

E. H. STORY.  
METAL ROLLING MACHINERY.

No. 494,904.

Patented Apr. 4, 1893.

Fig 1.

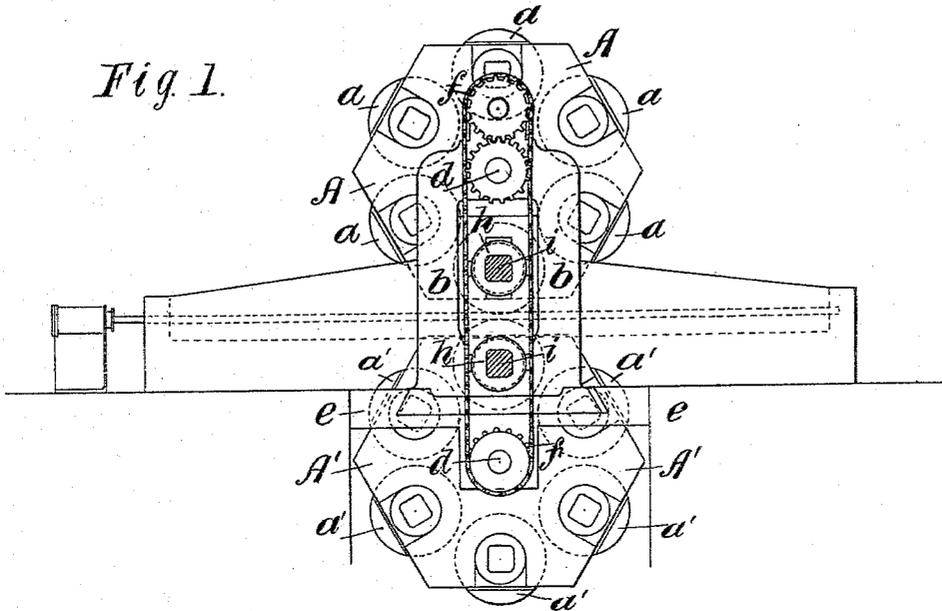
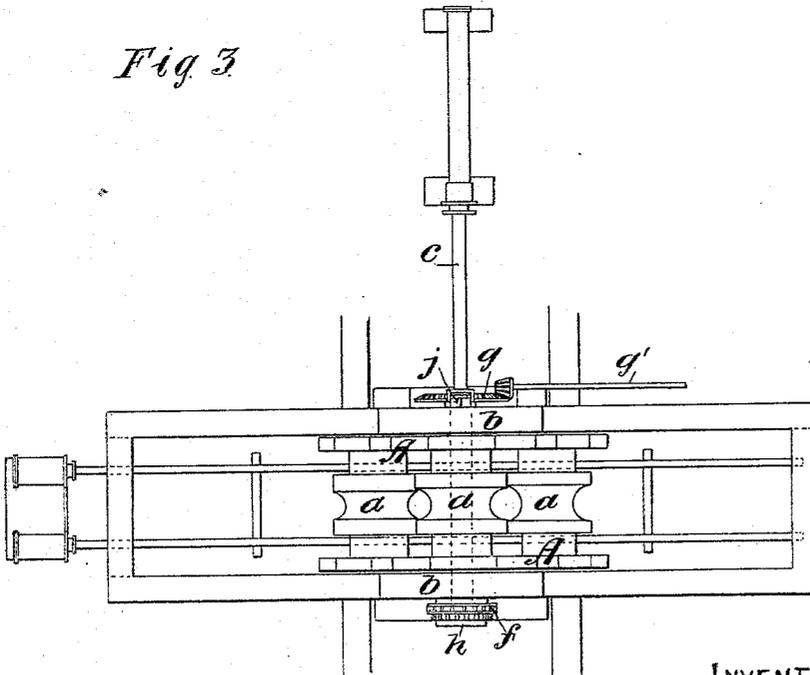


Fig 3



Witnesses

*George Baumann*  
*James Graves*

INVENTOR.

*Edwin Henry Story*  
By *his Atty*  
*Houston and Houston*

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Fig 2.

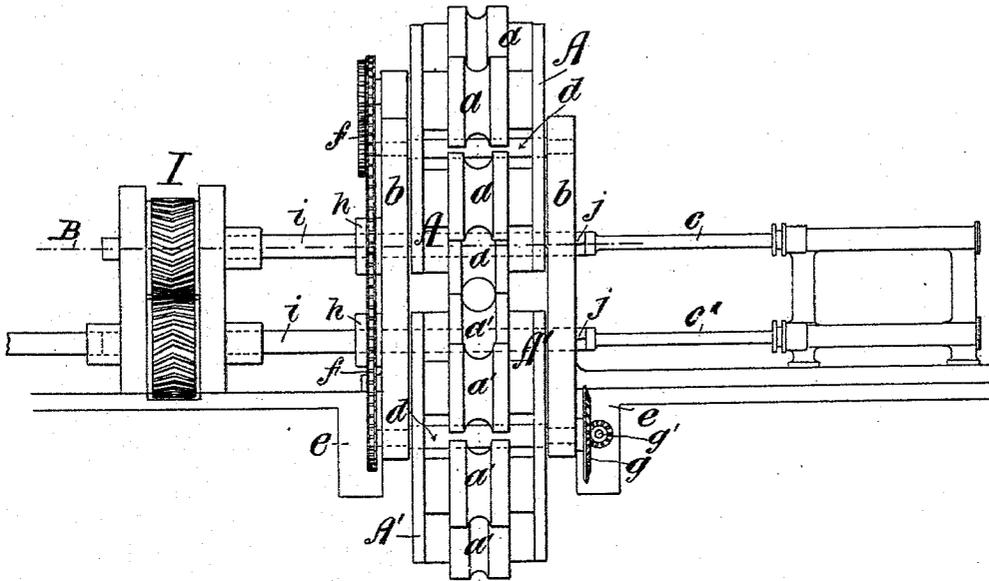
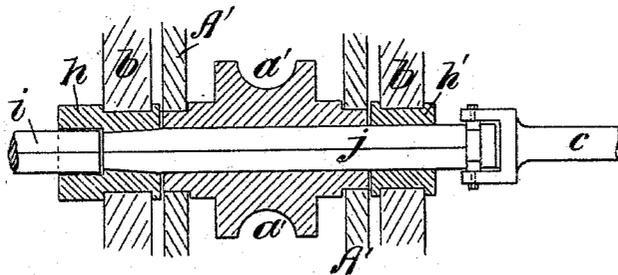


Fig 4.



Witnesses  
*George Baumann*  
*James Gracie*

INVENTOR  
*Edwin Henry Story*  
 By his Attor  
*Howson and Howson*

# UNITED STATES PATENT OFFICE.

EDWIN HENRY STORY, OF ECCLES, ENGLAND.

## METAL-ROLLING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 494,904, dated April 4, 1893.

Application filed September 27, 1892. Serial No. 447,047. (No model.)

*To all whom it may concern:*

Be it known that I, EDWIN HENRY STORY, engineer, a subject of the Queen of Great Britain and Ireland, residing at Oakleigh, Ellesmere Park, Eccles, near Manchester, in the county of Lancaster, England, have invented certain new and useful Improvements in Metal-Rolling Machinery, of which the following is a specification.

My invention relates principally to the rolling of hollow shafts and tubes and has for its main object to facilitate the changing of the rolls. A series of rolls are mounted in each of two carriers which are themselves mounted within the housings each carrier being arranged to turn upon an axis and having its carried rolls fitted to revolve upon axes which are concentric with the axis of the carrier. The rolls are arranged in pairs one roll of each pair being in one carrier and the other roll in the other carrier. One pair can be quickly changed for another by rotating the two carriers to the required extent. The rolls are driven by means of shafts which are mounted to slide into and out of engagement with the rolls which are formed with square or polygonal eyes or with suitably shaped eyes or trunnions to engage with the shafts.

In order that the nature of my invention and the manner in which I propose to carry the same into practical effect may be clearly understood I will describe my invention with reference to the accompanying drawings.

In the drawings:—Figure 1 represents a side elevation of a mill suitable for rolling tubes or hollow shafts. Fig. 2 is a front elevation of the same. Fig. 3 is a plan of the same. Fig. 4 is a horizontal section on the line B B in Fig. 2, ordinary parts, not necessary to the sufficient illustration, being left out in the drawings.

In the said figures A A' are the roll carriers, b b are the housings, and c c are rams which withdraw and push forward the roll shafts. Each roll carrier consists of a frame provided with seatings for six rolls a a' and carried by a central shaft d which is mounted to revolve in bearings, the bearings for the upper carrier being formed in the upper parts of the housings b and for the lower carrier in the foundation casting e. Each roll is formed with a square eye which is planed or finished

so that a square shaft may slide truly in the eye. The two carriers are connected together by means of chain gearing f passing around chain wheels on the shafts d of the two carriers, so that when revolved, the two carriers revolve in unison. The lower carrier is intended to be revolved by means of bevel gearing g connected with a side shaft g' operated by hand or by power.

Any suitable means may be employed to connect together and to revolve the two carriers.

The rolls in the two carriers are arranged in pairs so that any two rolls which are brought into juxtaposition as in the cases of the lowest roll in A and the highest roll in A' shall constitute a pair. By rotating the two carriers any one of the six pairs can be brought into working position. When so brought into working position the axis of each roll is in line with the axes of two loose journals h h', which are mounted to revolve in the housings and are formed with square eyes corresponding with the eyes in the rolls. These journals appear more plainly in Fig. 4 wherein h h' represent the two journals, the journal h being formed as a coupling to connect with the shaft i which is one of the ordinary coupling shafts of the driving train and is connected with the ordinary coupling gearing I. A square shaft j is fitted to slide in the eye of the journal h' the end of the shaft entering and fitting into the eye of the journal h. It will be seen that the shaft passes through the eye in the roll a' which is the lowest roll in the upper carrier. The shaft j is coupled to the ram c which slides in the hydraulic ram cylinder c' the connection of the shaft with the ram permitting of the rotation of the shaft. By means of the hydraulic ram the shaft can be drawn entirely out of the eye in the roll so that the roll carrier can be revolved. There is a corresponding arrangement in connection with the rolls in the lower carrier. When the rolls in a pair have been thus liberated by drawing out the two shafts by the simultaneous action of the two hydraulic rams the two carriers can be rotated until any two rolls constituting a pair are brought into working positions. The two shafts are then pushed in passing into and through the eyes in the rolls and entering the eyes in the jour-

nals  $h, h'$ . The shaft with the two journals and the roll will then revolve together as if they were one piece the journals revolving in the bearings in the housings and the shaft serving to connect together the roll and the two journals. The two rolls in the pair are then revolved by the ordinary train gearing and used as if housed in the ordinary manner. It will be understood that the rolls in the carriers have grooves varying in size so that they can be used in succession the revolution of the carriers rendering it possible to quickly change the rolls in use. The number of rolls which the carriers are adapted to hold may be varied and the eyes and the shaft might be hexagonal or be otherwise than square so long as the shaft was fitted to transfer motion to the rolls. In some cases the rolls might be made longer and be turned with two or more passes or grooves.

I claim as my invention—

1. The roll carriers  $A A'$  mounted to revolve upon centers and each carrying a series of rolls  $a$  or  $a'$  having grooves varying in size, for rolling metals combined with means for turning the roll carriers to bring a roll in one carrier into working relation with a roll in the other carrier substantially as set forth.

2. The rolls  $a a'$  the roll carriers  $A A'$  the sliding shafts  $j j$  the journals  $h h'$  and the hydraulic rams  $cc'$  in combination with housings to carry the roll carriers and the journals and with means for revolving the roll carriers and with ordinary means for driving the rolls through the journals and shafts substantially as and for the purpose set forth.

3. Rolls for rolling metal mounted in revoluble carriers containing two or more pairs the rolls in a pair being mounted in two separate carriers in combination with means for connecting the driving train with the two rolls in any pair brought into position by rotating the carriers substantially as set forth.

4. The combination with metal rolling mills of revoluble roll carriers each adapted to hold two or more rolls which have grooves varying in size and which can be separately brought into position by turning the carriers upon their axes.

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

EDWIN HENRY STORY.

Witnesses:

JOSHUA ENTWISLE,  
RICHARD W. IBBERSON.