

No. 895,722.

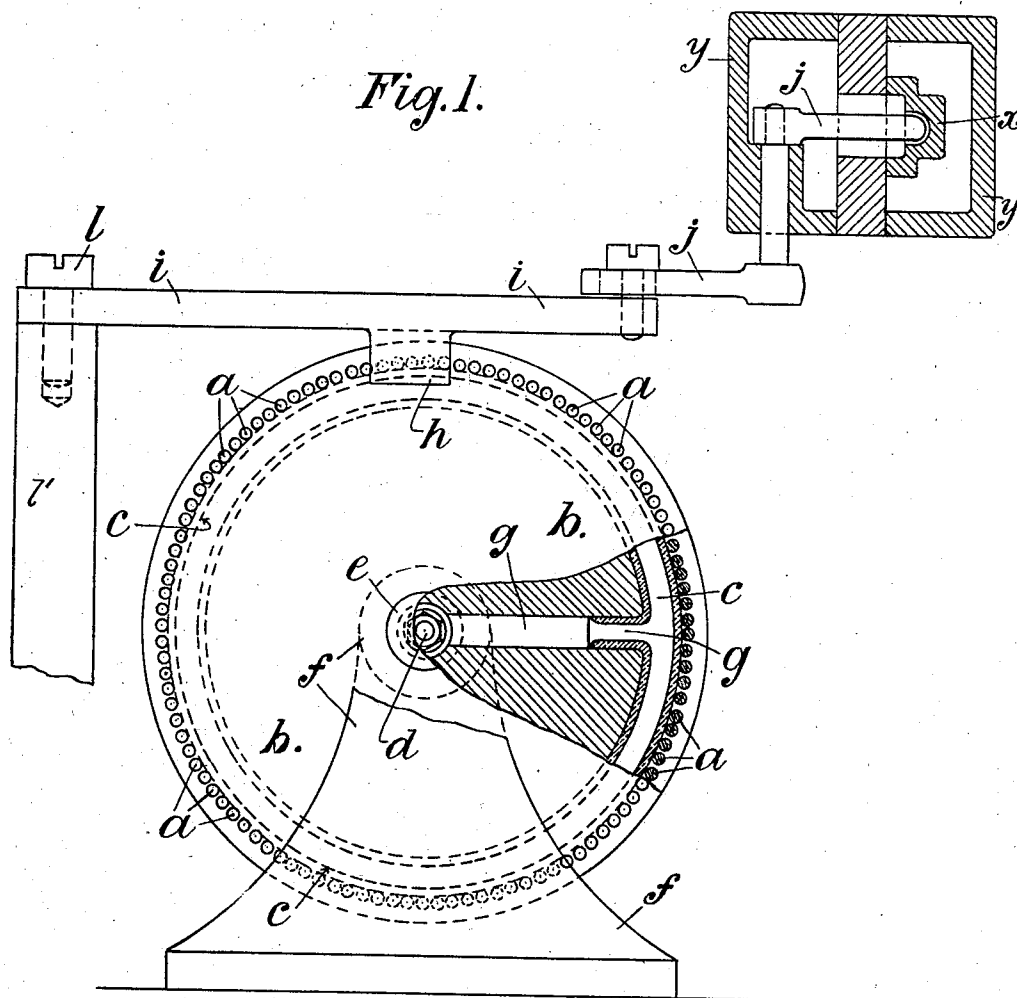
PATENTED AUG. 11, 1908.

W. G. BUNGEROTH.

MECHANISM FOR CONTROLLING THE ACTIONS OF TOOLS.

APPLICATION FILED DEC. 1, 1906.

2 SHEETS—SHEET 1.



WITNESSES

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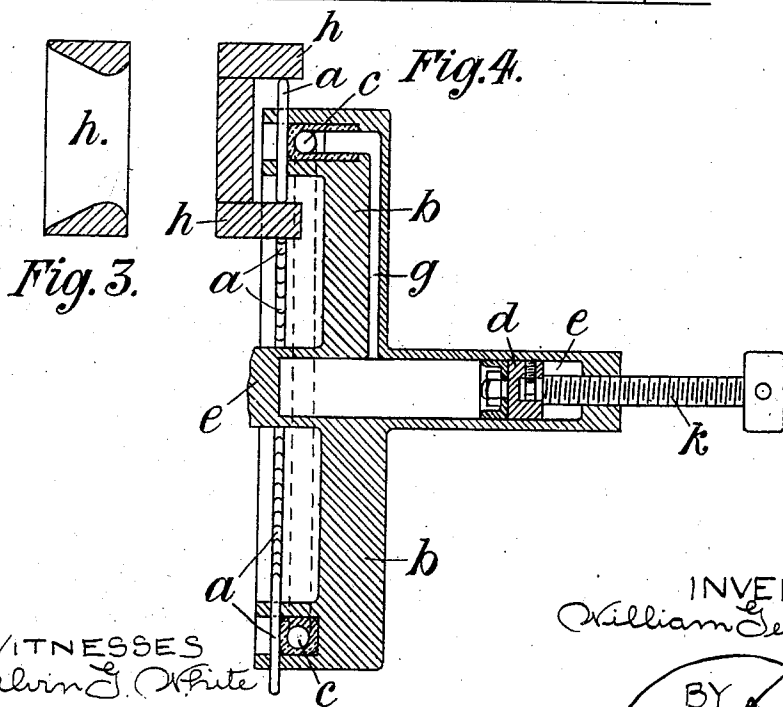
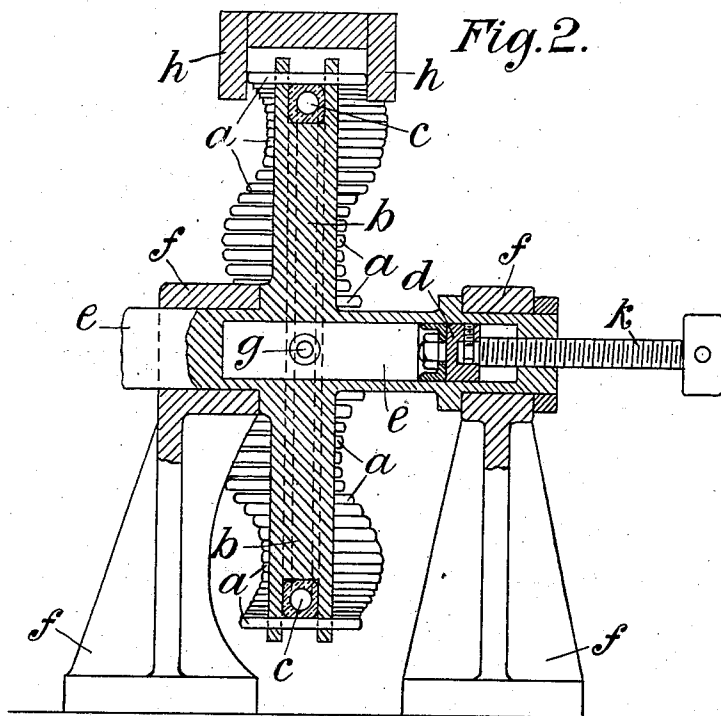
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UNITED STATES PATENT OFFICE.

WILLIAM GEORGE BUNGEROTH, OF LIVERPOOL, ENGLAND.

MECHANISM FOR CONTROLLING THE ACTIONS OF TOOLS.

No. 895,722.

Specification of Letters Patent.

Patented Aug. 11, 1908.

Application filed December 1, 1906. Serial No. 345,916.

To all whom it may concern:

Be it known that I, WILLIAM GEORGE BUNGEROTH, residing at Liverpool, in the county of Lancaster, England, have invented new and useful Improvements in Mechanisms for Effecting or Controlling the Actions of Tools for Lathes, Milling and Profiling and Similar Machines, of which the following is a specification.

10 This invention has reference to means or mechanisms for effecting or controlling the actions of tools or lathes, milling machines, profiling and other machines, using cutting tools for cutting or acting upon metal or hard materials; but for convenience, it will be mainly described as applied say to automatic lathes or screwing machines, and like machines, where metal has to be operated upon by a plurality of cutters, which receive movement in relation to the work, in certain orders, and of certain characters.

One of the chief objects of the present invention is to provide a mechanism or means by which such lathes or machines can have the operative parts which control or effect the action of these several tools of a kind and construction or character, which will enable the required movements, and time of movement, of the tool carriers or slides to be set or changed from one order setting and sequence of movement to another, and with very little expense; and at the same time, to provide an inexpensive machine, and so to provide machines which are economical as regards the first cost, and can be economically used for or in connection with the manufacture of small numbers of identical parts or articles as well as large numbers.

The type of mechanism of the kind referred to for effecting or controlling the actions of the tools, is that in which a fluid, preferably a liquid or electricity, is employed to move the tool rests or carriers; as, for instance, hydraulic rams and cylinders, to which water under pressure is admitted by valves at the required times, such rams and cylinders being connected up with and adapted to operate the said tool carriers or rests.

In the drawings, Figure 1 is an end elevation partly in section illustrating parts of the apparatus hereunder; Fig. 2 is a longitudinal section of same; and Fig. 3 is a section of a detail. Fig. 4 is a sectional elevation showing a modification.

55 The drawings show a cam according to this invention, for actuating a valve or valves

controlling the supply of liquid to and from a hydraulic cylinder or cylinders, connected with and adapted to operate the tool carrier, slide, or other part of the machine which has to be moved. The said hydraulic cylinder or cylinders for operating the tools or parts, not constituting a part of this invention, are not shown, it being assumed they are known things. They may be operated in one or both directions hydraulically, or in one direction hydraulically, and in the other, that is, the return action, by a spring. One of these cam devices or mechanisms would be used of course in connection with each hydraulic cylinder of the tool or part of the machine to be moved. These cams by which the required motion of the distribution valve of the hydraulic cylinder is operated, to actuate the ram of such cylinder at any desired moment or moments in the cycle of operations, and produce the character of movement required, consist of a number of readily adjustable or movable parts, preferably in the form of short rods *a*, set closely together in a ring, as shown, and carried in the cam carrier *b* in the form of a disk or wheel, in which they can be readily shifted, so that their edges or ends may be made to take any particular form, such as an irregular form—an instance of which is given in Fig. 2—to produce the variable movement, or a regular one; and these parts, *a*, are adapted to act upon and move a hydraulic valve *x* referred to, as hereinafter described. Thus, according to the positions in which these rods or pieces *a* are set and fixed on the cam *b*, so will be the time of movement of the hydraulic ram they are to control the action of, and the character of the movement or movements.

The cam shown in the drawing is of the form of a rotary disk, having a groove in it at the periphery, in which a tube of rubber, or rubber and canvas, or the like is disposed; while the rods *a* are passed through holes in the edges of these disks, outside the tube *c*; and they are gripped and held by being forced against the metal surrounding the outer part of the holes through which they pass, by forcing fluid into the tube *c*; this fluid being so forced, in the case shown, by a ram *d* working in a cylinder *e*, which constitutes the hollow shaft carrying the disk *b*, such ram *d* being pressed up by a threaded rod *k*, which screws through the end of the hollow shaft. The shaft *e* itself is supported in suitable bearings *f*. Thus, by

forcing up the ram *d* and rod *k* into the cylinder *e*—the tube *c* being connected by a passage *g* with the cylinder—any desired pressure can be created and maintained in the

5 holding or gripping tube *c*.

When the cam rods *a* have been set so that their edges take the required form to give the movement to the valve *x* required, and gripped as described, the cam is in the condition ready for use.

10 In action, the ends of these cam rods *a* act on two sides of a jaw *h*, formed on a lever *i* hinged at *l*, and operating the valve *x* which is disposed within a suitable valve box *y*, by

15 a bell crank lever *j*, one arm of which is connected with, and operated by the end of the lever *i*, and the other lies within the valve box *y*, and operates the valve *x* by its end, which lies in a suitable recess in the under-

20 side of the valve. Obviously, as the valve *x* (which distributes water to and from its cylinder which operates the tool or other part of the machine) is so moved by the cam, it will cause the said cylinder ram to be

25 moved.

The inside surfaces of the jaw are formed as shown in Fig. 3, that is, they taper inwards from the entrance end as shown, which is the widest end.

30 In the construction shown in Figs. 1 and 2, the cam pins *a* are shown horizontally arranged in the periphery of the wheel or disk *b*; and the modification in Fig. 4 consists merely in arranging these cam pins or rods *a*

35 vertically in the edge of the disk, the groove in which the gripping tube *c* lies, in this case being provided in the side of the periphery or edge of the disk, which is flanged out as shown.

40 In connection with the valves or moving parts, a suitable handle *l'* connected to the lever *i* may be employed to set the cam parts or rods *a* in the required position prior to using the machine for some particular job.

45 Namely, by moving this handle so as to move the valve *x* and the lever *j* in the required way, to give the required action of the tool carriers or slides, or parts to be operated by the hydraulic cylinder, it also operates

50 upon the cam devices or rods *a* through the jaw device *h*, which presses them or moves them to the required degree or extent within the edge of the wheel *a*; so that afterwards,

when these parts are fixed in position, they will repeat on the valve operating part and 55 valve, the motion and setting which are imparted or given to them in being set by hand. Thus, in one action, these cams can be set or formed to the exact setting required, following the motion of the hand operation referred 60 to. Then, afterwards, when set and fixed, they will repeat this action on the machinery.

In some machines where a number of tool holders or carriers are employed, such as in capstan lathes, several cams and sets of 65 valves in the valve pressure supply and discharge chests, would be employed with their operating hydraulic cylinder and ram in connection with each tool carrier or slide.

The operating hydraulic cylinder may act 70 on the tool carriers or slides directly, or indirectly through rack and tooth gear, or any suitable motion transmission means.

What is claimed is:—

1. An adjustable cam comprising a wheel, 75 pins adapted to slide through it, and means for simultaneously engaging with each individual pin for holding the same in any desired position.

2. An adjustable cam comprising a wheel, 80 pins passing transversely through it, and means engaging with the pins for simultaneously locking them in any desired position.

3. An adjustable cam comprising a wheel, 85 pins passing transversely through the periphery thereof, said pins having sliding movement and hydraulic means for binding the pins in place.

4. An adjustable cam comprising a wheel, 90 a plurality of pins passing transversely through the periphery of the wheel, a cylinder carried by the wheel, a hand operated piston in said cylinder, an elastic tube on the wheel adjacent to the pins whereby on the 95 operation of the piston the tube is expanded by the contents of the cylinder and the pins held in place by the pressure of the tube.

In testimony whereof I have signed my name to this specification in the presence of 100 two subscribing witnesses.

WILLIAM GEORGE BUNGEROTH.

Witnesses:

S. GOODALL,
GUY OKE.