装本机时必须找平固定，以确保正常运转。

本机应依照国家标准规定，妥善予以接地保护，连接电源后观察控制器信号，用手动试调电机旋向是否正确，启动伺服电机试空运转，保证一切正常工作。

四、 校直架：

为了弹簧产品的质量，必须选用优质的钢丝，校直装置使用于校正较小的偏差，它由两个相互垂直方向的校直单元组成，钢丝通过校直后进入线轮到达芯轴再经两个顶杆（曲线规）弯曲即可形成各种所须弹簧，当然成形之弹簧取决于操作人员的知识和经验，特别是对电脑控制器的使用必须经过一定的专业训练才能操作。

五、 送线滚轮及顶杆（曲线规）等简单示图：



（图三）右旋

七、送线部件：

送线滚轮（K-06）具有两沟槽，装于本机时将后面的沟槽与线材导板平行垂直，利用 13 送线轮压紧装置给予压力，确保绕出弹簧即可。

前方导线板（K-01）可防止线材在送线滚轮与第一绕圈顶杆之间发生缠结。前方导线板之前不用盖板予以遮盖，而是以间距刀（K-09）予以遮盖，此间距刀之定位通过摆杆调节螺丝（H-37）图九予以调整，在进行拉力弹簧制造时，弹簧不应抵住间距刀运转。

制造左旋弹簧时,将芯轴、间距刀、切刀与右旋安装相反，曲线规下移既可。

注意：加工不同线径时，需更换不同的送线滚轮，更换线轮时，必须注意里面的线轮垫圈装配方向，小平面压住里面的轴承，线轮与大平面接触，然后用线轮锁紧螺母 H-43，H-44（左旋螺纹）锁紧，反之，若安装垫

圈方向相反，则会损坏设备。

八、 绕圈系统：

（K-06）曲线规（图三）装在变径刀夹（C-23）图六上可以任何方向转动调正，绕圈杆尖之面应朝前，二曲线规绕圈尖可同时对称移动或分别移动，二绕圈尖相对之正确位置由变径滑块拔杆（D-05）予以决定。

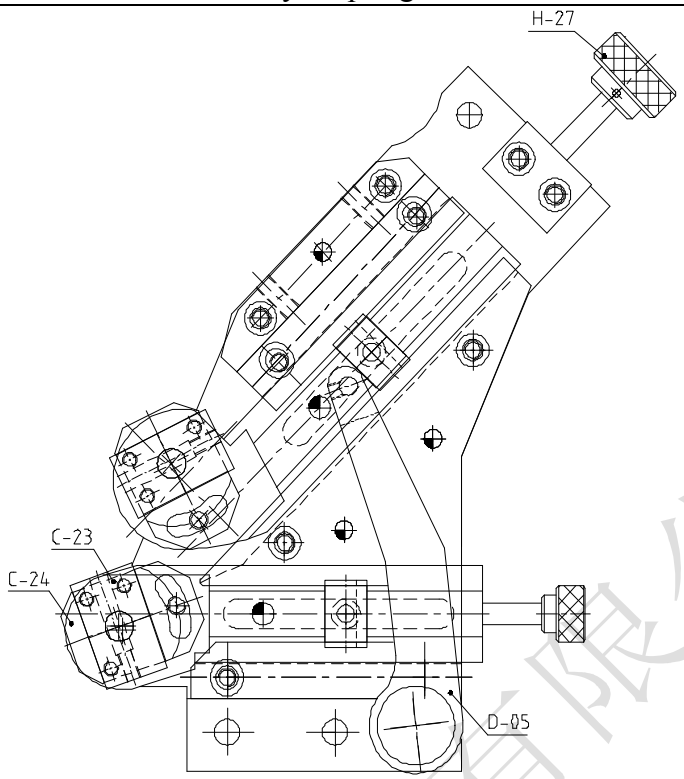
九、 变径弹簧辅助装置：

当使用变径弹簧辅助装置时，二曲线规由变径微调摇臂（D-02）图七，促使配合工作，变径微调摇臂之动作由变形凸轮（见附件明细表）经滚子，变径短摇臂（D-04）而传递，通过变径调节螺杆帽（H-17）移动小游标座可改变动程。因为曲线规由一弹簧控制复位，因此滚子开始接触凸轮板，绕圈尖到极限位置（即弹簧最大外径）应由弹簧直径调整螺杆 10（图一）予以限制，而不是靠凸轮板限制。

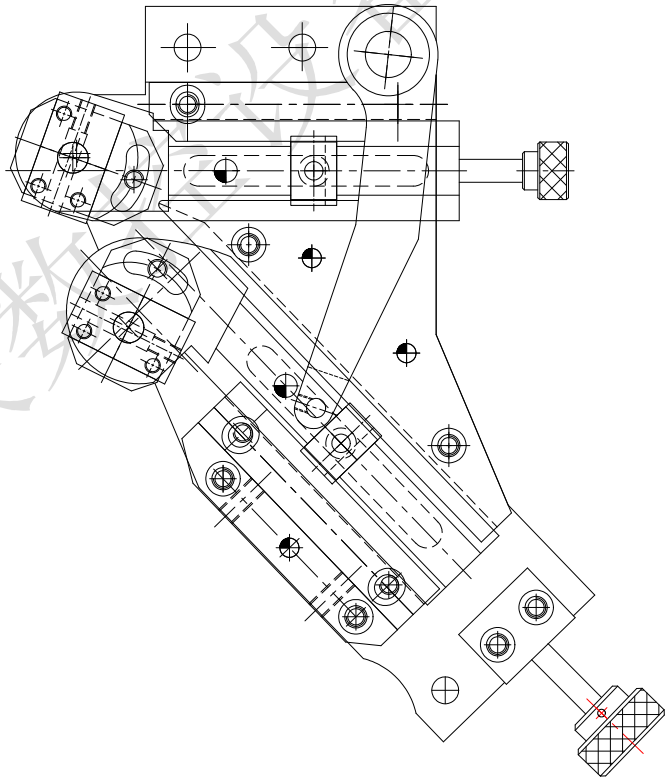
十、 弹簧外径修正装置：

弹簧外径修正中间盘（E-22）图七包括变形凸轮，便可与变径弹簧装置连同使用，此中间盘装置可安装变形凸轮。当用平行轴之间距工具进行具有大节距弹簧之绕圈时，使用本装置。在制造紧密绕圈端之压缩弹簧时，因间距工具压迫弹簧而使弹簧外径减小，因此造成弹簧外径不一致，借助变形凸轮可控制绕圈顶杆，使用弹簧端之绕圈外径减小，此减小值与间距工具造成的值抵消，从而使得整体弹簧之外径符合所需之值（即为正确之圆柱状）。

在制造小或中等节距压缩弹簧时，用垂直弹簧轴之间距刀进行，一般不用此装置。

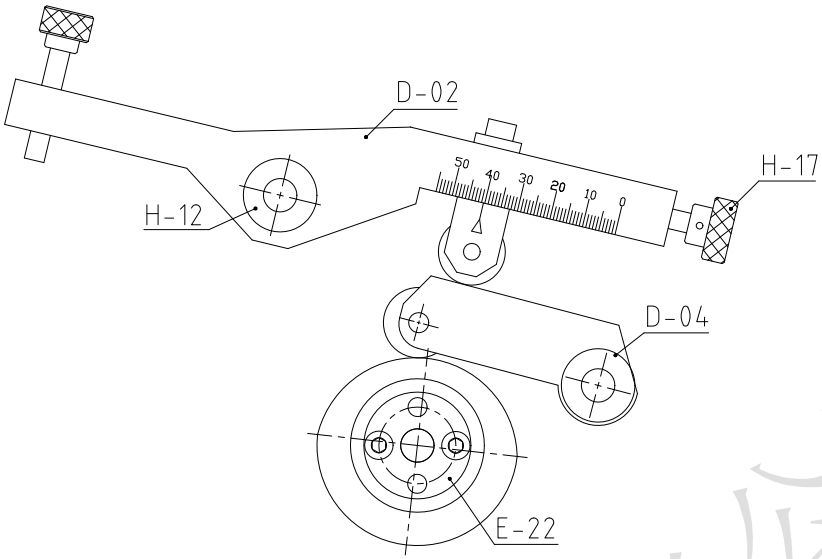


（a）



（b）

（图六）曲线规座　（a）右旋　（b）左旋



（图七） 变径弹簧辅助装置

十一、依弹簧垂直方向调整节距装置：

本节距调整装置用于制造压缩弹簧，绕密圈时，间距刀插入迫使展开，间距刀（K-09 见附件明细表）分小锥面和大锥面两种，小锥端在制造小节距弹簧时使用。而具有大锥面的间距刀系用于制造较大节距之弹簧。将间距刀装入切料滑块（C-03）图八槽中，使之能恰好通过线材导板——由右旋绕圈弹簧之下方或左旋绕圈弹簧之上方通过。

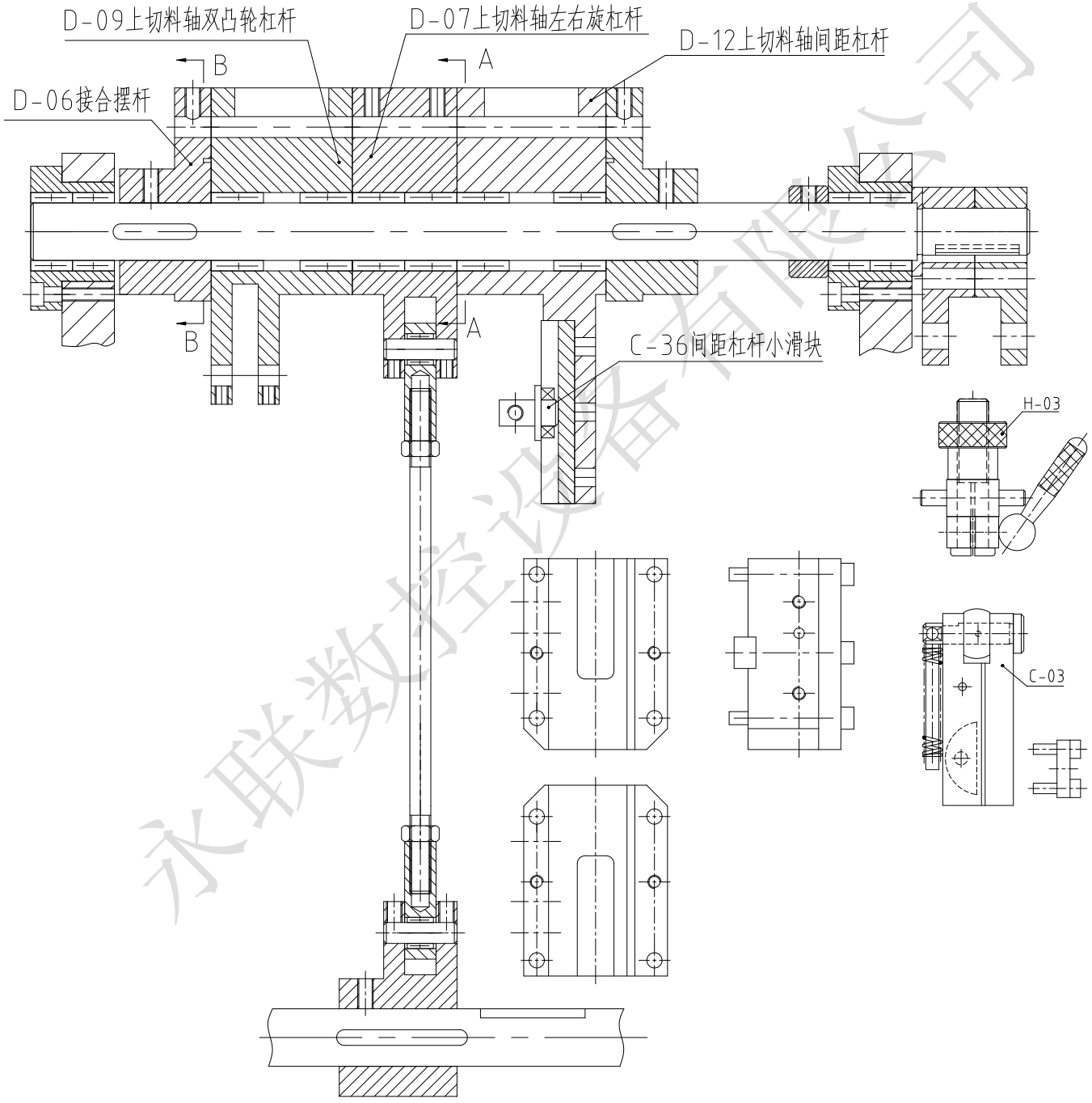
切料滑块（C-03）由间距凸轮经由上切料间距杠杆、摇臂轴间距微调杠杆(D-12,D-13)图九操作。位于上切料间距杠杆(D-12)之杠杆拔销(H-16)在制造右旋弹簧时,必须退后到上切料轴左右旋杠杆（D-07）图八中；而在制造左旋弹簧时，必须前进到图八左边驱动上切料轴离合摆杆（D-06）中，在中央位置时，间距刀则不产生作用。

告诫：必须确使间距连杆及切割连杆之两杠杆拔销 H-16（图九 A-A，B-B）不得同时插入上切料轴左右旋杠杆（D-07）图八中，否则会造成机器损坏。

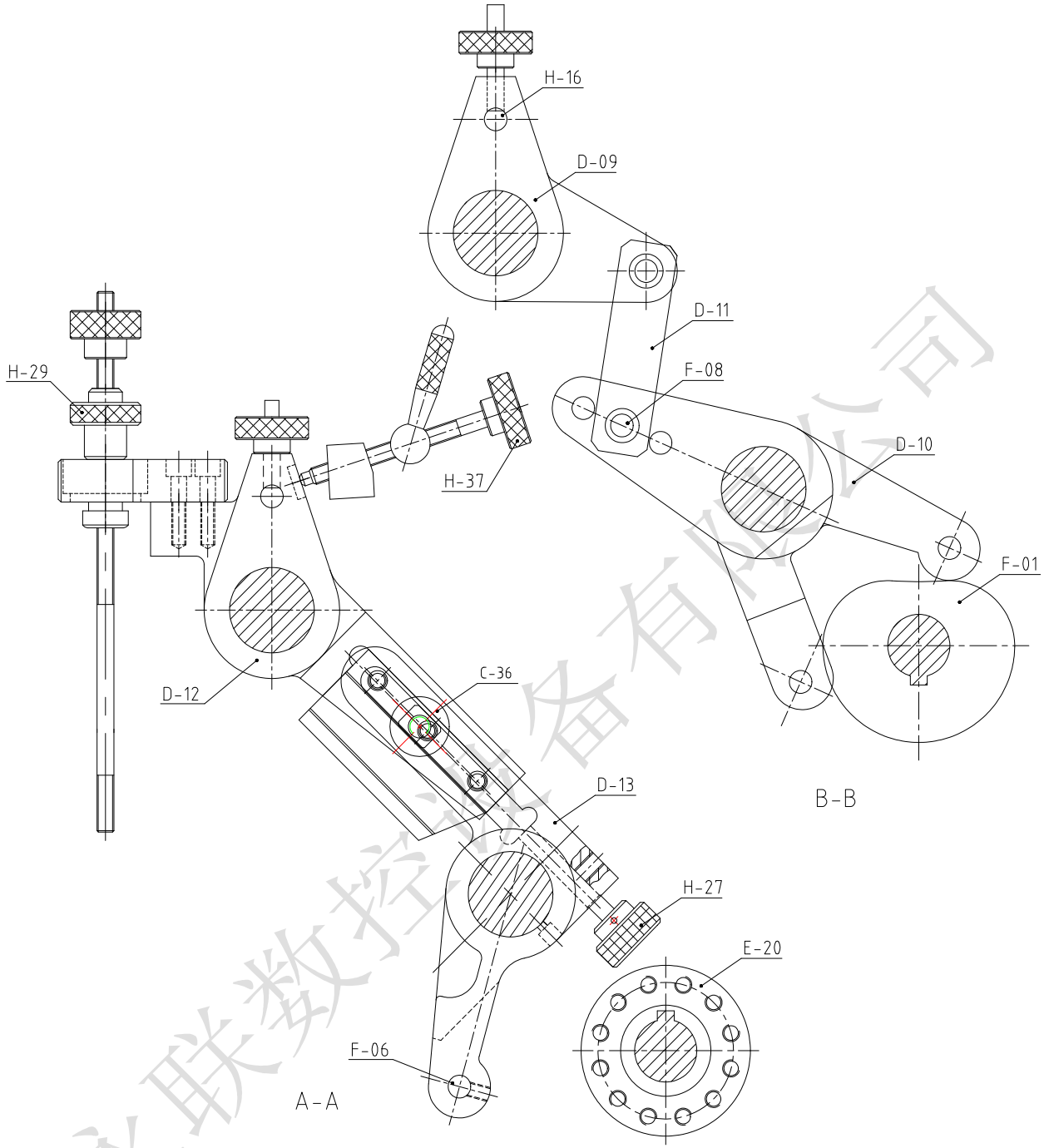
间距凸轮应依照所制弹簧规格选用。凸轮上之大幅形状改变系针对长

弹簧而用，而较缓之形状改变系用于制造短弹簧。

间距刀之行程可通过间距杠杆微调螺杆帽（H-27）图九来移动间距杠杆小滑块（C-36）改变杠杆比可以调整。间距刀之最前位置能以（H-27）予以改变，其后退位置可由摆杆调节螺杆（H-37）予以限制。



（图八）



（图九）

十二、依弹簧轴平行方向调整节距：

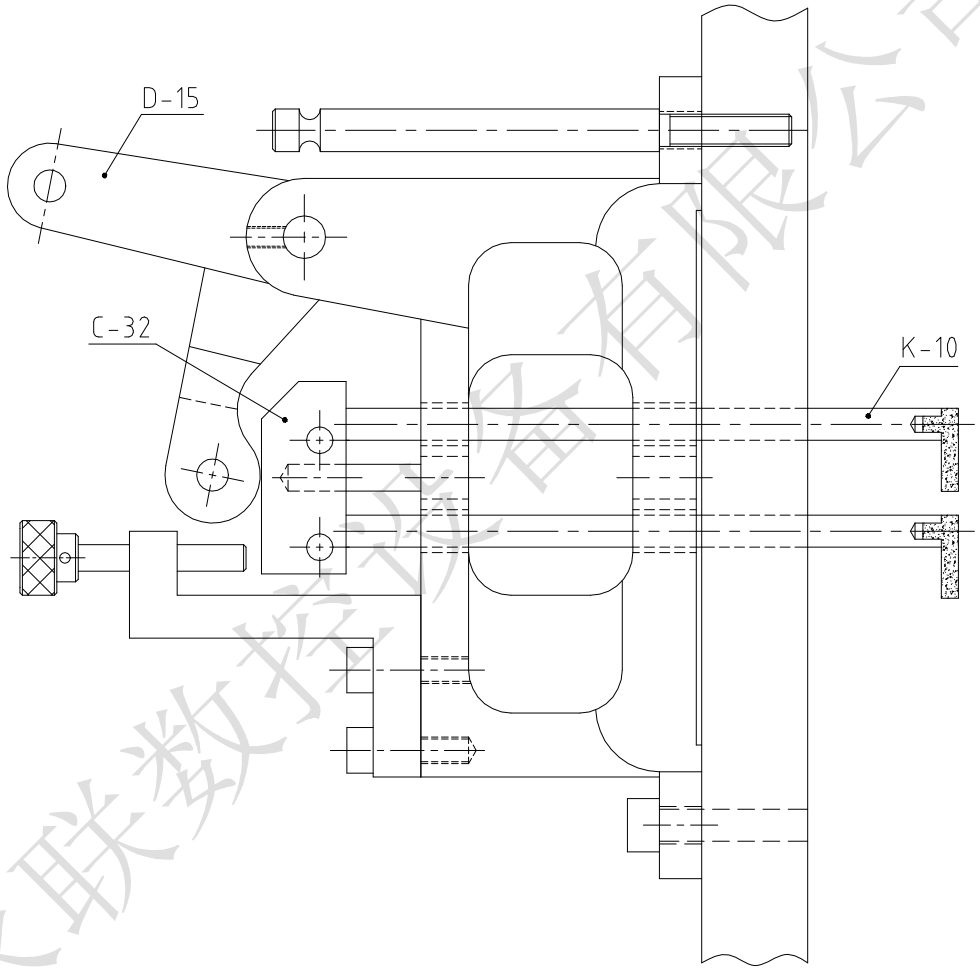
在绕制较大节距之弹簧时，宜配合与弹簧轴平行方向之节距调整操作。

二间距工具（K-10）图十固定于间距推轴推块（C-32）上，且通过间距凸轮带动上切料间距杠杆、摇臂轴间距微调杠杆（D-12,D-13）图九及间

距推轴杠杆(D-15)图十而予推动。杠杆拨销(H-16)必须确保固定于(D-12)中心以使弹簧轴垂直方向之节距调整脱离操作。

间距工具前方位置靠间距杠杆调节螺母（H-29）予以调整。

注意：必须切记此间距工具在进行切断时，应位于后方位置，以避免切刀撞及此工具。



（图十）

十三、切断：

盘绕的弹簧必须在每一操作循环之最后给予切断。切断操作由凸轮控制。切刀的回程靠凸轮而不是靠拉簧。因此，避免了切刀返回失败的可能。

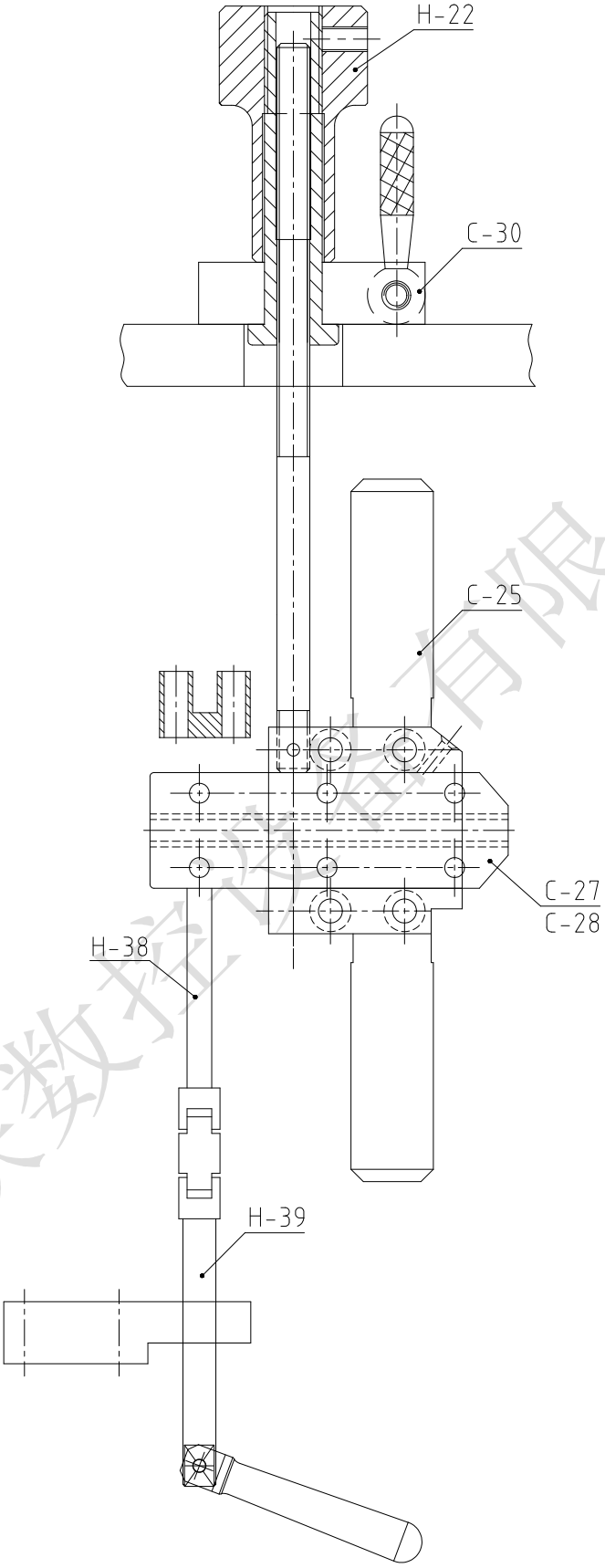
切断由芯轴（K-07，图三）及可动之切刀（K-08）图三相辅而成。因

顾及相当应力之产生，芯轴较弹簧之内径稍小，根据以往的经验，弹簧之外径较线径大五倍时仍可以切断，但此五倍为切断条件之限。

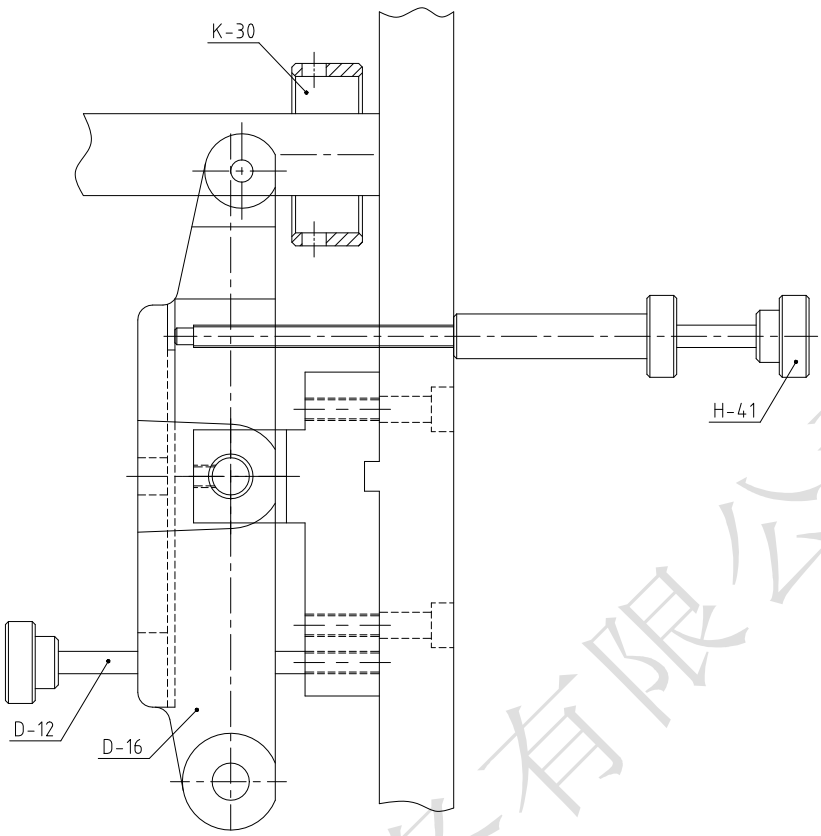
芯轴位于芯轴刀夹、芯轴刀夹压板（C-27，C-28）图十一中，并由万向螺杆（H-38）紧固。此芯轴刀夹可通过芯轴杠杆调节螺杆（H-41）图十二调整向前位置，其后退靠弹簧力。芯轴调节滑板（C-25）与芯轴刀夹及芯轴一起可通过转动芯轴上下调节螺母（H-22）在垂直方向调整。

切刀（K-08）图三位于切料滑块（C-03）图八中，可通过切刀调整垫（H-11）和两固定螺钉旋转调整调。在进线停止时，由切断凸轮（F-01）图九经上切料轴凸轮杠杆、摇臂轴凸轮杠杆（D-9，D-10）控制切断操作。切刀之行程越短越好，可通过改变凸轮杠杆连杆（D-11）和凸轮杠杆连杆销（F-08）之位置可以调整。切刀的前后位置由转动调整螺母（H-03）可以调整。切刀的最前位置以超过芯轴的切刀以小距离为宜。

通过移动上切料轴凸轮杠杆（D-09）上的杠杆拔销（H-16）可带动上滑块或下滑块。绕制右旋弹簧时，切断由上方进行，杠杆拔销向后插入图八中左边的结合杠杆拔销（H-16）中，而绕制左旋弹簧时，杠杆拔销则要向前插入上切料轴左右旋杠杆（D-07）中，切断由下方进行。



图（十一）



图（十二）

十四、芯轴移动装置：

在制造双锥，中央锥，腰形之弹簧时，必须使芯轴移位。

固定于芯轴刀夹、芯轴刀夹压板（C-27、C-28）图十一中的切断芯轴在进行弹簧绕圈时，由抽芯凸轮片（K-30）图十二操作芯轴调节杠杆（D-16）使其移出绕圈平面。在切断弹簧时，芯轴短暂被推向前。注意：当使用此芯轴装置时，芯轴杠杆调节螺杆（H-41）应当向后旋转不再与芯轴调节杠杆（D-16）下接触。

十五、左旋绕圈弹簧装置：

当绕制左旋弹簧时，绕圈向下展开，应将左旋曲线规座装上以替换右旋曲线规座，切刀装于下方滑块中而间距刀则装于上方滑块中。

双锥弹簧辅助装置选用于右向及左向绕圈弹簧。变径微调摇臂，变径

短摇臂（D-02）和（D-04）图七必须换至位于凸轮轴下方的变径微调摇臂小轴，万向节螺杆（H-12），（H-39）上。

十六、调整：

当送线滚轮，线板导板，绕圈顶杆及芯轴根据线径或弹簧外径要求装好后，即可开始，为了有效的进行第一圈绕制，绕圈顶杆尖端应调到较大的弹簧外径位置。待线材通过校直装置，送线滚轮及右向线材导板后，线端应以圆头板手予以成一环并将其置入绕圈尖之沟槽内，即可使用送线轮压紧装置将其压紧，但此压力足以将线材顺利引进本机即可。

转动手轮以引进线材，同时调整绕圈杆达到所需的弹簧外径。若需要时，同时转动绕圈杆变径刀夹座（C-24）图六变径短摇臂（D-04）以正确定位及调整绕圈尖的位置。

十七、压缩弹簧：

在制造具有紧密绕圈端之压缩弹簧时，绕圈尖应妥为调整使弹簧之绕圈相列而不产生拉力。弹簧的节距靠间距工具获得。

1、　圆柱形弹簧的调整：

a、安装需要的送线滚轮，调节这对送线滚轮使其能相互接触（不能插入钢丝）。

b、安装带盖板的线材导板并向送线滚轮方向移动，直到导板接触到送线滚轮为止。然后再将其退回约0.5～1mm(避免在操作期间接触送线滚轮)。

c、安装芯轴刀，应根据弹簧直径确定芯轴刀的尺寸，芯轴刀的凸出部位应比弹簧内径小0.5mm，其凸出部位的磨光长度约为相应的钢丝直径的约二倍。

d、调整送线滚轮与芯轴刀之间的右方线材导板。绕制细线材时，间隙不能超过 0.2～0.3mm。线材导板的另一端做成直边。如果加工小弹簧，靠近芯轴刀的线材导板的直角应削成约 45 度（绕制右旋弹簧时削上部；而绕制左旋弹簧时削下部）。

e、安装导板盖板，注意盖板不要碰到运动部件。

f、通过芯轴杠杆调节螺杆（H-41）图十二调整芯轴刀夹使的超出刀夹滑座约 1mm。将芯轴刀对准线材导板后锁紧卡紧块（C-30）图十一。

g、插入节距刀。一般情况下用 45 度刀（绕制细钢丝时用 30 度尖刀）。移动节距刀使其超出线材导板上边 5mm。调节压紧螺钉使节距刀接触线材导板，但应自由运动，安装切断刀时，须注意切刀的刀口应与芯轴的刀口一致。调整切刀行程，使其在芯轴刀的上方之行程量不超过线径的二倍。

h、安装绕圈顶杆之前应核对所要绕制弹簧的技术要求。如果要绕制的是细钢丝，绕圈顶杆前端的多余部分及靠进沟槽的多余均应磨去，沟槽两侧边缘应成弧状。如果弹簧外径小于 4mm，绕圈顶杆前端须做成尖状。

i、近似的调整进线长度，检查绕圈数。调整准确的进线长度。

j、安装间距凸轮并调整到获得理想的尾圈为止。

2、单元锥形弹簧的调整：

制造单元锥形弹簧时，应由弹簧的最小外径开始绕圈。位于变径短摇臂（D-04）图七上的滚子位于凸轮板的最高点。在弹簧盘绕时，滚子依凸轮板之间下弧度抽其最低点（大弹簧外径）进行。

两绕圈顶杆之半圈为下一弹簧之开始，因此凸轮板具有一大幅升起弧形，可使顶杆快速至最小的弹簧外径，同时停止进线。弹簧于此由完成大

外径至欲开始小外径的转折点处进行切断。

3、双锥弹簧

制造两端均成锥形之双锥弹簧时，变径短摇臂（D-04）图七上之滚子于绕圈过程中由变形凸轮的最高点进至最低再返回。若弹簧中央部分为柱状，则变形凸轮于弧度起落之间应有一段同心圆部分。

4、腰形弹簧

绕制向中央成双锥形之腰形弹簧时，芯轴必须在绕圈时移离绕圈平面，为此须连上芯轴移动装置。

十八、电气操作及维护：

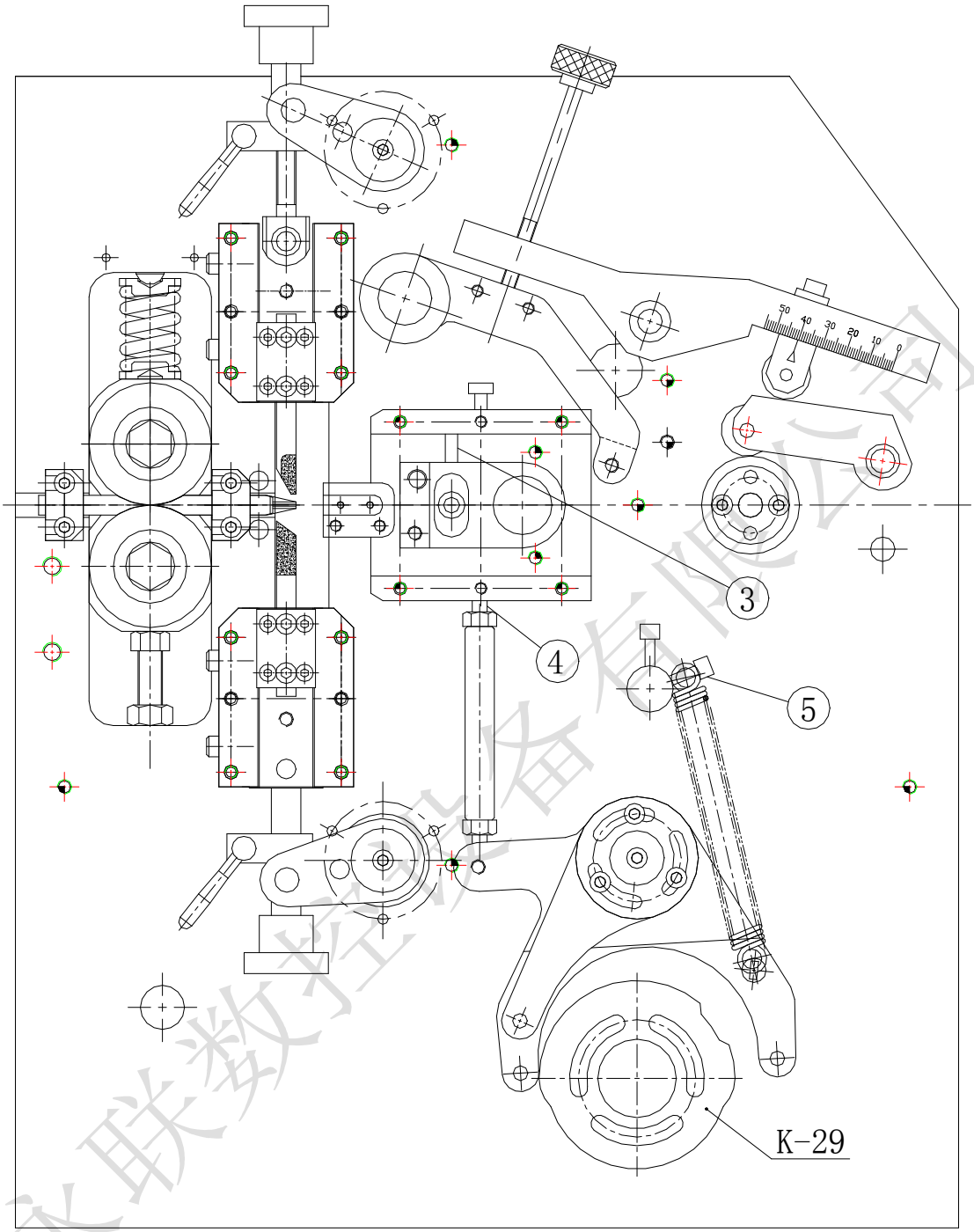
1、故障开关：当送线架出现故障时，电脑机自动停机。

2、继续送线和连续送线（快速补偿）。

在送线架的引线架上有一拨动开关用于控制送线架马达的连续或继续转动。当该开关拨至继续位置时，通过机器所在卷制的钢丝拉动微动开关，使送线马达继续转动，当开关拨至连续位置时，送线架将以调定的速度连续转动放线，并且可以在放线不及时时自动继续加速放线，放线速度由开关旁的调速旋钮控制。

十九、扭簧装置：用户选配

本机除了能做上述各类弹簧外,还特别为用户设计了一套扭簧装置。即带尾巴形弹簧。图十三是全部做扭簧机构的传动部件。在刀架滑块装一件刀夹，夹上装有切刀，右侧装有刀座，通过连杆上下移动可以做放尾巴单件，具体安装方法见图（十四）五条说明，在扭簧凸轮座（E-20）上应装上扭簧凸轮片（K-29）。



（图十三）

标准弹簧滑板装置替换右向扭簧滑板装置：

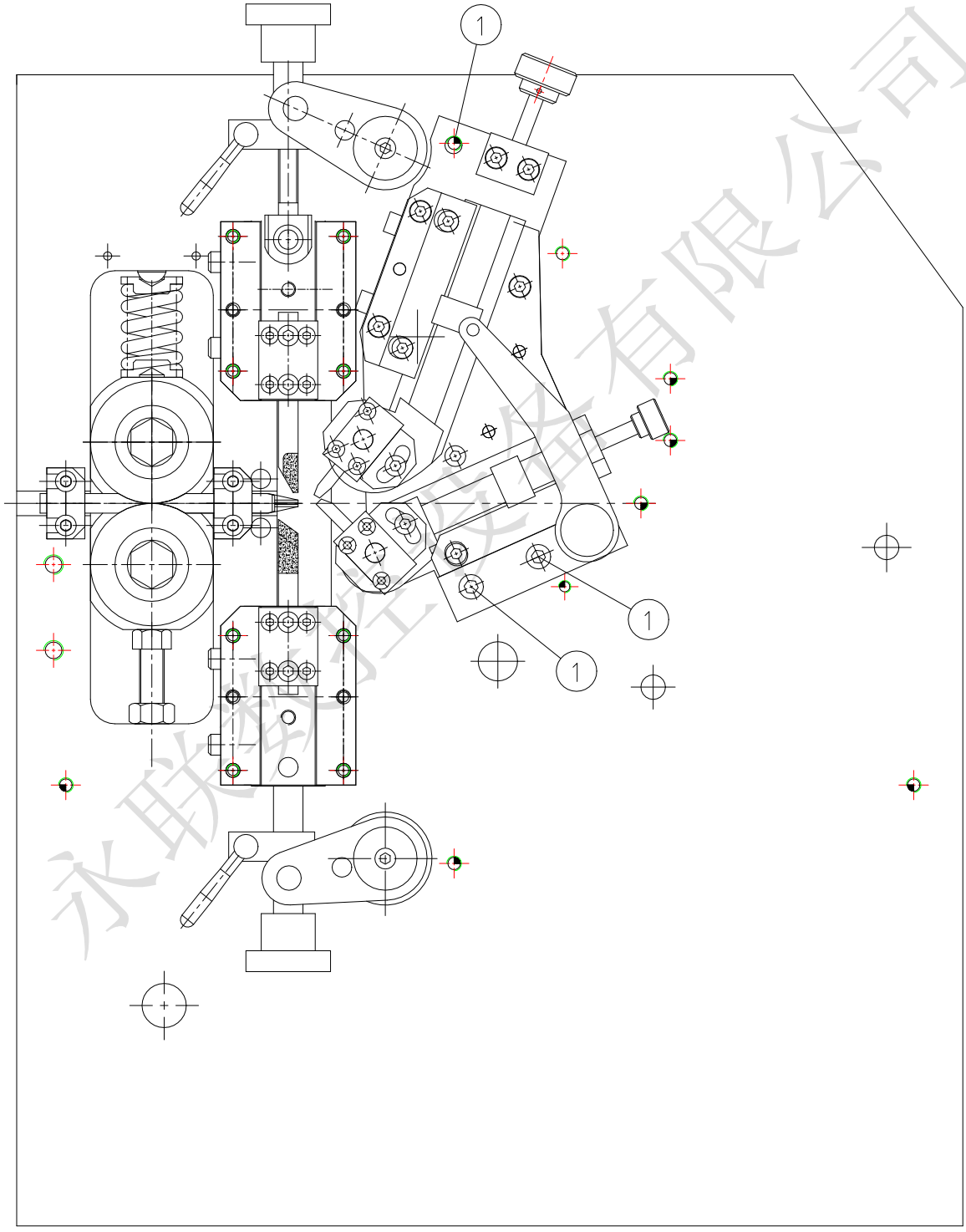
1、拆除标准弹簧滑板上三个固定螺丝（编号 1）

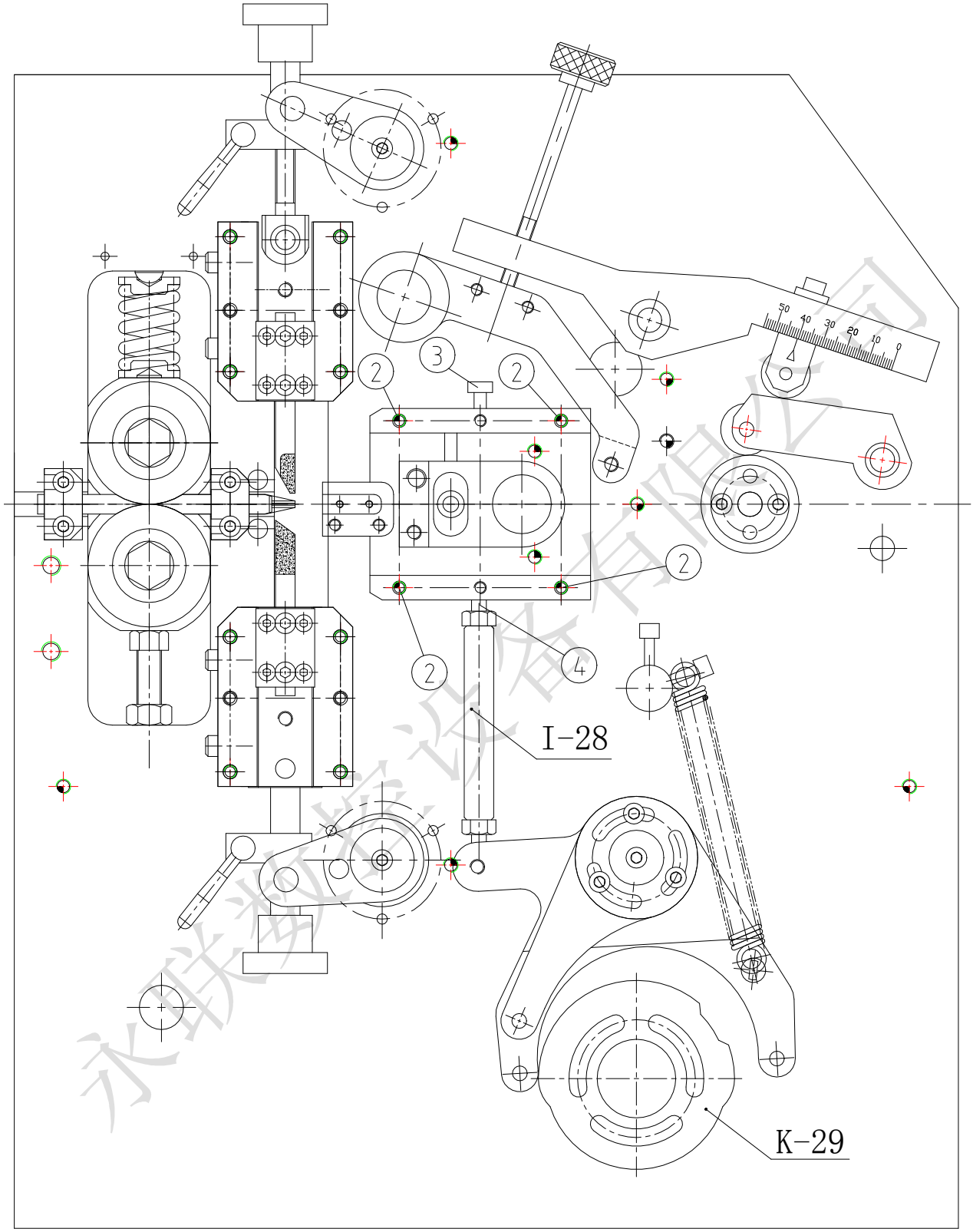
2、安装扭簧滑板紧固四个螺丝（编号 2）

3、安装扭簧用的倒顺六角接头（I-28）及主件扭簧凸轮片（K-29）

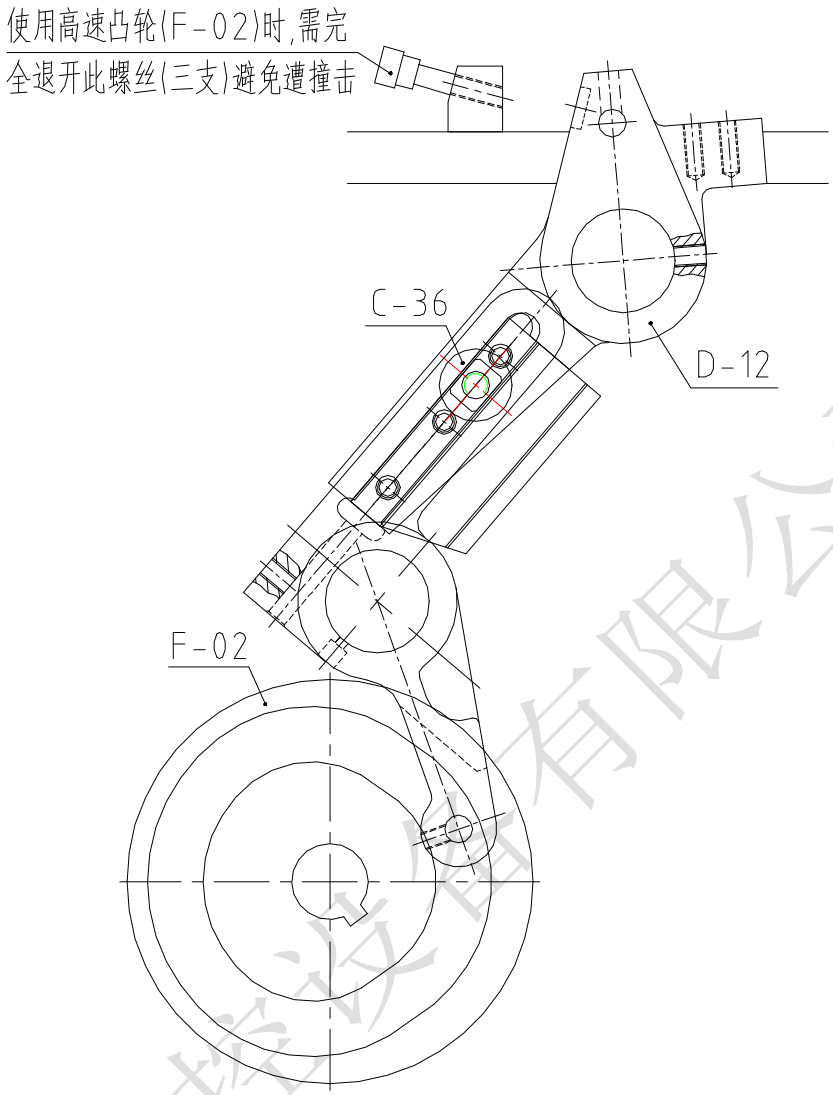
4、放松编号 3 之螺丝，以拆弯刀座上指明（凸轮最高点）不可碰撞此螺丝为原则。

5、放松编号 4 之螺丝，以拆弯刀座复归时（凸轮最低点）不可碰撞间隙刀为原则。





（图十四）



（图十八）

二十、高速凸轮使用方法：

此高速凸轮主要用于弹簧间距，当做各种压缩弹簧间距时应使用代圆轴间距刀，配合槽内凸轮（F-02）用（C-36）间距杠杆小滑块调整各式间距大小，在做间距弹簧时应注意使用左旋刀还是右旋刀，客户可根据具体情况稍加修改左右旋间距刀头就可以工作了。

二十一、安全，保养，维护

1、机器在使用中必须加以维护保养，才能长期保持稳定的精度，和使用寿命，操作者在开机时必须每隔 3 天在杠杆轴承注一次油，基面板上滑轨和滑槽用喷雾润滑 6CB9 每天一、二次，工作完毕要清除表面和周围的污物。

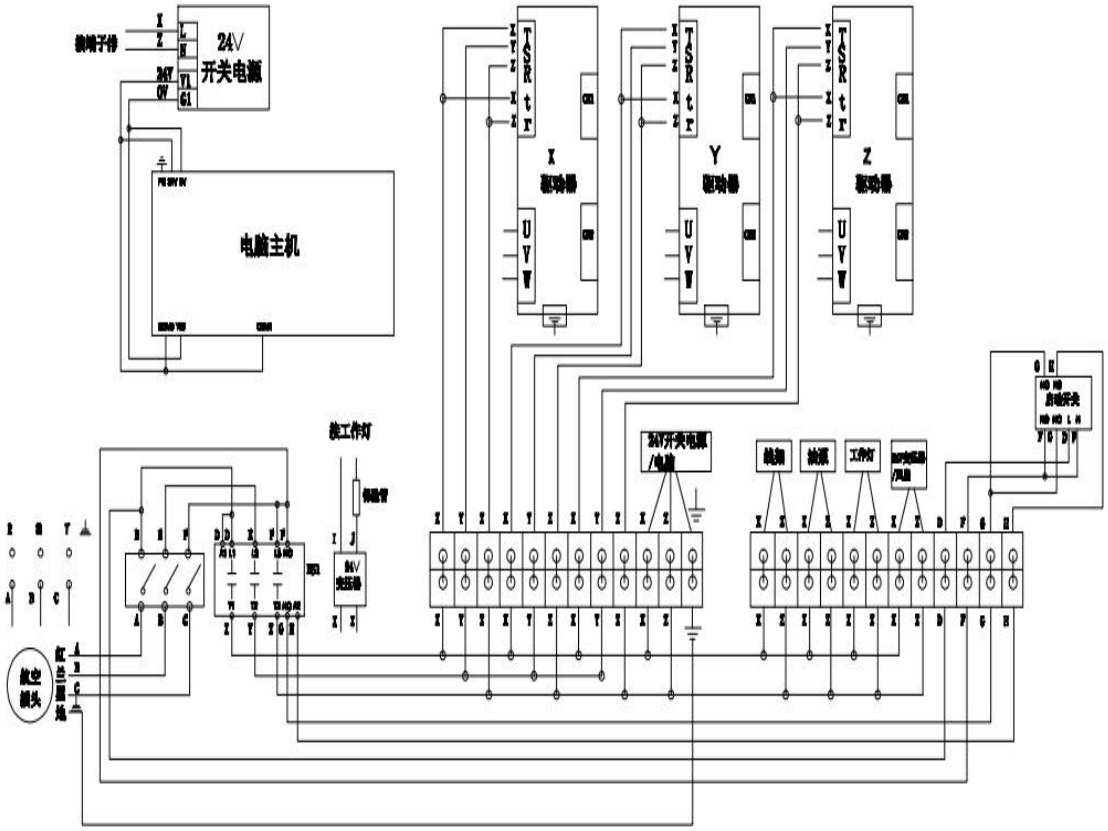
2、在卷制弹簧时一定要按规定的钢丝直径，不要随意加大直径，以勉损坏机器，作异型材时按照最大线径的同等面积计算即可。

3、在工作时操作者不准把手伸进机器内，更不准把铁器伸入机器内去清理弹簧等物件，因机器在运转时速度很快，特别注意不要出事故。如在工作中发现有问题可以立即停机然后再处理故障。

4、工作室（电脑机房）内除了保持清洁、卫生外，不要阳光直接照在机器上，不准在室内加热任何物品，要保持室内正常工作温度（16°—26°之间）最佳，不准有任何灰尘。

二十二. 电路接线图

永联数控弹簧机接线图



注意：1、此图为3相220V或2相220V通用接线图。
2、R、S、T、地线颜色对应使用红、蓝、黑、黄绿，接线要求美观大方。
3、380V电源输入必须外接变压器。

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YLSK-08 CNC Spring Coiling Machine

Operation Manual

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First, the applications of the machine:

The computer is composed of a controller and two servo systems. It is mainly used to manufacture left and right circular cylindrical compression springs, deformation tension springs and two-end coil springs. YLSK-08 computer numerical control spring machine is the most ideal choice especially for the manufacturing of slender oil seal springs.

This machine mainly provides two winding ejector system. However, it

can be equipped with a single-rod system, which can process tail-shaped springs and other kinds of springs such as torsion springs if customer required.

The control system of the machine is controlled by CNC, which has the high precision advantage. The main parts are made of high wear-resistant materials, precision wear-resistant bearings with good performance based on good manufacturing and assembling skills. The production and the versatility capacity are strong which make the machine run fast and easily. It is an ideal manufacturing tool for spring manufacturing.

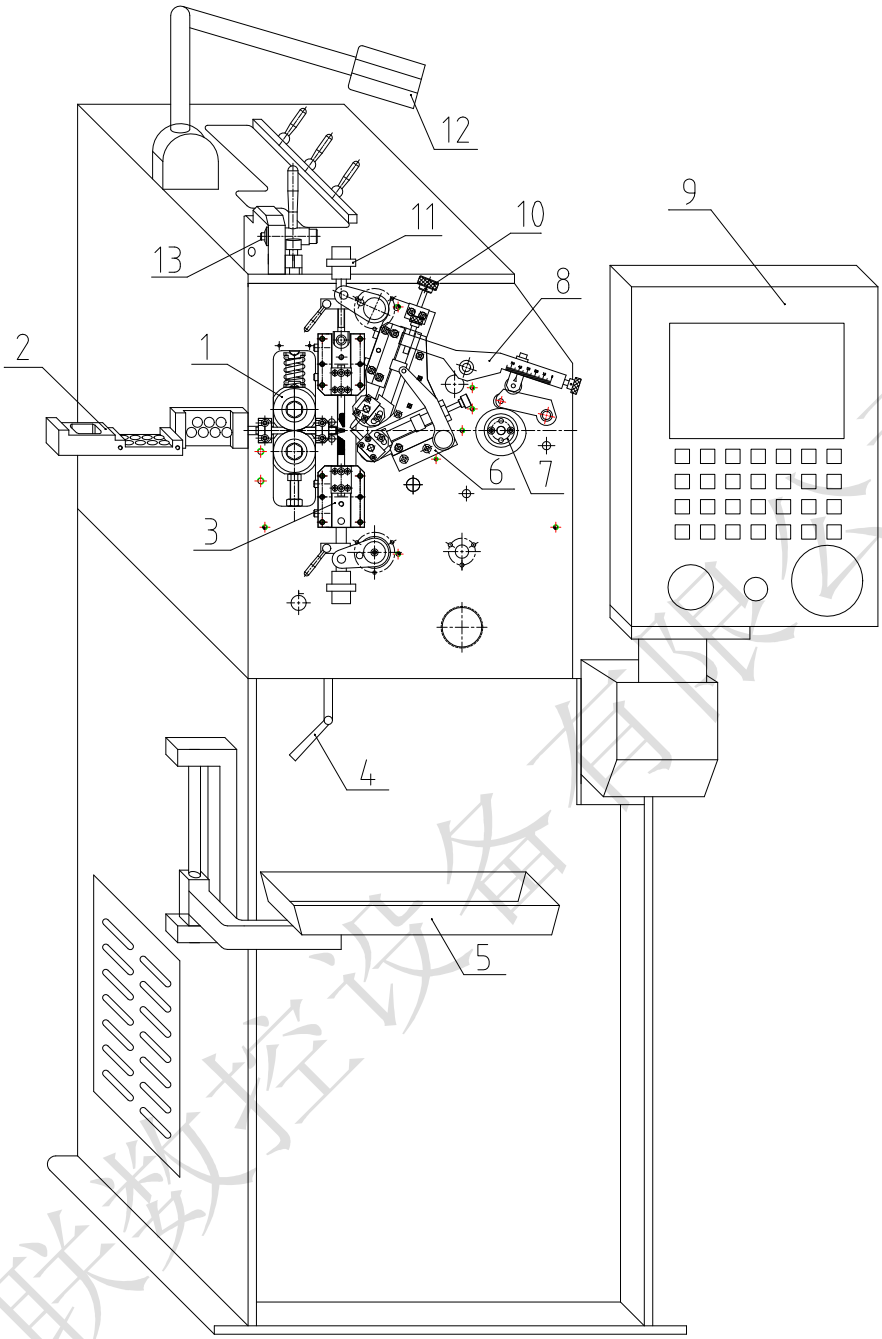
I. Technical parameters：

Description	Specification	Unit
Machining wire diameter	φ0.15～φ0.8	mm
Max. OD of spring	φ18	mm
Max. wire feed length	10000	mm
Output/min	500(max)	pcs/min
Servo motor power	2×0.75	kw
Coiling direction	Left/Right	
Machine weight	350	kg
Machine dimension	610×820×1580	mm

II Part of the machine

Figure 1 schematic diagram of the machine

Figure 2, transmission schematic diagram



1. Feeding Wheel 6. Reducing tool holder 11. Cutting slider adjustment nut

2, Straightening frame 7, Variable diameter cam 12, lighting

3, Cutting tool holder 8, Variable diameter fine adjustment rocker arm 13, Wire roller pressing device

4, Mandrel knife locking handle 9, Controller

5, Tray 10, Spring diameter adjustment screw

Figure 1 schematic diagram of the machine

This machine is controlled by two axes: Feeding line Y axis and the cam X axis. For details, please refer to the operation manual:

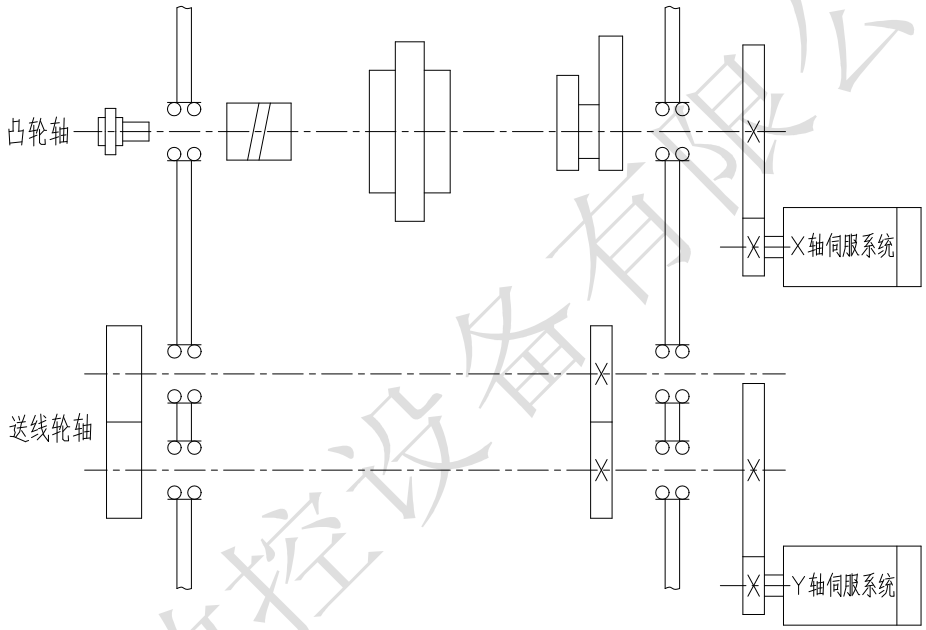


Figure 2, transmission schematic diagram

I Machine installation ：

The machine has been assembled at the factory and tested, sampled, and must be leveled to ensure proper operation.

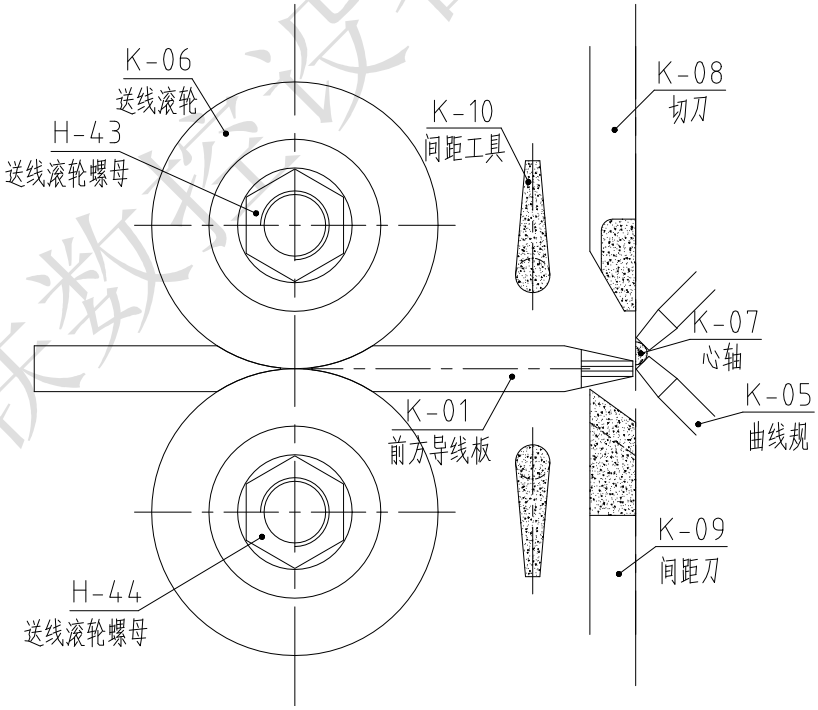
This machine should be properly grounded in accordance with the national standards. After connecting the power supply, observe the controller signal, adjust the motor rotation direction by manual, start the servo motor for empty

run, and ensure that everything works normally.

I Straightening frame：

In order to ensure the quality of the spring product, high-quality steel wire must be used. The straightening device is used to correct small deviation. It consists of two straightening units that are perpendicular to each other. After the steel wire is straightened, it enters the wire wheel and reaches the mandrel. A ejector (curve gauge) can be bent to form a variety of required springs. Of course, the formed spring depends on the knowledge and experience of the operator, and in particular, the use of the computer controller must be subjected to certain professional training.

I Simple diagram of the wire feeding roller and the ejector pin (curve gauge)：



(Figure 3) Right-Rotation

VII Wire feeding parts：

The wire feeding roller (K-06) has two grooves. When installed in the machine,

the rear groove is parallel to the wire guide. The pressure is given by the 13 wire roller pressing device to ensure that the spring is wound.

The front wire guide (K-01) prevents the wire from tangling between the wire feed roller and the first winding ram. The front wiring board is not covered by the cover before, but is covered by a spacing knife (K-09). The positioning of the spacing knife is adjusted by the pendulum adjusting screw (H-37) in Figure 9. When the tension spring is manufactured, The spring should not be able to withstand the spacing of the knife.

When manufacturing a left-handed spring, the mandrel, the spacing knife, and the cutter are opposite to the right-handed installation, and the curve gauge can be moved down.

Note: When processing different wire diameters, it is necessary to replace different wire feeding rollers. When replacing the wire wheel, you must pay attention to the direction of assembly of the wire wheel washer inside. The small plane presses the bearing inside, the wire wheel contacts the large plane, and then uses the wire wheel. Lock nuts H-43, H-44 (left-hand thread) are locked. Conversely, if the mounting washers are in the opposite direction, the device will be damaged.

VIII Winding system：

(K-06) Curve gauge (Fig. 3) can be rotated and adjusted in any direction on the variable diameter tool holder (C-23). The surface of the circle around the pole should be forward, and the curve of the second curve can be

simultaneously Symmetrical movement or movement separately, the correct position of the two winding tips is determined by the variable diameter slider (D-05).

VIII Diameter reducing spring auxiliary device：

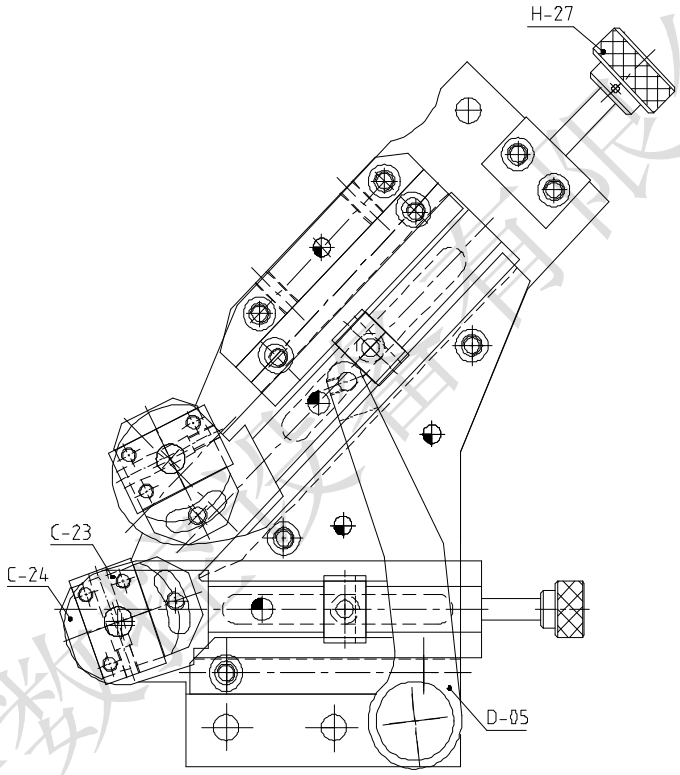
When using the reducing spring auxiliary device, the two-curve gauge is adjusted by the variable-diameter rocker arm (D-02). Figure 7 promotes the cooperation. The action of the variable-diameter rocker arm is guided by the deformation cam (see attached list). The variable diameter short rocker arm (D-04) is transmitted, and the movement can be changed by moving the small cursor seat by the variable diameter adjusting screw cap (H-17). Since the curve gauge is reset by a spring control, the roller begins to contact the cam plate, and the winding tip to the extreme position (ie, the maximum outer diameter of the spring) should be limited by the spring diameter adjusting screw 10 (Fig. 1) instead of the cam plate. .

VIII Spring Outer Diameter Correction Device：

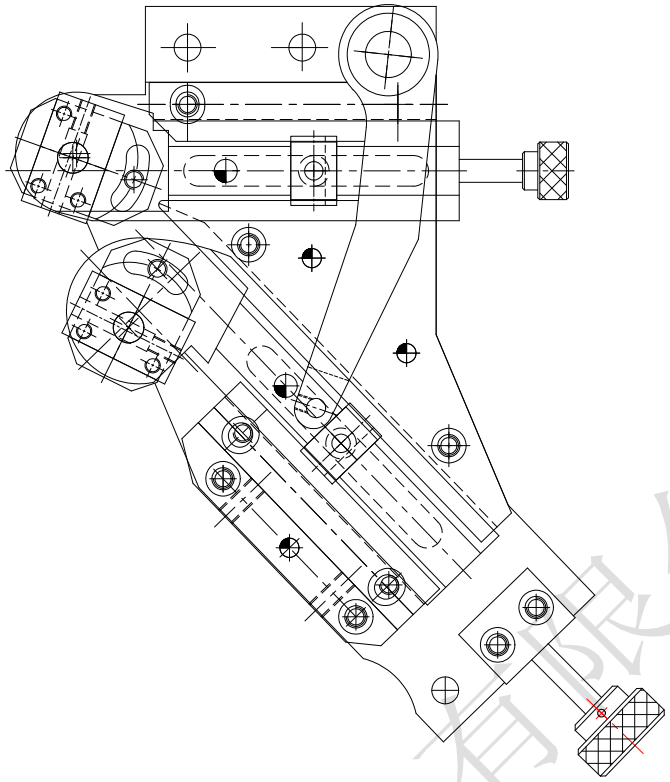
Spring Outer Diameter Correction Intermediate Plate (E-22) Figure 7 includes a deformation cam that can be used with a variable diameter spring device that can be fitted with a deformed cam. Use this unit when making a coil with a large pitch spring from a tool with a parallel axis. When manufacturing a compression spring with a tightly wound end, the outer diameter of the spring is reduced by the spacing tool pressing the spring, thereby causing the outer diameter of the spring to be inconsistent. The deformation of the ejector rod can

be controlled by the deformation cam, and the outer diameter of the winding end using the spring end is reduced. Small, this reduction is offset by the value caused by the spacing tool, so that the outer diameter of the overall spring meets the desired value (ie, the correct cylindrical shape).

In the manufacture of small or medium-pitch compression springs, the vertical spring shaft is used between the knives and the device is generally not used.

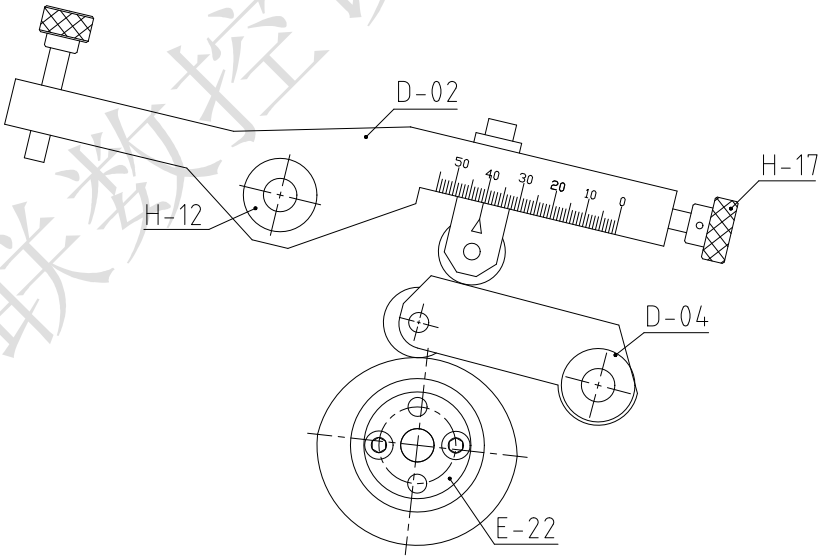


（a）



（b）

(Figure 6) Curve gauge (a) right-handed rotation (b) left-handed rotation



(Figure 7) adjustable auxiliary spring device

VVI Adjust the pitch device according to the vertical direction of the spring:

The pitch adjustment device is used to manufacture a compression spring.

When the coil is wound, the pitch knife is inserted to force the unfolding, and the spacing knife (K-09 see the attached list) is divided into a small cone surface and a large cone surface, and the small cone end is in the manufacturing section. Used when moving from the spring. A pitch cutter with a large taper is used to make a spring with a large pitch. Insert the spacer into the slot of the cutting slider (C-03) in Figure 8 so that it can pass through the wire guide - either below the right-handed spring or above the left-handed spring.

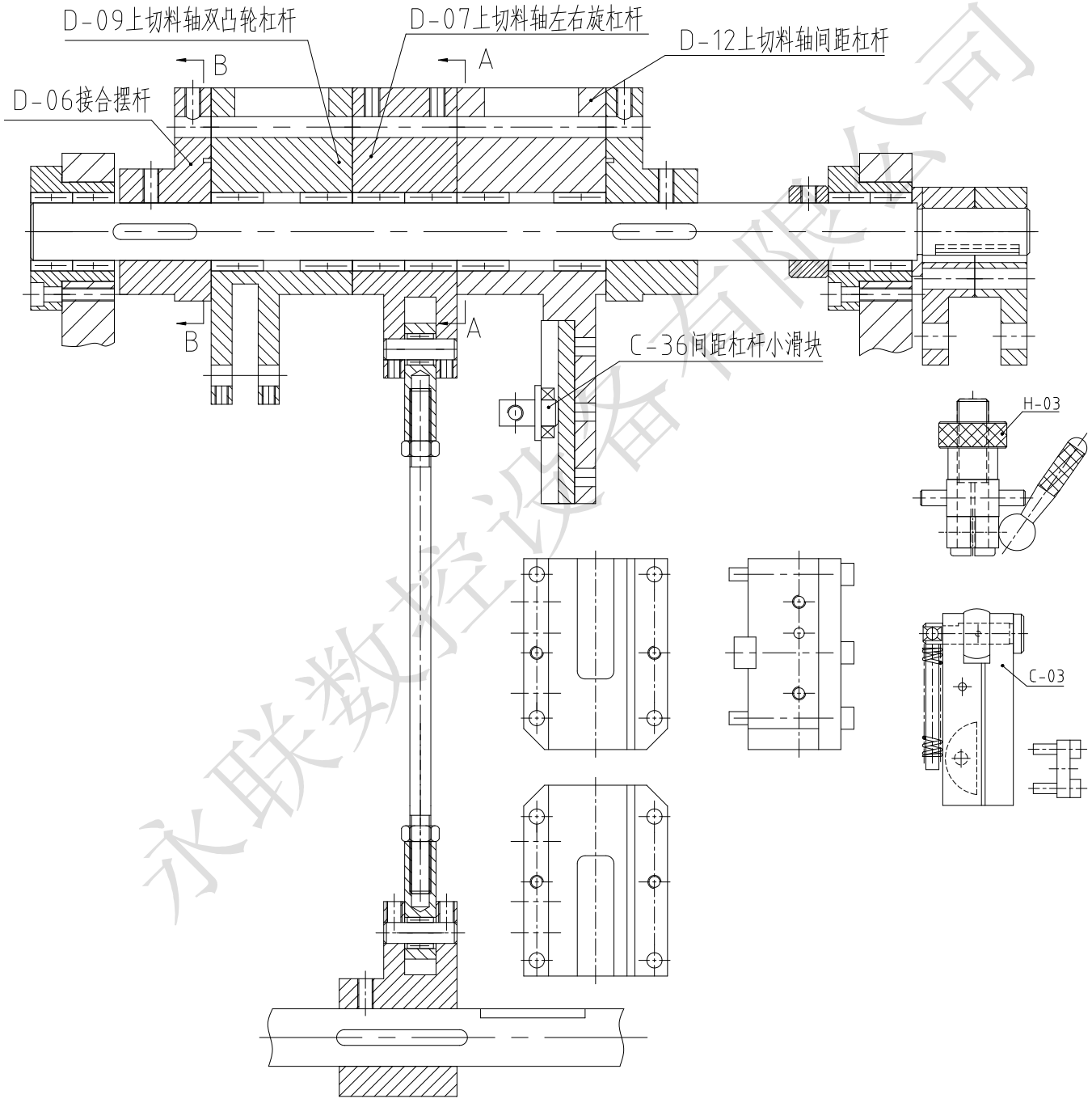
The cutting slider (C-03) is operated by the pitch cam via the upper cutting distance lever and the rocker shaft spacing fine adjustment lever (D-12, D-13). The lever pull pin (H-16) located on the upper cutting distance lever (D-12) must be retracted to the upper and lower cutting shafts (D-07) in Figure 8 when manufacturing the right-handed spring; When turning the spring left, you must advance to the left-hand drive shaft clutch lever (D-06) on the left side of Figure 8. In the center position, the pitch knife does not work.

Note: It must be ensured that the two lever pull pins H-16 (Fig. 9A, BB) of the pitch link and the cutting link must not be inserted into the upper and lower rotary levers (D-07) in Figure 8 at the same time, otherwise it will cause The machine is damaged.

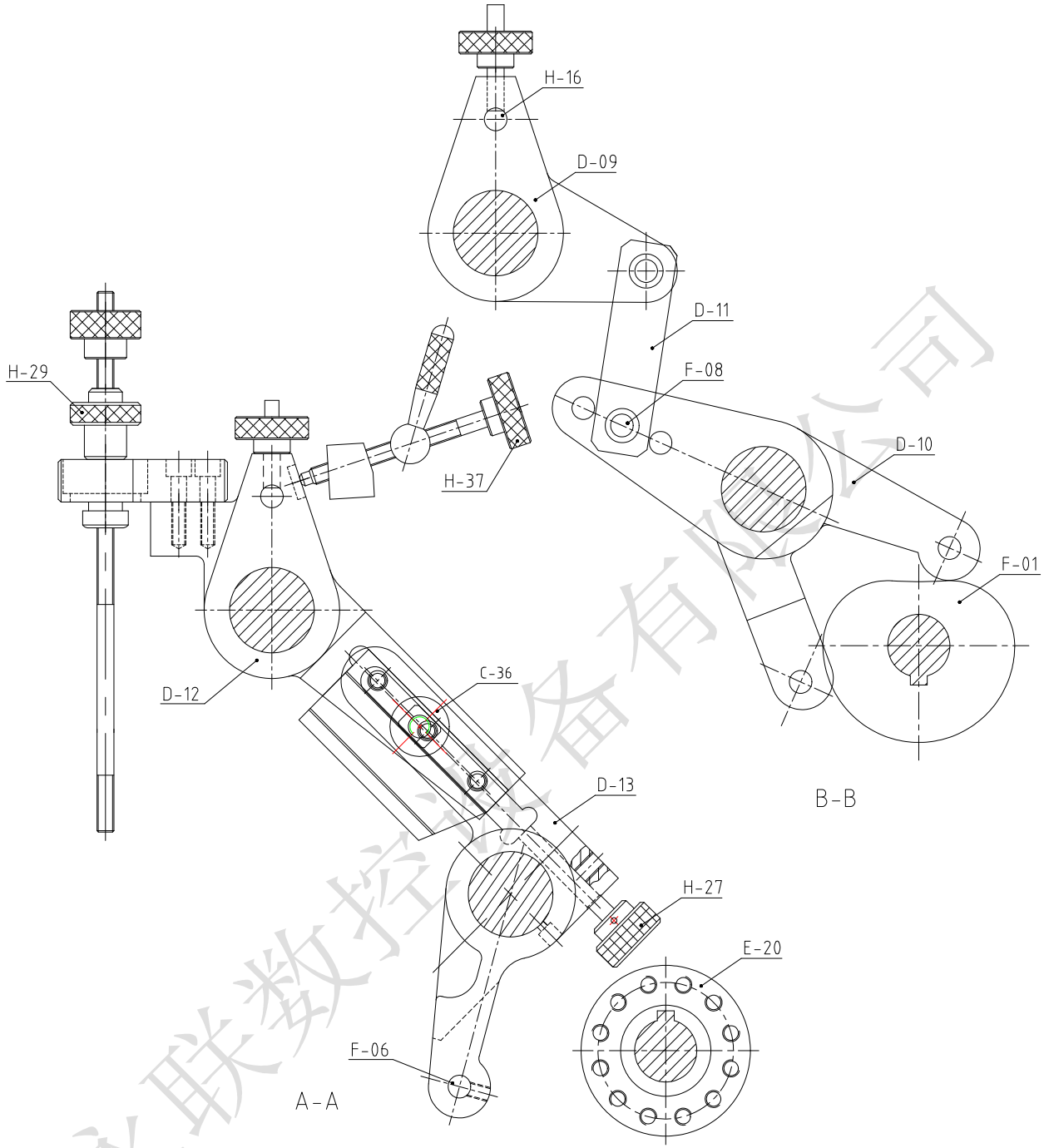
The pitch cam should be selected according to the spring specifications. The large shape change on the cam is for long springs, while the slower shape change is used to make short springs.

The pitch of the pitch knife can be adjusted by adjusting the lever ratio by

adjusting the lever ratio by adjusting the lever cap (H-27) in Fig. 9 to move the pitch lever small slider (C-36). The front position of the pitch knife can be changed by (H-27), and its retracted position can be limited by the pendulum adjustment screw (H-37).



（ Figure 8）



（Figure 9）

VVII Adjust the pitch according to the parallel direction of the spring axis:

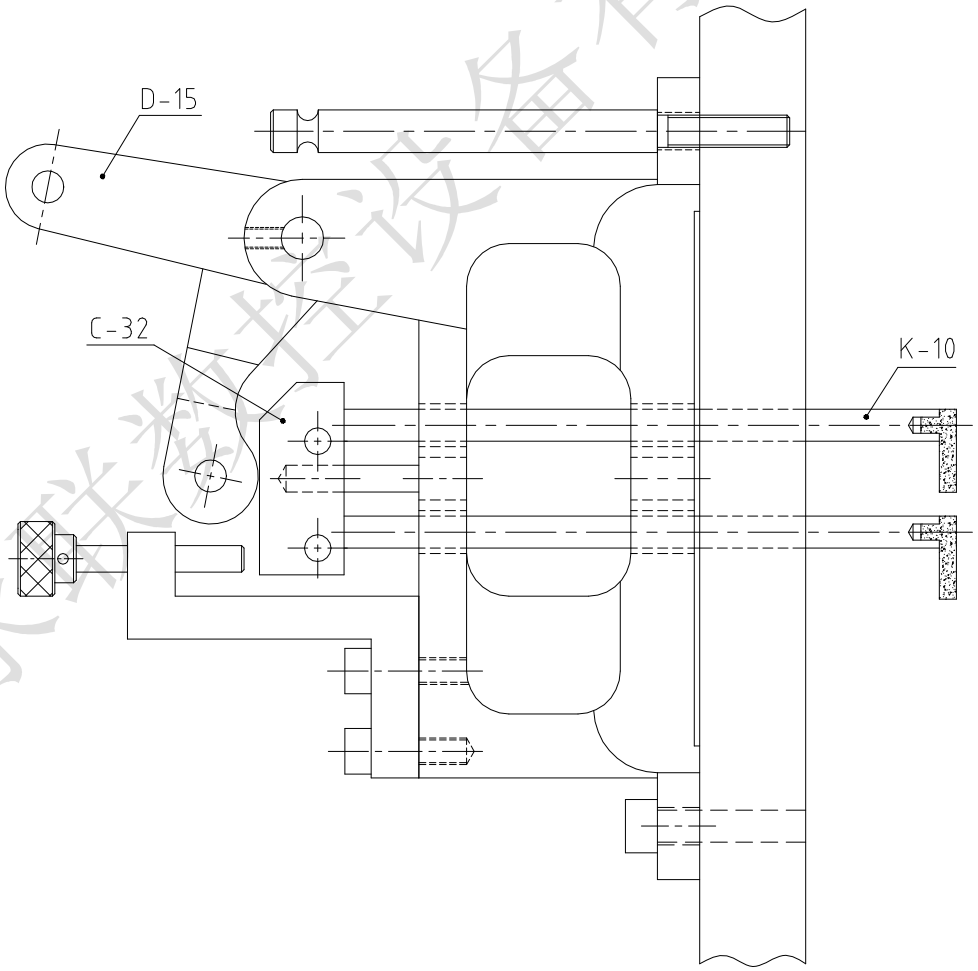
When winding a large pitch spring, it is advisable to adjust the pitch in parallel with the spring axis.

The two-pitch tool (K-10) Figure 10 is fixed on the pitch push-axis push

block (C-32), and the upper cutting distance lever and the rocker shaft pitch fine-adjusting lever (D-12, D-13) are driven by the spacing cam. Figure IX and the pitch push lever (D-15) are shown in Figure 10. The lever lever (H-16) must be secured to the (D-12) center to adjust the pitch of the spring axis in the vertical direction.

The position of the pitch tool is adjusted by the spacing lever adjustment nut (H-29).

Note: It must be remembered that this spacing tool should be in the rear position when cutting, to avoid the cutter hitting the tool.



（ Figure 10）

VVIII Cut off：

The coiled spring must be cut off at the end of each cycle of operation. The cutting operation is controlled by the cam. The return stroke of the cutter is on the cam instead of the tension spring. Therefore, the possibility of the cutter return failure is avoided.

The cutting is made up of three phases of the mandrel (K-07, Fig. 3) and the movable cutter (K-08). Due to the considerable stress, the mandrel is slightly smaller than the inner diameter of the spring. According to past experience, the outer diameter of the spring can be cut even when the outer diameter is five times larger than the wire diameter, but the five times is the limit of the cutting condition.

The mandrel is located in the mandrel tool holder and the mandrel tool clamping plate (C-27, C-28) in Figure 11 and is fastened by a universal screw (H-38). This mandrel holder can be adjusted to the forward position by the mandrel lever adjustment screw (H-41) in Fig. 12, and then retracted by the spring force. The mandrel adjustment slide (C-25) can be adjusted in the vertical direction by rotating the mandrel upper and lower adjustment nut (H-22) together with the mandrel holder and the mandrel.

Cutter (K-08) Figure 3 is located in Figure 8 of the cutting slider (C-03). It can be adjusted by the cutter adjustment pad (H-11) and the two fixing screws. When the incoming line is stopped, the cutting operation is controlled by the cutting cam (F-01), the upper cutting shaft cam lever, and the rocker shaft cam

lever (D-9, D-10). The shorter the stroke of the cutter, the better. It can be adjusted by changing the position of the cam lever link (D-11) and the cam lever link pin (F-08). The front and rear positions of the cutter can be adjusted by turning the adjusting nut (H-03). The front position of the cutter is preferably a small distance with a cutter that exceeds the mandrel.

The upper or lower slider can be moved by moving the lever pull pin (H-16) on the upper cutting shaft cam lever (D-09). When the right-handed spring is wound, the cutting is performed from above, and the lever pull-out is inserted backward into the joint lever pull pin (H-16) on the left side of Figure 8. When the left-handed spring is wound, the lever pull-out is inserted forward. In the left and right rotation levers (D-07) of the cutting shaft, the cutting is performed from below.

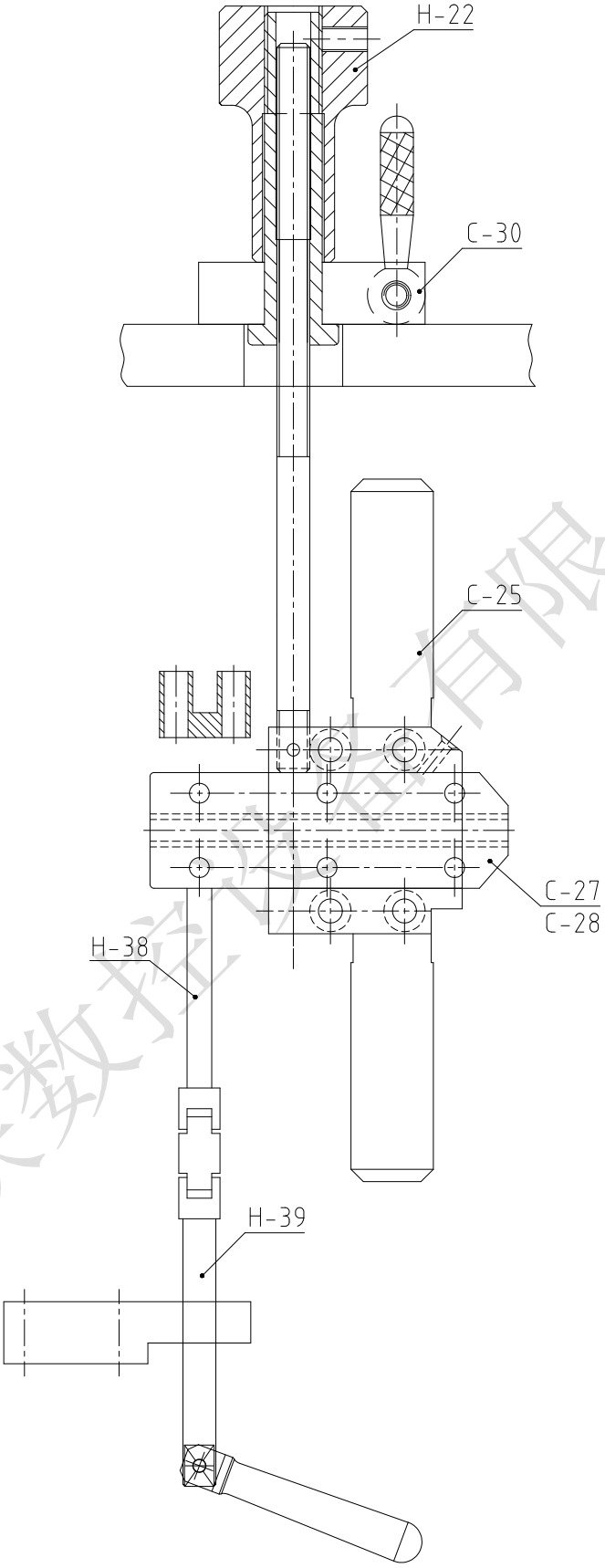
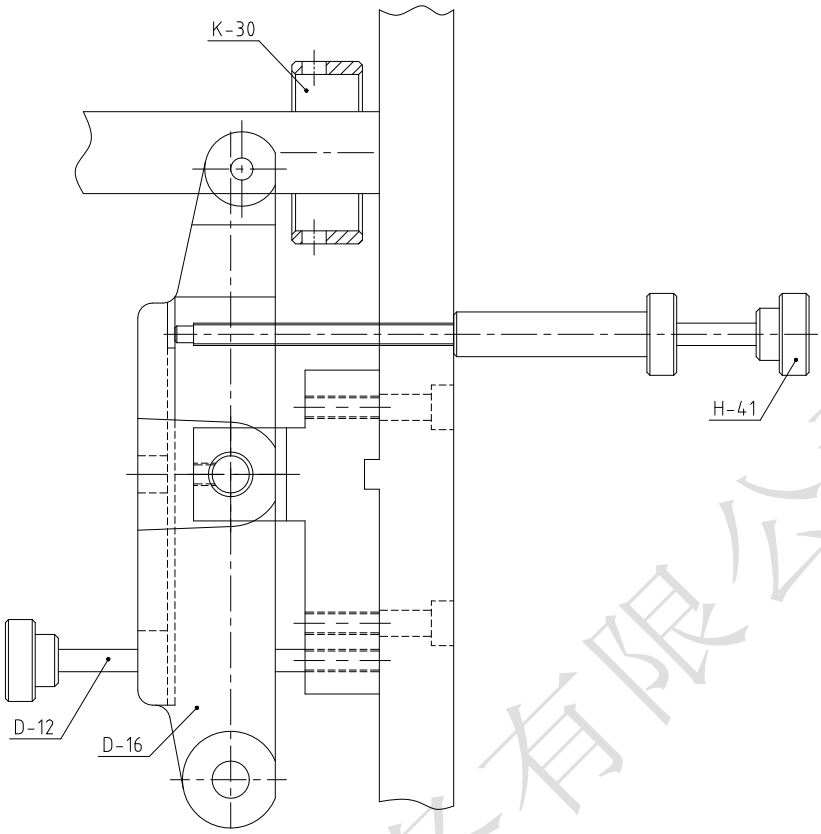


Figure (11)



(Figure 12)

X Mandrel moving device:

When manufacturing a double cone, a center cone, and a waist spring, the mandrel must be displaced.

Fixed to mandrel tool holder, mandrel tool clamping plate (C-27, C-28). The cutting mandrel in Figure 11 is operated by the cored cam piece (K-30) when the spring winding is performed. The mandrel adjustment lever (D-16) moves it out of the circle plane. When the spring is turned off, the mandrel is pushed forward briefly. Note: When using this mandrel device, the mandrel lever adjustment screw (H-41) should be rotated backwards and no longer in contact with the mandrel adjustment lever (D-16).

XV Left handed circling spring device:

When winding the left-handed spring, the circle is downwardly deployed. The left-handed curve gauge should be installed to replace the right-handed curve gauge. The cutter is placed in the lower slider and the spacing knife is installed in the upper slider.

The double cone spring aid is selected for the right and left direction coil springs. The variable-diameter rocker arm, the variable-diameter short-rocker arm (D-02) and (D-04) Figure 7 must be changed to the small-diameter rocker arm under the camshaft, the universal joint screw (H-12), (H-39).

XVI. Adjustment:

When the wire feeding roller, the wire guide, the winding ejector and the mandrel are installed according to the wire diameter or the outer diameter of the spring, it can be started. In order to effectively perform the first winding, the tip of the winding ejector should be adjusted to larger spring outer diameter position. After the wire passes through the straightening device, the wire feeding roller and the right wire guide, the wire end should be formed into a ring with a rounded wrench and placed in the groove around the circle, and the wire feeding device can be used. Press it tightly, but this pressure is enough to bring the wire into the machine smoothly.

Turn the hand wheel to introduce the wire and adjust the coil to achieve the desired spring outer diameter. If necessary, simultaneously turn the circle-reducing tool holder (C-24) Figure 6 to reduce the short arm (D-04) to correctly position and adjust the position of the winding tip.

XVII compression spring:

When manufacturing a compression spring with a tightly wound end, the winding tip should be properly adjusted so that the coils of the spring are aligned without creating a pulling force. The pitch of the spring is obtained by the spacing tool.

2、 Adjustment of cylindrical spring:

a. Install the required wire feed roller and adjust the pair of wire feed rollers to make them contact each other (no wires can be inserted).

b. Install the wire guide with the cover and move it in the direction of the wire feed roller until the guide plate touches the wire feed roller. Then return it to about 0.5 to 1 mm (avoid touching the wire feed roller during operation).

c. Install the mandrel knives; the size of the mandrel knives should be determined according to the diameter of the spring. The protruding part of the mandrel knives should be 0.5mm smaller than the inner diameter of the spring, and the buffing length of the bulging part is about two of the corresponding wire diameters. Times.

d. Adjust the right wire guide between the wire feeding roller and the mandrel knife. When winding a thin wire, the gap should not exceed 0.2 to 0.3 mm. The other end of the wire guide is made straight. If a small spring is machined, the right angle of the wire guide near the mandrel blade should be cut to about 45 degrees (the upper part is cut when the right-handed spring is wound; the lower part is cut when the left-handed spring is wound).

e. Install the guide cover. Be careful not to touch the moving parts.

f. Adjust the screw (H-41) through the mandrel lever. Figure 12 Adjust the mandrel holder so that it is about 1 mm beyond the holder. Align the mandrel knife with the wire guide and lock the clamping block (C-30).

g. Insert the pitch knife. In general, use a 45-degree knife (a 30-degree sharp knife when winding a thin steel wire). Move the pitch knife 5 mm beyond the edge of the wire guide. Adjust the compression screw so that the pitch knife contacts the wire guide, but it should move freely. When installing the cutting knife, it should be noted that the cutting edge of the cutter should be consistent with the edge of the mandrel. Adjust the cutter stroke so that the stroke above the mandrel cutter does not exceed twice the wire diameter.

h. Check the technical requirements of the spring to be wound before installing the ferrule. If the thin steel wire is to be wound, the excess part of the front end of the ferrule and the excess of the groove should be worn away, and the edges of both sides of the groove should be curved. If the outer diameter of the spring is less than 4 mm, the front end of the ferrule should be pointed.

i. Approximate adjustment of the length of the incoming line, check the number of turns. Adjust the exact length of the incoming line.

j. Install the pitch cam and adjust to the desired tail loop.

2. Adjustment of the unit cone spring:

When manufacturing a conical spring, the winding should start from the smallest outer diameter of the spring. The roller on the variable diameter short

arm (D-04) Figure 7 is located at the highest point of the cam plate. When the spring is coiled, the roller is drawn at the lowest point (large spring outer diameter) of the lower arc between the cam plates.

The half turn of the two winding ferrules is the beginning of the next spring, so the cam plate has a large raised arc shape, which allows the ejector pin to quickly reach the minimum spring outer diameter while stopping the incoming line. The spring is cut at this point from the completion of the large outer diameter to the point at which the small outer diameter is to be started.

3, double cone spring

When manufacturing a double-cone spring with tapered ends, the variable-diameter short rocker (D-04) is driven by the highest point of the deformed cam to the lowest point during the winding process. If the central portion of the spring is cylindrical, the deformed cam should have a concentric portion between the arc and the arc.

4, waist spring

When winding a waist spring that is biconical toward the center, the mandrel must move away from the winding plane as it is wound, for which purpose the mandrel moving device must be attached.

XVIII Electrical operation and maintenance:

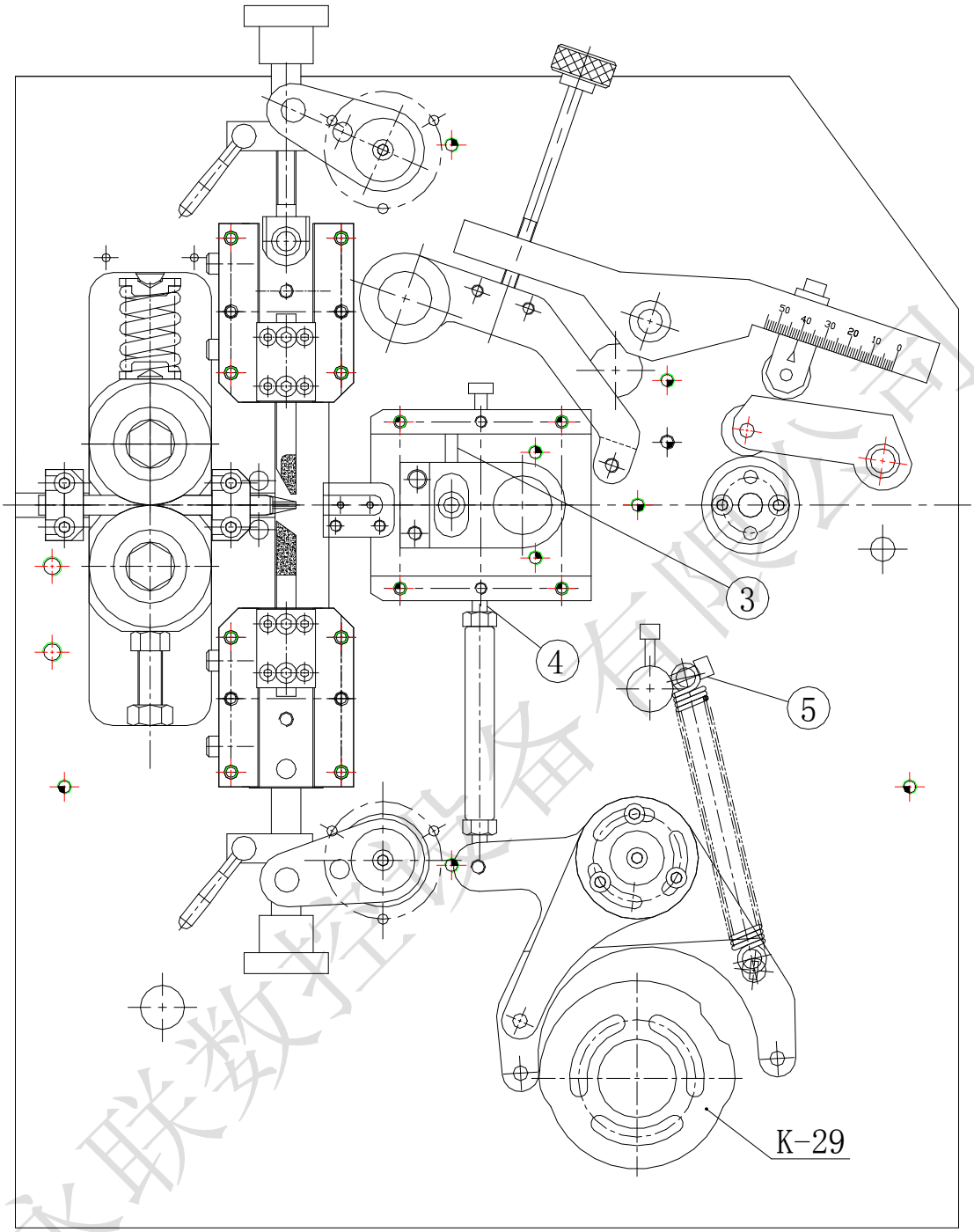
1、Fault switch: When the feeder rack fails, the computer automatically stops.

2、Carry on wire feeding and continuous line (fast compensation).

A toggle switch is provided on the lead frame of the wire feeder for controlling the continuous or continued rotation of the wire carriage motor. When the switch is turned to the continuation position, the micro-switch is pulled by the rolled steel wire of the machine, so that the wire feeding motor continues to rotate. When the switch is turned to the continuous position, the wire feeding frame will continuously rotate and release the line at the set speed. And it can automatically continue to accelerate the pay-off when the pay-off is not timely, and the pay-off speed is controlled by the speed control knob next to the switch.

XVIIII torsion spring device: user selection

In addition to the above-mentioned various types of springs, this machine has specially designed a set of torsion spring devices for users. That is, with a tail-shaped spring. Figure 13 shows the transmission components of all the torsion spring mechanisms. In the knife holder slider, a knife holder is installed, the cutter is equipped with a cutter, and the cutter seat is mounted on the right side. The tail rod can be moved up and down through the connecting rod to make a single tail piece. The specific installation method is shown in Figure (14). A torsion spring cam (K-29) should be attached to the spring cam (E-20).



（Figure 13）

The standard spring slide device replaces the right torsion spring slide device:

1. Remove the three fixing screws on the standard spring slide (No.

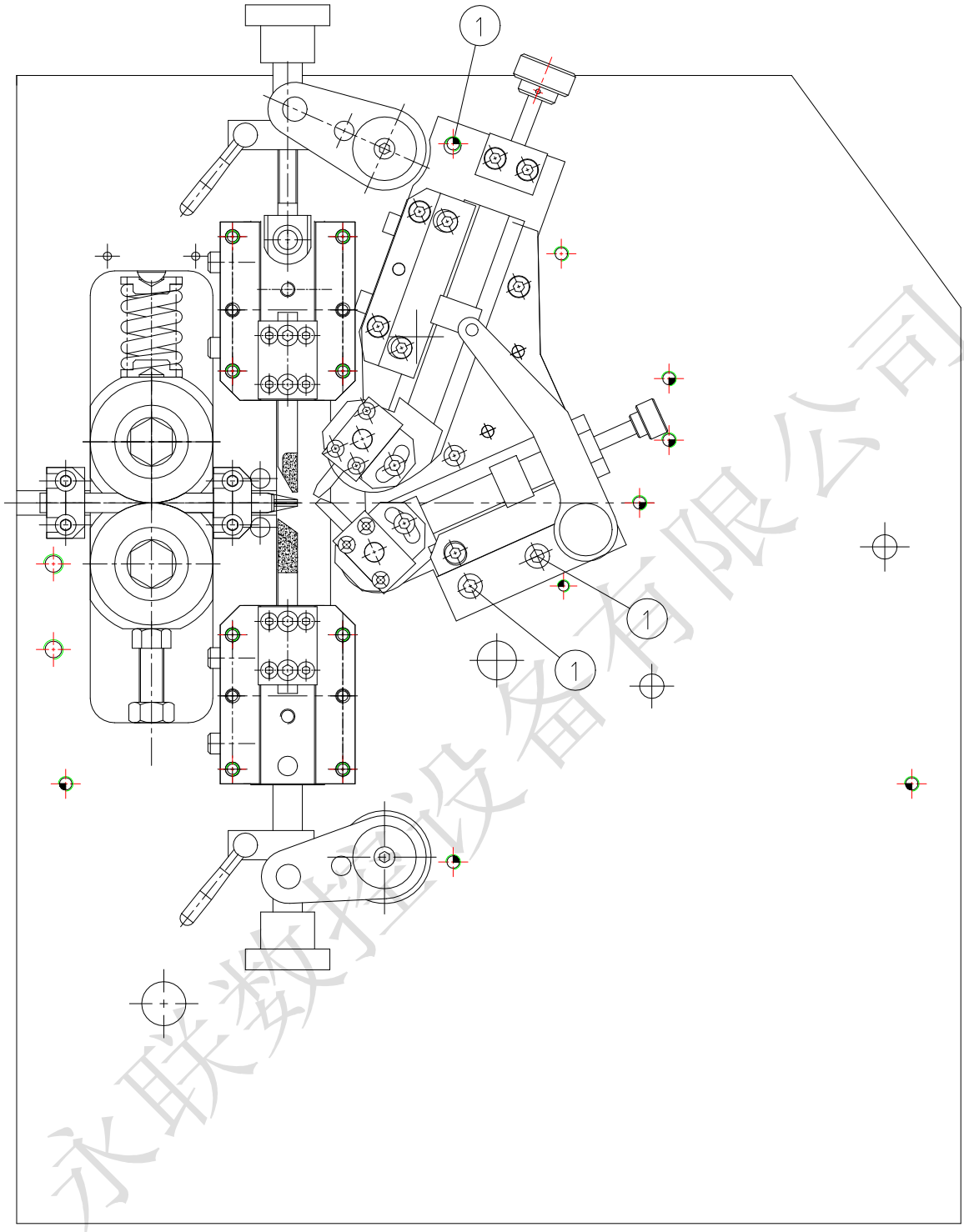
2. Install the torsion spring slide to tighten four screws (No. 2)

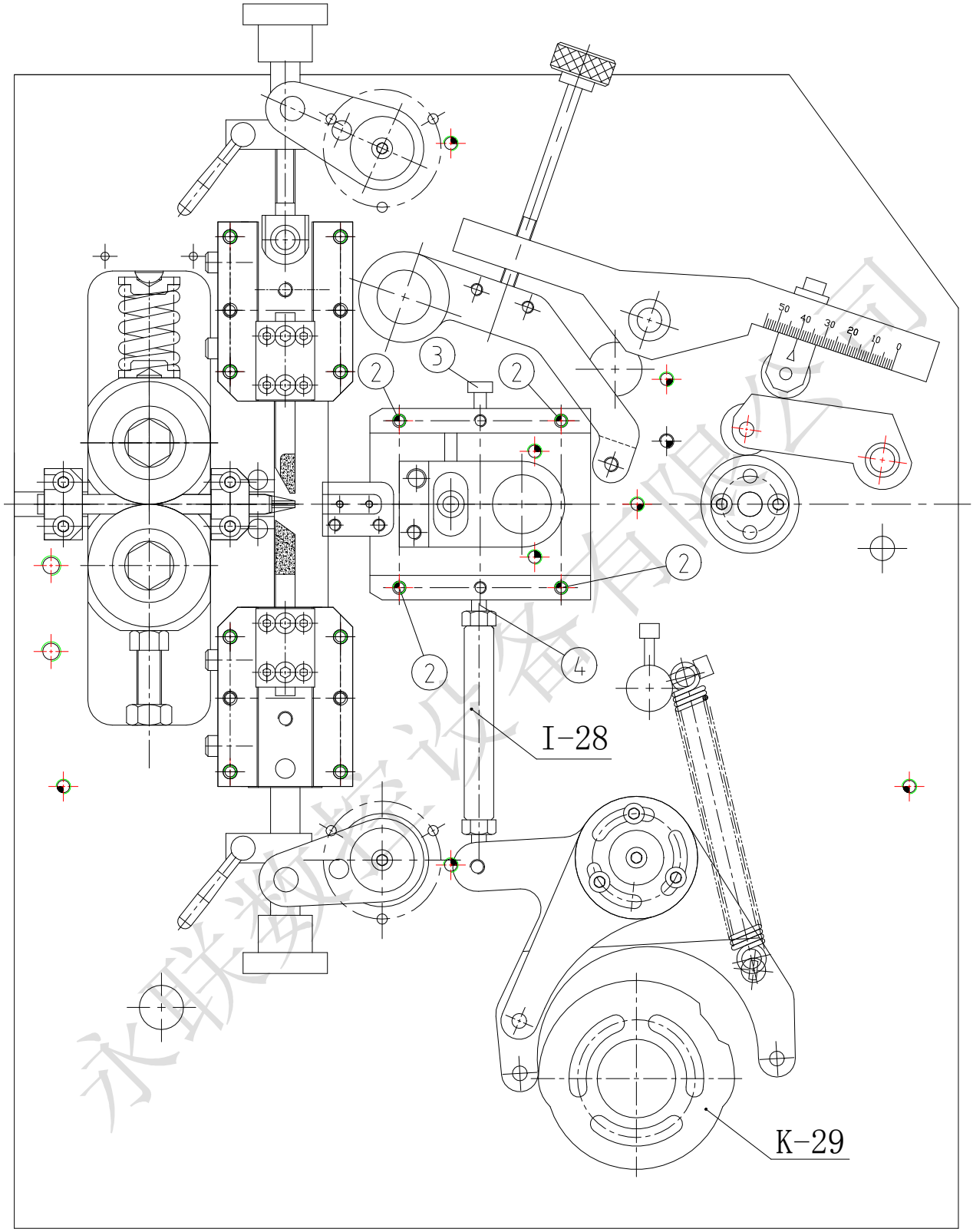
3. Install the reverse hex joint (I-28) for the torsion spring and the main part

torsion spring cam (K-29)

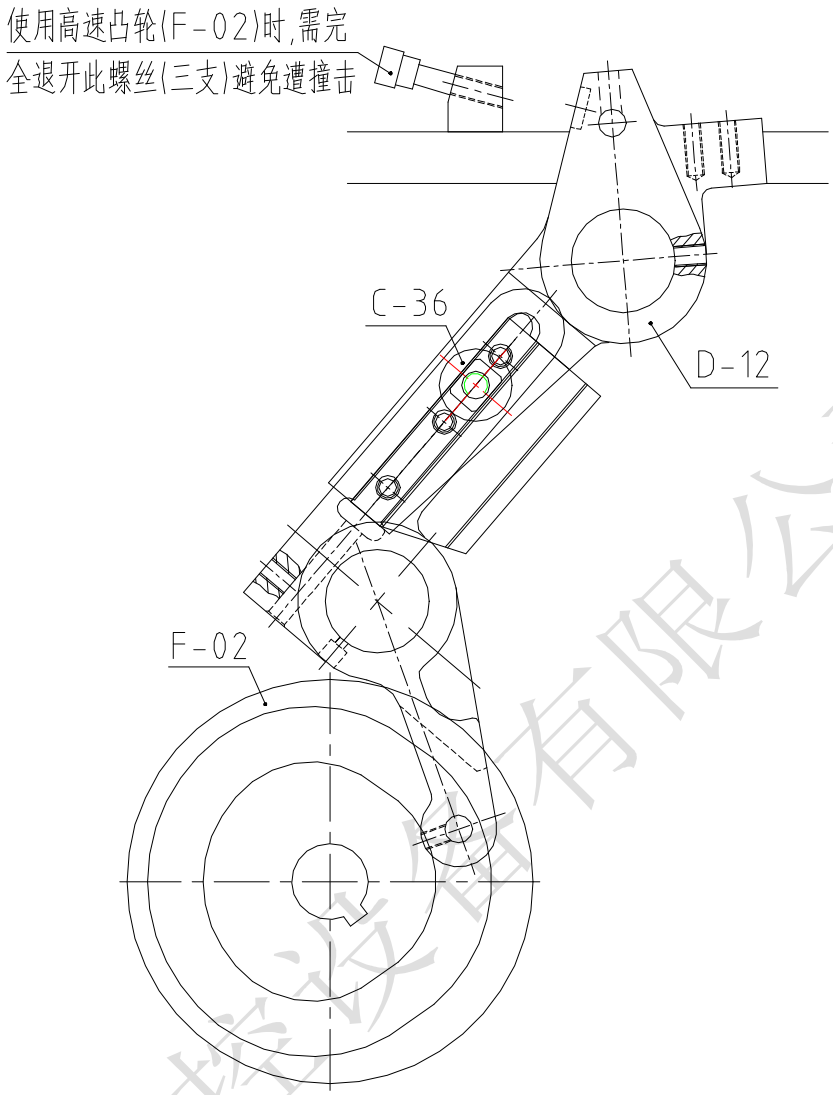
4. Loosen the screw of No. 3, and the principle that the screw is not pointed at the highest point of the cam (the highest point of the cam) is the principle.

5. Loosen the screw of No. 4, and the principle of non-collision clearance knife is the principle when the demolition knife seat is returned (the lowest point of the cam).





（Figure14）



（ Figure 18）

XX, High-speed cam using method:

This high-speed cam is mainly used for the spring pitch. When using various compression spring pitches, the round-axis pitch cutter should be used, and the inner cam (F-02) can be used to adjust the pitch of each type with the (C-36) pitch lever small slider. When making the spacing spring, you should pay attention to whether you use the left or right rotary knife. The customer can modify the left and right rotation pitch according to the specific conditions to work.

XXI safety, maintenance, maintenance

1、The machine must be maintained in use to maintain stable accuracy and service life for a long time. The operator must inject the oil in the lever bearing every 3 days when starting the machine. The slides and chutes on the base panel are lubricated with 6CB9 per day. Once or twice, the surface and surrounding dirt should be removed after work.

2、 When rolling the spring, be sure to follow the specified wire diameter. Do not increase the diameter arbitrarily to damage the machine. When calculating the profile, the same area of the maximum wire diameter can be calculated.

3、 During the working time, the operator is not allowed to reach into the machine, and it is not allowed to extend the iron into the machine to clean the springs and other objects. Because the machine is running fast, pay special attention to accidents. If you find a problem at work, you can stop immediately and then deal with the failure.

4、In addition to keeping clean and hygienic in the studio (computer room), do not directly shine on the machine, do not allow to heat any items indoors, and keep the indoor normal working temperature (between 16 ° and 26 °). There is any dust.

Note: The final interpretation right belongs to the company.