

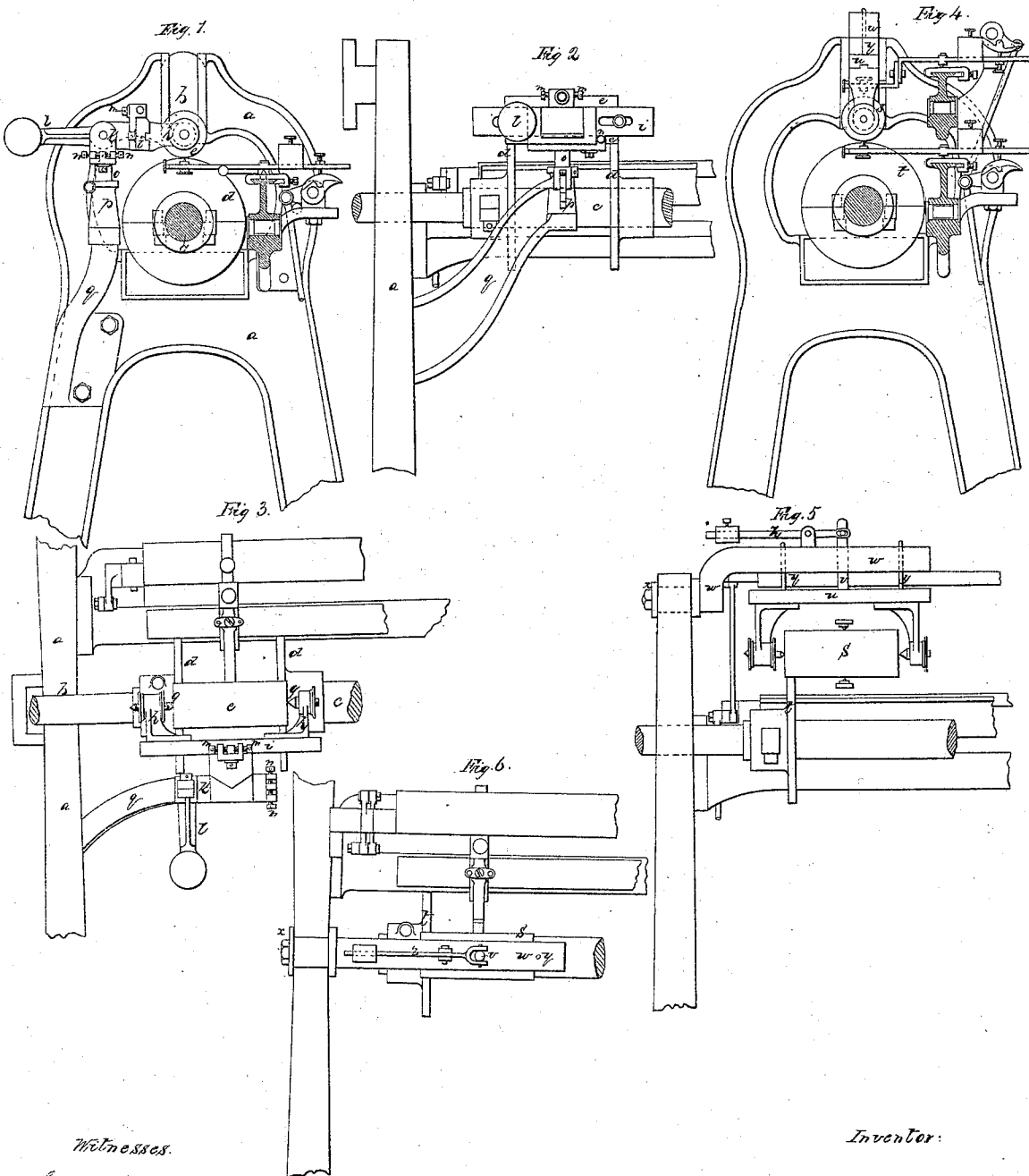
R. Whittam,

Sheet 1 of 2 Sheets

Engraving Machine,

N^o 33421.

Patented Oct. 1, 1861.



Witnesses.

*Edward J. ...
John ...*

Inventor:

Robert Whittam

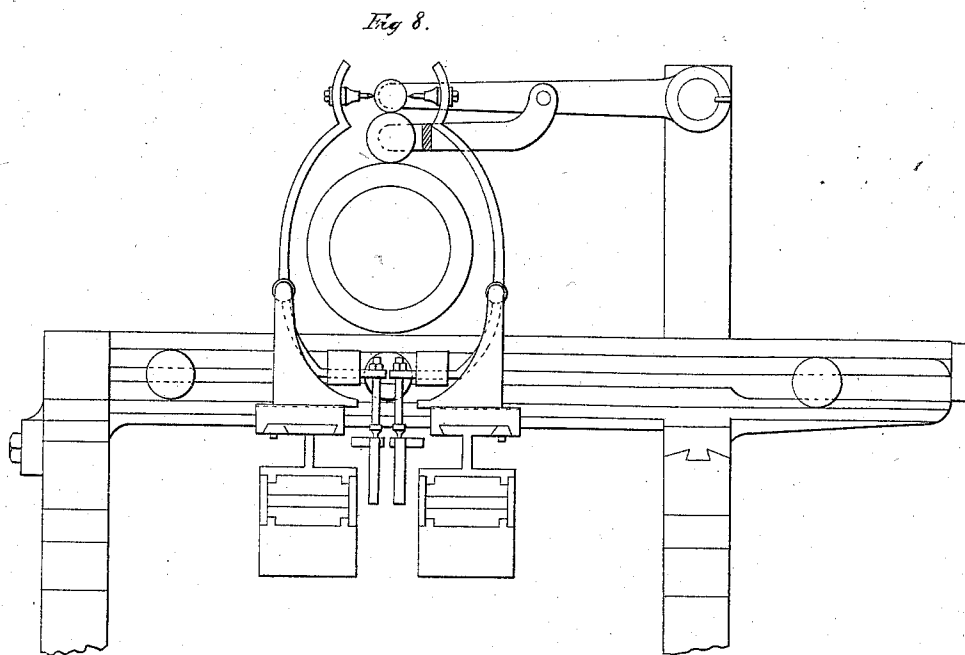
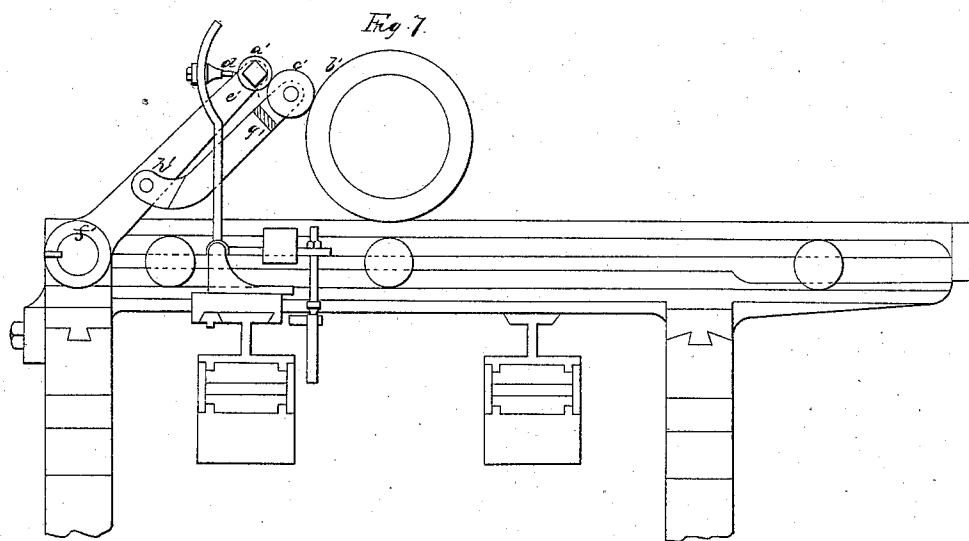
R. Whittam,

Sheet 2 of 2 Sheets

Engraving Machine,

N^o 33421.

Patented Oct. 1, 1861.



Witnesses.

*Edward G. Wright
John H. H. H. H.*

Inventor.

Robert Whittam

UNITED STATES PATENT OFFICE.

ROBERT WHITTAM, OF ACCRINGTON, ASSIGNOR TO JOSEPH LOCKETT AND
ROBERT LEAKE, JR., OF MANCHESTER, ENGLAND.

IMPROVEMENT IN PANTOGRAPH-MACHINES.

Specification forming part of Letters Patent No. 33,421, dated October 1, 1861.

To all whom it may concern:

Be it known that I, ROBERT WHITTAM, engraver, of Accrington, in the county of Lancaster and Kingdom of England, have invented new and useful Improvements in Pantograph-Machines, used for engraving metal rollers or cylinders employed in printing calicoes and other surfaces; and I do hereby declare that the following is a full and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon.

This invention relates to certain improvements intended to be applied to any kind of pantograph-machine employed for engraving designs upon rollers used for printing calicoes and other surfaces, for though there are several kinds of pantograph-machines in existence I wish it to be understood that however much the said machines may differ in their arrangement they are all capable of having my improvements applied to them.

This invention consists in the general application to any pantograph-machine of machinery or apparatus for holding steel or other metallic surface intended for a die and acting upon it in the same manner as the copper roller is operated upon in the pantograph-machine. The principal object of this arrangement for engraving designs upon steel or metal surfaces intended for dies is to enable those who employ the pantograph-machine to engrave part of a design by mill in the ordinary manner and the other part by pantograph, which for some designs is a considerable advantage. Let us suppose there is a design with five colors, which design is well arranged to be engraved by pantograph upon the roller with the exception of one color, this one color being better adapted for engraving by mill in the usual way. In this case all the five colors should be drawn upon the enlarged sketch of the pattern, which is placed in the pantograph-machine in the usual manner, and then the four before-supposed colors should be engraved or traced upon four copper rollers and afterward etched in the ordinary way. That is what I term "pantographing" upon the roller. At this stage of the operations a steel or other metal surface intended for a die is placed in my apparatus, which is arranged for holding the

die in the same position as the copper rollers, so that it may receive in every respect similar motions to those given to the rollers. Then from the sketch in the pantograph-machine is traced one or more sketches of the design on the die exactly in the same manner as if they had required to have been traced on the rollers. The said sketch or sketches are now etched on the die, or they are partially etched and afterward finished by hand, which mode is preferred to etching full strength upon the die. Then the mill is raised from the die in the usual manner and ready to be machined upon the copper roller by the ordinary engraving-machine, and in order that the machine-engraver may engrave the pattern upon the roller so as to fit the aforesaid four colors I place the said copper roller in the pantograph-machine and mark from the enlarged sketch squares on every sketch, both in the width and circumference of the copper roller, which sketches are marked by the diamonds or traces that have engraved or traced the designs on the aforesaid four rollers. Similar squares are also engraved or traced on the die from the enlarged sketch in the pantograph-machine, which squares are raised on the mill, and are intended to fit the corresponding squares on the copper roller, thus showing the machine-engraver that the square or squares on his mill if fit to the corresponding squares on the copper roller must be correct to fit the four aforesaid colors on the aforesaid copper rollers. The die is made of any required diameter and length, and if round rotates upon centers held upon brackets, arms, or standards of any desired form, it being understood that they must of necessity be made and arranged according to the kind of pantograph-machine to which the steel or other metal surface intended for the die is applied. The designs on the copper rollers are in some machines traced by a number of pointers in various positions on one or both sides by giving a rotatory motion to the roller and a longitudinal motion to the pointers, and the design is traced or engraved on the die with one or more pointers, either additional or otherwise, by giving the intended die a rotatory motion similar to that given to the copper roller and a longitudinal motion to the pointers for the die similar to that given

to the pointers for the roller, and in all cases the perfect identity of the two motions is obtained by the employment of the same means for tracing the designs both on the copper roller and die. Thus the pointers which trace the longitudinal lines on the roller and die are placed on the same slide and receive exactly the same motion, and if the roller is placed upon disks for giving it the rotatory motion the die is also placed on one of the disks, and as there has been no change it must necessarily have exactly the same rotatory motion as the roller; or, if the roller is turned by the backward and forward motion of a straight surface in contact with it the die, if resting upon the same surface, must move exactly the same. It is also easy to cause the roller to give an exactly similar extent of motion as it receives itself, for if the die rests upon the roller it must move the same distance as the roller, though in a contrary direction, and if an intermediate disk be placed between them the die is moved exactly the same distance as the roller and in the same direction, and in all cases whatever design can be put upon the roller can also be put upon the die. There are some pantograph-machines now in use for engraving upon copper rollers in which both rotatory and longitudinal motions are given to the roller, the tools or diamonds being stationary instead of giving, as before described, one motion to the roller and the other to the tools or diamonds. To the aforesaid machines in which the two motions are given to the copper roller my die apparatus is also applicable by arranging the apparatus for holding the die in the same position as the copper roller, so that it may receive motions similar in every respect to those given to the copper roller.

From the foregoing description it will be perceived that the modes of giving motion to the die will vary according to the kind of pantograph-machine to which this invention is applied, and also that the brackets, standards, or holders will have to be varied according to the position the die is to be held and the form of the frame-work of the machine to which it is applied; but it is evident that the arrangements required for the last-mentioned purpose are so simple and self-evident as to be easy of application by any ordinary mechanic. Therefore it is not necessary to give detailed drawings of all the methods of applying my invention, inasmuch as its nature and general application to all kinds of pantograph-machines will be clearly understood by referring to the figures and letters of reference on the accompanying two sheets of drawings representing a few modes of applying my improvements to two kinds of pantograph-machines at present in use for engraving metal rollers or cylinders employed in printing calicoes or other surfaces.

Figs. 1, 2, and 3 represent a transverse section, front elevation, and plan of part of a pantograph-machine having upon it one ar-

range of my apparatus for holding steel or other metal surface intended for a die. Part of one of the end frames of the machine is represented at *a* having a slot *b* for holding one of the bearings of the copper roller, a similar slot being on the frame at the opposite end. On the shaft *c* are the disks *d*, which carry the copper roller and give its rotatory motion, which disks are shown as having been shifted near the end of the shaft for the purpose of supporting and giving motion to the steel or other metal surface *e* intended for the die, and as the disks rotate they move the circumference of the intended die exactly the same distance as they move the circumference of the copper roller. The aforesaid metal surface or die *e* is centered upon the centers *f* and *g* in the head-stocks *h*, fitting slots in the plate *i* for enabling the head-stocks and centers to be shifted according to the length of the intended die and afterward fixed by screws. The plate *i* is jointed to the bearing *k* and is provided with a lever and balance-weight *l*, which can be shifted, as required, to add to or diminish the pressure of the die on the disks. The plate *i* swivels in the center and is adjusted perfectly parallel with the mandrel of the machine, both at the top and side, by screws *m* and other screws *n*. At the under side of the plate *i* there is a pin *o*, fitting a boss *p*, forming part of the arm or bracket *q*, which is bolted to the end frame *a*.

Figs. 4, 5, and 6 represent a transverse section, front elevation, and plan of part of a machine similar to that shown in Figs. 1, 2, and 3, but having another arrangement of my apparatus for holding steel or other metal surface intended for a die. In these figures the frame-work of the machine, the slots for holding the bearings of the copper roller, the disks which carry and give motion to the said roller, the shaft to which the disks are fixed, the centers on which the intended die is centered, the head-stocks which hold the centers, and the plate which carries the head-stocks are the same as those described in Figs. 1, 2, and 3; but instead of employing two disks for supporting and giving motion to the steel or other metal surface intended for the die, one disk only is used, and also the position of the plate *t* for holding the head-stocks and the mode of connecting it with the end frame of the machine are different. The intended die is shown at *s* and the disk for supporting and giving it motion at *t*. The plate for holding the head-stocks is represented at *u*, and instead of being at the side is placed above the intended die *s*. At or about the middle of the plate there is a spindle *v*, fitted into a hole in the bracket *w*, the end of which is fitted into the slot of one of the end frames *a* of the machine, and after being adjusted according to the diameter of the intended die is firmly fixed by the nut *x*. The plate *u* is provided with steady-pins *y*, passing through holes in the bracket *w*, so that they can rise or fall as required, and the die is balanced by

the lever and weight *z*, in order to prevent the die from being pressed too heavily on the disk. The principal object of this arrangement is to adapt the apparatus to fit a number of similar machines, as it is only necessary to loosen the nut *x* and take out the bracket, which is then placed in the slot of another machine, and after being adjusted is then fastened tight.

Fig. 7 represents a transverse section of part of another pantograph-machine having adapted to it a suitable arrangement of apparatus for holding steel or other metal surface intended for a die. In this machine rotary motion is given to the die *a'* from the copper roller *b'* by means of the intermediate disk *c'*. The tool or diamond is shown at *d'*. It moves longitudinally upon the die, exactly in the same manner as it moves upon the copper roller. The die is centered in head-stocks connected to the arm *e'*, which is jointed, as at *f'*, to any suitable part of the framework of the machine. The intermediate disk *c'* is centered on the arm *g'*, which is jointed, as at *h'*, to the arm *e'*, and it will be seen that when the disk is upon the roller and the die upon the disk, that when the roller rotates the die will rotate exactly the same distance and in the same direction as the copper roller, and thereby receive from the tools or diamonds a design similar to that which would be engraved on the copper roller.

Fig. 8 represents a transverse section of part of a pantograph-machine similar to that shown in Fig. 7, having the same arrangement of apparatus for holding steel or other

metal surface intended for a die, but placed in such a position that the die and intermediate disk are at the top of the copper roller, so as to be operated upon by a tool or diamond at each side of the die, in order that designs may be traced upon both sides of the die by a double-bar pantograph-machine exactly as they are now traced on the copper roller.

Having now explained and illustrated the nature of my improvements in pantograph-machines used for engraving, as aforesaid, it is to be understood that what I claim as my invention is—

The application of the peculiar arrangement of machinery or apparatus herein described and illustrated in the accompanying two sheets of drawings for holding steel or other metal surfaces intended for dies in the same or a similar position as the copper or other metal rollers employed in printing calicoes or other surfaces are now held in all pantograph-machines, so that the dies will receive on their surfaces designs in every respect the same as would otherwise be imparted to such copper or other metal rollers as aforesaid.

Done at Manchester this 10th day of April, 1861.

ROBERT WHITTAM.

In presence of—

EDWARD JOSEPH HUGHES,

JOHN BLOODWORTH,

Patent Agents, both of 17 Cross Street, Manchester.