No. 653,494. Patented July 10, 1900.

A. WENZEL.

SCULPTURE COPYING MACHINE.

(Application filed May 22, 1899.)

(No Model.) 2 Sheets—Sheet 1.

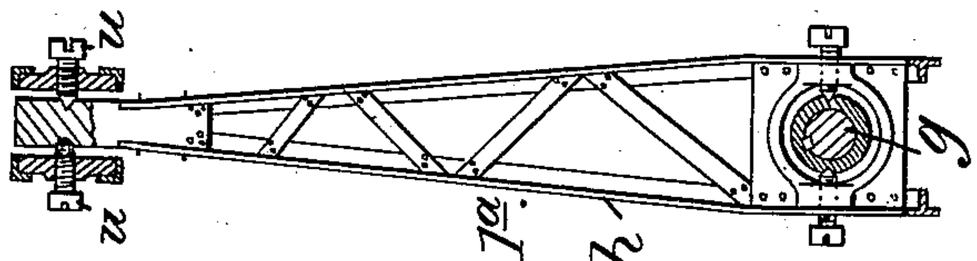

Fig. 1a.

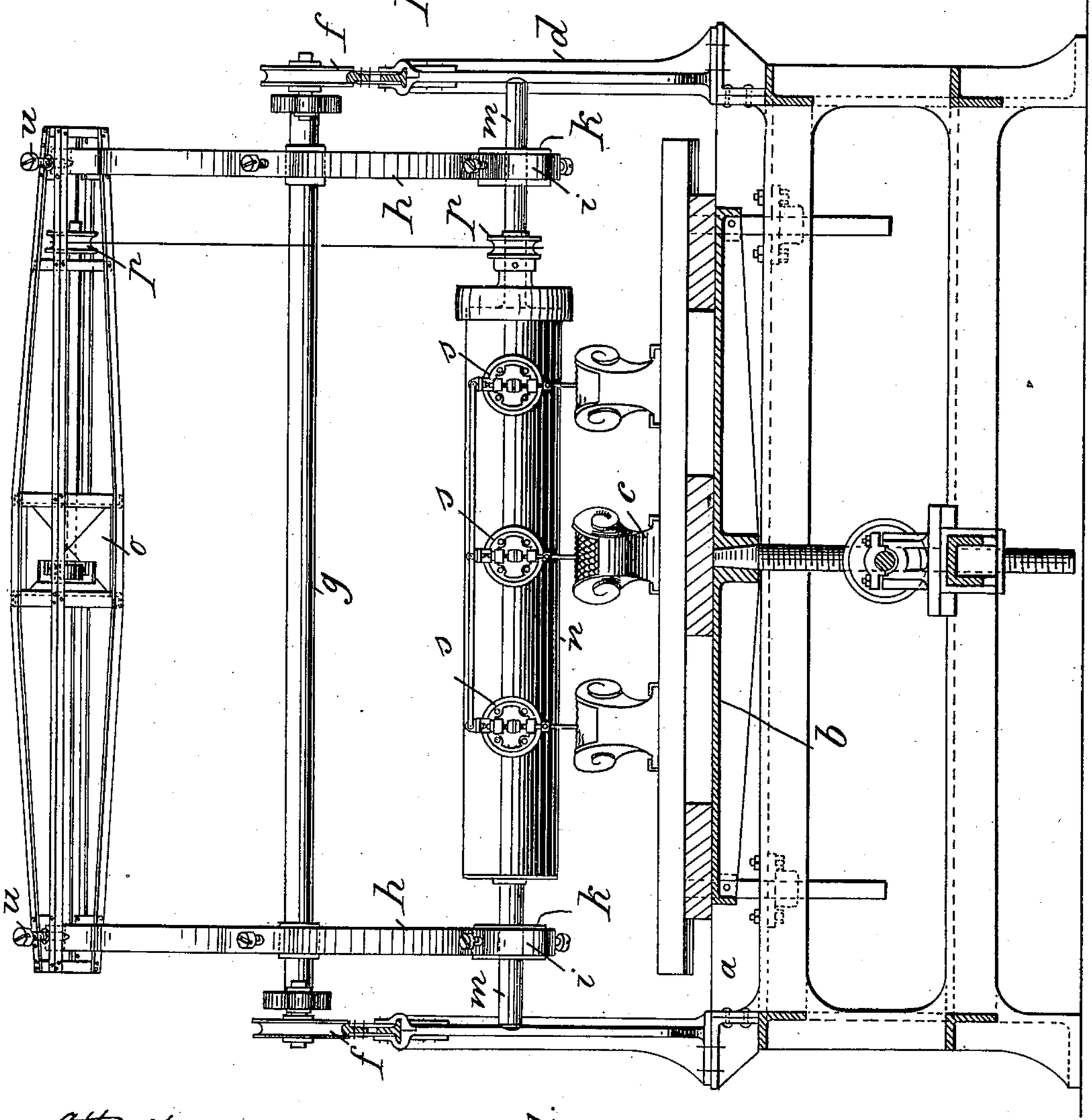

Fig. 1.

Attest

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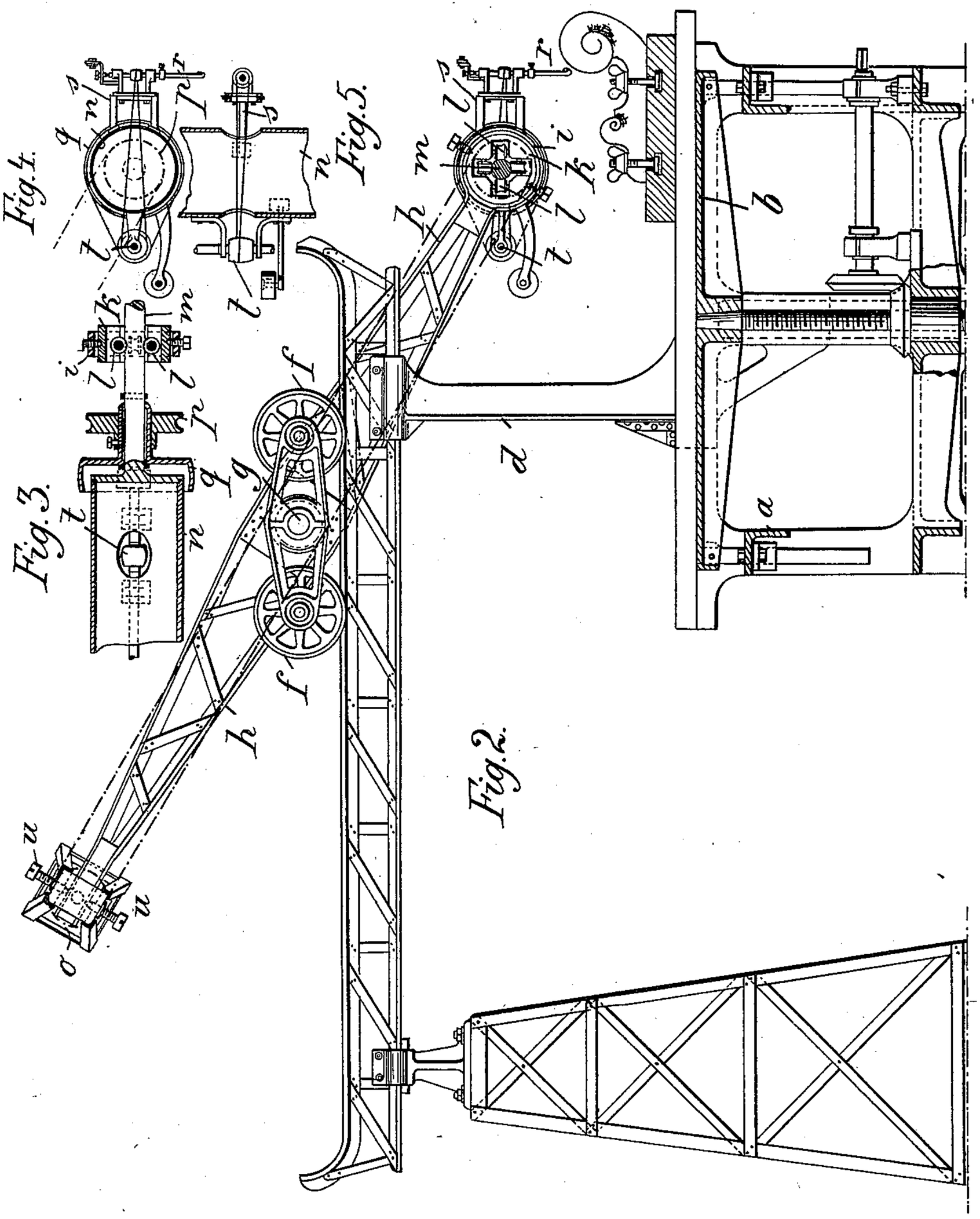

Attest
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UNITED STATES PATENT OFFICE.

ALEXANDER WENZEL, OF BERLIN, GERMANY, ASSIGNOR TO THE PLASTIK, GESELLSCHAFT FÜR HOLZ UND STEINBILDNEREI MIT BESCHRÄNKTER HAFTUNG, OF SAME PLACE.

SCULPTURE-COPYING MACHINE.

SPECIFICATION forming part of Letters Patent No. 653,494, dated July 10, 1900.

Application filed May 22, 1899. Serial No. 717,823. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER WENZEL, of Berlin, Prussia, Germany, have invented certain new and useful Improvements in Sculpture-Copying Machines, of which the following is a full, clear, and exact specification.

The present invention has reference to a machine by means of which several pieces of sculptural work may be copied simultaneously. The work is effected by means of quick-running borers, drills, or other tools, which are mounted on a common frame or shaft, so that they all make the same simultaneous movement. This frame or shaft also carries a guide, which is borne against the copy, following its outline. In consequence of the mutual connection all the tools follow the same lines as the guide and cut the material of the wood or marble work presented accordingly. With the present class of machines it is necessary that the weight of the tools be counterbalanced as exactly as possible, so that the machinist can readily control the guide and tools and press the former more or less firmly against the copy, as may be required. The tools must, furthermore, admit of being moved rapidly in all directions. For this purpose the tool-carrier is here arranged both to turn in its bearings and also to slide in them in the direction of its length. The said bearings are, moreover, contained in a frame mounted on the axis of a carriage, so as not only to rock on the said axis, but to travel to and fro with the carriage. In addition to this the frame itself, instead of being constructed as a rigid body, may be hinged or jointed at the corners. This is done by the connections with the transverse members being made by means of center points or balls instead of by rivets or screws. The frame can thus be given a certain lateral displacement, whereby the tools can be adjusted in the horizontal plane, the carriage being traversed on its rails as required. By turning the frame on the carriage-axis and the tool-carrier in its bearings the tools can be brought into any desired vertical position, and by means of the said pivotal connections of the frame and by arranging the tool-carrier to slide longitudinally in its bearings the tools can also, within certain limits, be adjusted in a horizontal direction. Furthermore, the tools themselves are secured in their holders in slots, so that they can be turned around and set at any desired angle, and thus be able to cut the sides of the work.

On the accompanying drawings, Figure 1 is a front elevation of the machine. Fig. 1ª is a detail view showing one of the arms of the frame and the manner in which it is jointed by center-points. Fig. 2 is an end view of the machine. Fig. 3 shows the construction of the bearings of the tool-carrier, and Figs. 4 and 5 the manner in which the tool is driven.

a is the framework of the table, carrying a rising plate *b*, capable of being vertically adjusted, as desired, by means of a crank and screw-spindle or the like. On this plate *b* is the copy or templet *c* and also the wood, marble, or other blocks which are to be cut. On the framework *a* on either side is a standard *d*, on the top of which rails are supported, on which run the wheels *f f*, mounted on the transverse axis *g*. On this axis is mounted the frame *h*, which rocks on it as a center. This frame comprises the two double arms *h h*, forming at their lower or front ends the bearings *i*. The latter are formed as annular eyes, and each receives a loose ring *k*, Fig. 3, held in place by means of screw center points or ball surfaces. In this ring *k* are arranged the rollers *l*, of which there are three or more. Between these rollers lies the shaft *m* of the tool-carrier *n*, which can be pushed to and fro between these rollers, as desired. The rear or upper ends of the double arms *h h* are connected together to form a bearing for the electromotor *o*, which by means of grooved pulleys *p* and strap drives the belt-pulley *q*, which gives the rotary motion to the tools *r*. (See Figs. 4 and 5.)

The tool-carrier consists of a solid or hollow shaft *n*, to which the tool-holders proper, *s*, and the driving-rollers *t* are secured, so that they may make every movement in common. The attachment of the tools *r* in the tool-carrier is such that they can be readily set at an angle by means of set-screws. The weight of

the tools is balanced by counterweights on the tool-carrier *n*.

Instead of a rigid connection the tie which connects the rear upper ends of the arms *h* *h* and forms the bearing for the electromotor can be connected with the arms by means of center points or balls *u*, as shown in Fig. 1ª, so as to form a joint. In this case the double arms are likewise connected by center-points or the like to their shaft or axis *g*, so that here also there is a pivotal connection. The roller-bearings of the front or lower ends of the arms *h* are likewise provided, as already mentioned, with center-points. The arms *h* can not only rock on the shaft *g*, but also be swung laterally and so brought into a position at any desired angle to the said shaft.

The tool-carrier *n* has shafts *m* projecting at either end, sliding in the roller-bearings *i*, so that it can be given a certain lateral displacement. This lateral sliding motion can be so increased by the frame *h* being pushed toward the same side, that the extent of the lateral motion is the sum of that of the arms *h* and of the tool-carrier *n*.

The construction of the machine can be modified by dispensing with the rear ends of the double arms *h* *h* and mounting the electromotor directly on or over the shaft *g*. The weight of the tools and tool-carrier and the like can in this case be balanced by suitable counterweights instead of, as shown on the drawings, the electromotor and its bearings and other parts serving as counterbalance.

I claim—

1. A copying-machine for sculptural work, comprising a framework *a* *d* carrying a vertically-adjustable table *b* for the work, and a frame *h* mounted on the axis *g* of a carriage *f* running on rails above such framework, the front ends of said frame *h* carrying a shaft *m* turning axially and sliding laterally in roller-bearings *l*, and carrying tool-holders *s* and tools *r* and gearing *p*, *q*, *t* for driving said tool, a tie at the rear ends of the said frame *h* carrying a motor *o*, and means for transmitting its motion to the said tool carrier or shaft *n*, said motor and parts being arranged to counterbalance the weight of tool carrier or shaft *n* and parts, all substantially as and for the purposes hereinbefore set forth.

2. A copying-machine for sculptural work, comprising a framework *a* *d* carrying a vertically-adjustable table *b* for the work, and a frame *h* mounted on the axis *g* of a carriage *f* running on rails above such framework, and by means of center-points turning pivotally upon said axis *g*, the front ends of said frame *h* carrying a shaft *n* turning axially and sliding laterally in roller-bearings *l*, pivotally turning in the said frame *h* by means of center-points, said shaft *n* carrying tool-holders *s* and tools *p* and gearing *p* *q* *t* for driving said tools, a tie at the rear ends of the said frame *h* pivotally jointed at each end by means of center-points, to said frame, and carrying a motor, and means for transmitting its motion to the said tool carrier or shaft *n*, said motor and parts being arranged to counterbalance the weight of the tool carrier or shaft *n* and parts, all substantially as and for the purposes hereinbefore set forth.

3. In a copying-machine for sculptural work, a frame traversing to and fro from back to front and capable of turning axially on a horizontal axis or fulcrum, in combination with a horizontal shaft, turning axially and sliding laterally in roller-bearings in the ends of said frame, and carrying tools and gearing for transmitting motion to said tools from a motor suitably mounted on said frame on its axis, all substantially as and for the purposes hereinbefore set forth.

4. In a copying-machine for sculptural work, a frame traversing to and fro from back to front and capable of turning axially on a horizontal axis or fulcrum, and also pivotally about such axis, so as to be capable of being laterally or horizontally displaced, in combination with a shaft *n* turning axially and sliding laterally in roller-bearings, pivotally turning in the said frame by means of center-points, said shaft carrying tools and gearing for transmitting motion to said tools from a motor mounted on said frame or axis, all substantially as and for the purposes hereinbefore set forth.

5. In a copying-machine for sculptural work, a bearing *i* for the tool-carrier, comprising a ring *k* pivotally mounted between center-points and containing three or more rollers *l* between which the shaft of the tool-carrier can turn axially and slide laterally, all substantially as and for the purposes hereinbefore set forth.

In witness whereof I have hereunto signed my name, this 20th day of April, 1899, in the presence of two subscribing witnesses.

ALEXANDER WENZEL.

Witnesses:

WOLDEMAR HAUPT,

HENRY HASPER.