2 Sheets—Sheet 1.

W. RYDER.

Forging Machine.

No. 3,235. Patented Aug. 26, 1843.

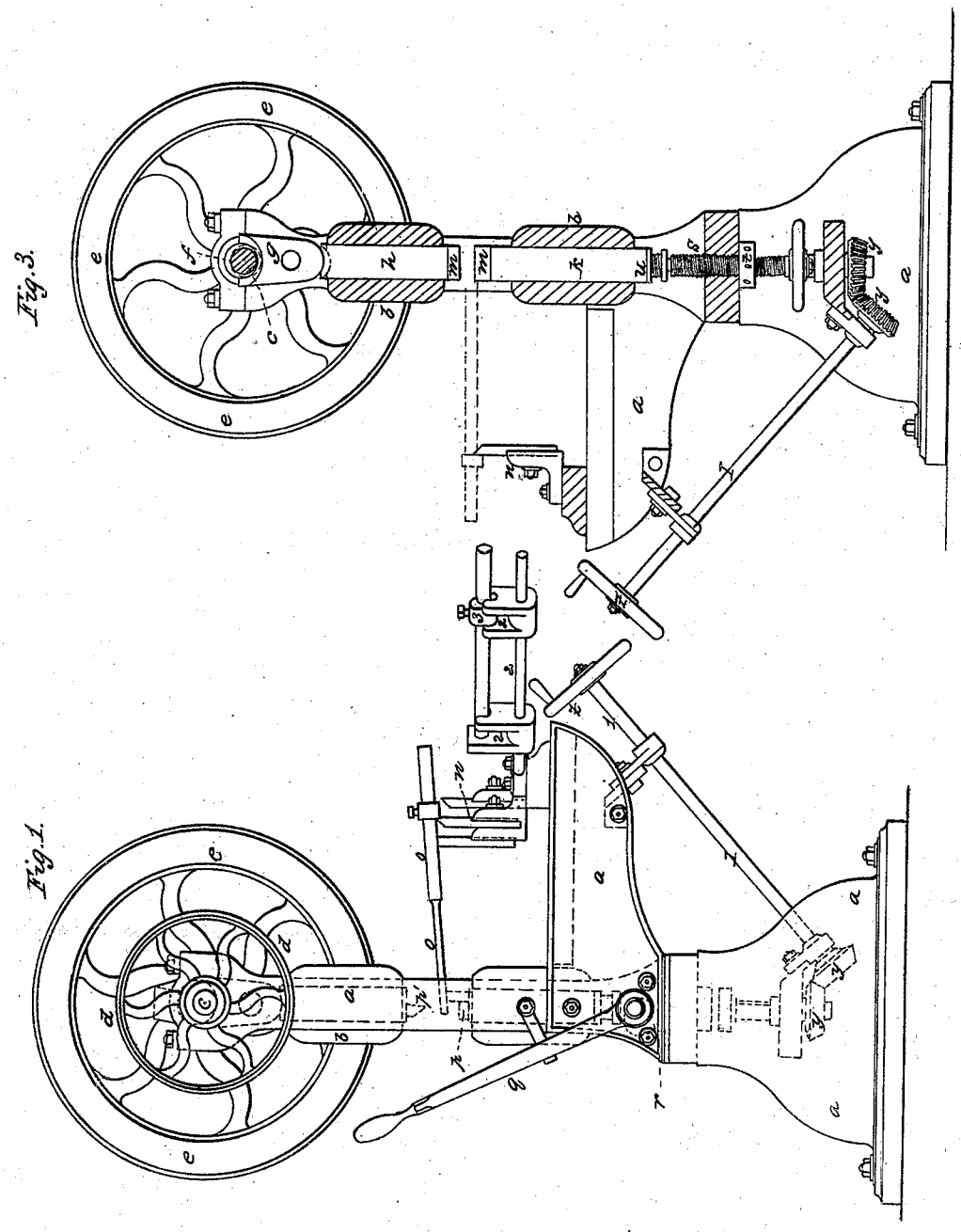

Fig. 3.

Fig. 1.

Witnesses:
John Knowles
Robert Hooper

Inventor:
William Ryder

2 Sheets—Sheet 2.

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Forging Machine.

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Fig. 2.

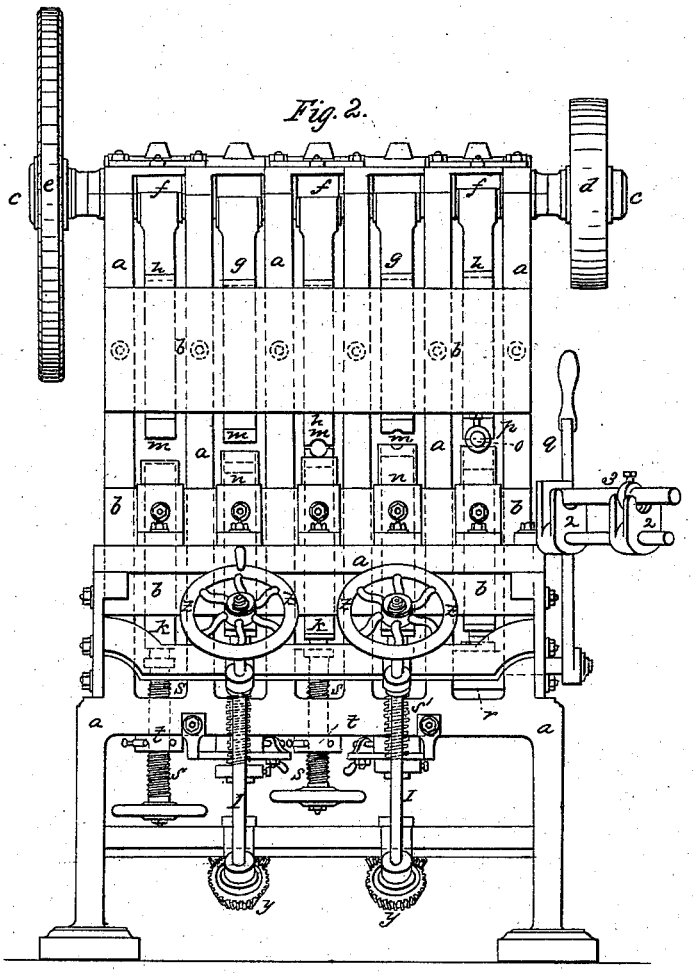
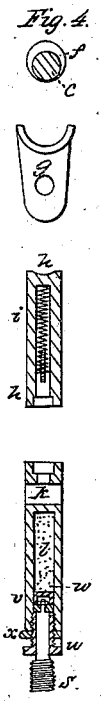


Fig. 4.



Witnesses:

John Knowles
Robert Hope

Inventor:

William Ryder

UNITED STATES PATENT OFFICE.

WILLIAM RYDER, OF BOLTON, ENGLAND, ASSIGNOR TO JOHN MILLER AND EBENEZER M. DORR, OF CLAPVILLE, MASSACHUSETTS.

MACHINE FOR FORGING, DRAWING, SWAGING, OR FORMING SPINDLES, ROLLERS, BOLTS, AND VARIOUS OTHER ARTICLES IN METAL.

Specification of Letters Patent No. 3,235, dated August 26, 1843.

To all whom it may concern:

Be it known that I, WILLIAM RYDER, of Bolton, in the county of Lancaster, in the Kingdom of Great Britain, roller and spindle-maker, have invented a new and improved machine for forging, drawing, molding, or forming spindles, rollers, bolts, and various other articles in metal; and I do hereby declare that the following is a full and exact description thereof.

My improved apparatus for forging drawing molding or forming spindles rollers bolts and various other like articles in metal consists of a novel combination arrangement or construction of mechanism designed for the purpose of effecting these several operations by mechanical power or agency instead of performing the same by manual labor as hitherto done.

The principal object of my present invention is to forge draw down mold or form spindles shafts, &c., while in a heated state by means of a continuous succession of blows rapidly performed by hammers, swages, or dies and to give the required form to the spindle shaft or other article under operaion by placing it under the striking or forging apparatus during the rotation or action of the machinery which will complete the necessary form or shape of the article under operation in a much more perfect and economical manner than hitherto accomplished by hand labor.

I would here observe prior to entering into the detailed description of my improved apparatus to be used for such purposes that the size strength and respective proportions of all the essential parts of the apparatus must be varied in order to suit the particular class of work to be performed as it will be evident that the same construction of apparatus which would be sufficient for forging hammering or forming light spindles rollers shafts bolts or nuts such as are used for cotton machinery and other comparatively light purposes as blanks for files and cutting tools cutlery &c., would not be sufficiently strong for performing the same work upon shafts or axles of two three or more inches in diameter such as are used for mill gearing and other heavy purposes. And yet the same principles of my invention may be equally adapted and carried into practical operation upon either the larger or smaller scale of work providing of course that the several proportions strength and arrangement of the mechanism shall be suitably modified to the quality or class of work to be performed. Such being the case I have attached a sheet of drawings containing views of my improved apparatus and of a light construction such as should be employed for forging spindles rollers &c for cotton machinery or articles for other light uses by way of illustrating with facility the application of my improvements.

Similar letters of reference will be found upon corresponding parts in all the figures.

Figure 1 represents a side elevation of my improved apparatus drawn upon a scale of about 2 inches to the foot; Fig. 2 a front view, and Fig. 3 a transverse section taken vertically through the same.

An iron frame work *a a a a* suitably connected together by means of cross bearers *b b b b* supports in pedestals the driving shaft *c c* upon one end of which are keyed the strap pulley *d* and upon the reverse end the balance or fly wheel *e*. Upon this shaft *c* a series of eccentrics cams or cranks *f f f f* are either forged or otherwise conveniently fixed revolving with it and bearing in bed or cradle pieces *g g g g* which vibrate slightly as the eccentrics revolve above them and bear at their lower extremities upon the ends of the punches or bars *h h h h* and thus cause them to descend rapidly at every revolution of the eccentrics or cams *f*, *f*, *f*, *f*, their instantaneous ascent being alternately affected by means of the springs *i i i i* (seen in sectional Fig. 4) placed inside the punches one end of which bears against the upper part of the punch and the other bearing against a collar fixed in the frame *b* a slot being left in the punches to admit of their action. Thus it will be observed that this series of punches or bars *h h h h* are made alternately to slide up and down in the guides or crossbearers *b b b b* at every revolution of the driving shaft and perform a rapid reciprocating action (and may be said to constitute the striking hammers of the machine). There are similar bottom bars *k k k k* (which may be said to constitute the anvils of the machine) which are also supported by the cross bearers *b*, *b*, these bars or punches *k*, *k*, are filled with

cork as shown at *l* in the sectional Fig. 4 and compressed to any required degree of hardness in order to relieve the concussion between the hammers *h*, *h*, and the anvils *k k* during the foregoing operation. Pairs of dies swages or hammers *m m m m* of any suitable form are placed respectively at the extremities of the bars *h h* and *k k* into or between which the heated rod or bar to be forged drawn or molded is to be placed by the operator or smith and supported upon the adjustable rests *n n* as shown in red lines in Fig. 3 and there being held and turned by the hands of the smith as in the ordinary manner of forging iron the machinery being in motion the forging or hammering apparatus will operate rapidly upon the heated shaft as shown by the red lines in the sectional figure.

The essential parts of this apparatus are also shown detached at Fig. 4 being the eccentric *f* and driving shaft *c* the vibrating cradle piece *g* and the punch or hammer *h*. The apparatus may also be conveniently furnished with a pair of cutting dies or shears *p p* to pare or cut the ends of shafts, collars &c. *o*, *o*, if required being worked by the operator pulling the hand lever *g*, and thus raising the lower cutter *p* by means of the eccentric *r* or in any other convenient manner.

Regulating screws *s s* are provided in order to set the block *k* and swages *m* to the exact distance the article to be forged may require. *t t* are lock nuts to secure the screws when set, *u* connecting nut to connect the screw *s* to the block *k*, and by means of the loose collar *v* and the cap *w* to keep the cork compressed and leave the screw free; *x* another lock nut to secure the nut *u*.

A pair of bevel wheels *y y* are connected to the other screws *s′ s′* and the hand wheels *z z* by means of the diagonal shafts 1, 1 and are intended to be used to raise or lower the blocks *k* whenever collars or moldings are required to be forged.

A stop gage 2 is attached to one side of the machine to set the stop collar 3 upon the article to be forged so as to regulate the position of such collar and consequently the distance of the rest from the swages and thus regulate the length to be forged.

Having now particularly described my invention and the manner in which the same is to be performed I desire it to be particularly understood that I claim as my invention—

1. The improved apparatus herein described for forging drawing molding or forming spindles rollers bolts and various other like articles in metal as herein particularly set forth and exhibited in the accompanying drawings; that is to say, I claim the manner of combining the eccentric cam, or crank, *f*, with the cradle piece *g* the top and bottom punch bars or swage holders *h* and *k* with their swages; the hammers *h*, *h*, being provided with a spring as at *i* for the purpose of lifting or keeping up the punch *h* and cradle piece *g* against the eccentric *f*.

2. I also claim the employment of a cork or other elastic substance, as at *l*, for the purpose and in the manner set forth.

3. I also claim the combining with such a machine the apparatus for raising and lowering the anvils; and these devices I claim as applied to these purposes in whatever manner the construction form or dimensions of the apparatus may be modified or varied, while the same ends are attained by means substantially the same.

WILLIAM RYDER.

Witnesses:
JOHN KNOWLES,
ROBERT HOPE.