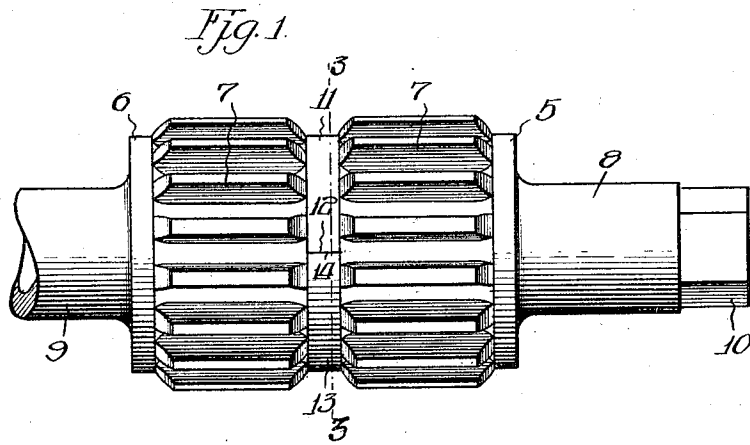
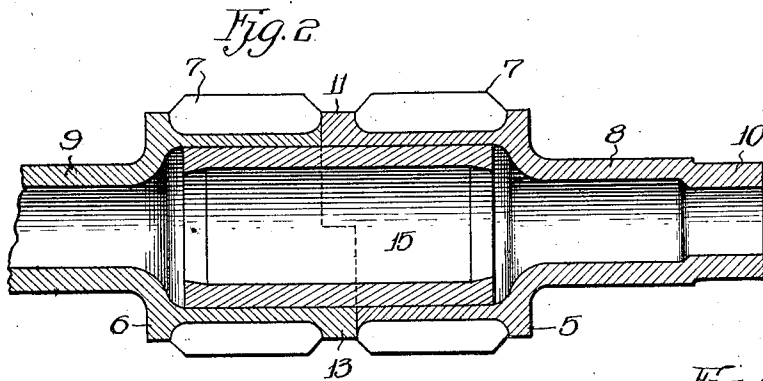
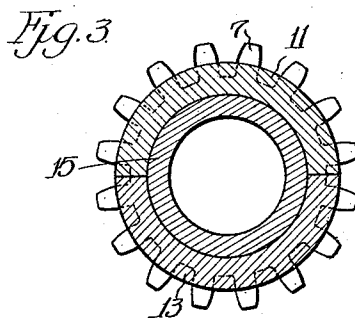
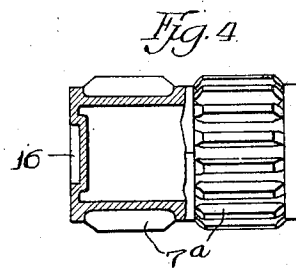


E. S. BLACK.  
MILL PINION.  
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1,309,837.

Patented July 15, 1919.



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# UNITED STATES PATENT OFFICE.

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## MILL-PINION.

1,309,837.

Specification of Letters Patent.

Patented July 15, 1919.

Application filed January 22, 1919. Serial No. 272,422.

*To all whom it may concern:*

Be it known that I, EDWARD S. BLACK, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Mill-Pinions, of which the following is a specification.

My invention relates to mill pinions and particularly to the two part type of mill pinion for use in rolling mills, blooming mills and the like.

I am aware that two part pinions have heretofore been made but the objection to the two part pinions as heretofore made has been that transmission of power from one part to the other has not been successfully maintained, especially where these pinions were used in reversing mills. Where the pinion has been made from a casting and applied to a wrought steel shaft, practical experience has shown that the shaft breaks from the pinion part, all of which tends to increase the expense of the pinions and of maintenance of same. Since the advent of alloy steel used in manufacturing these pinions, the question of heat treatment has become an important one. Therefore, to provide a mill pinion having alloy steel pinion teeth, such, for instance, as manganese steel teeth, it was found that when these pinions were made in the form of shells or rings to permit proper heat treatment and then were applied to wrought steel shafts the ring portions outlasted the shaft portions. Later two part pinions were made having the pinion part cast integrally with the neck portion which neck portion was made of alloy steel, the difficulty in this construction being that positive rotation between the two parts of the pinion could not be positively maintained with any degree of certainty, experience showing that the two parts often separated.

My invention has to do with overcoming the above recited and other objections in the present practice of two part alloy steel mill pinions.

One of the objects of my invention is to improve two part mill pinions.

Another object is to provide a two part mill pinion made of alloy steel having positive driving connection between the two parts.

A further object is to provide a two part

mill pinion having means for effecting positive driving connection between the two parts in either direction of rotation and which means do not depend upon a third member for driving connection.

A still further object is to improve two part mill pinions for successful commercial use.

Attention is directed to the drawings, in which—

Figure 1 is an elevational view of the preferred embodiment of my invention, a portion of one of the necks being broken off.

Fig. 2 is a vertical section through Fig. 1.

Fig. 3 is a transverse section on the line 3—3 of Fig. 1, and

Fig. 4 is a view, partially in section of a modified form.

The form which I have chosen to illustrate my invention embodies two substantially similar portions 5 and 6, each portion being made as an integral casting preferably of manganese steel, including the toothed or pinion portions 7. It is necessary in making such a casting of manganese steel that the thickness of the various parts be somewhat uniform in order to prevent internal stresses and strains being set up during heat treatment and also to eliminate the joining of thick and thin portions in the castings. The end of the neck 8 terminates in a reduced and flattened end portion 10 forming a wabblers for coöperation with the usual coupling boxes. I prefer to provide each of the pinions 7 on the inner ends thereof with what I term shrouds and form in the shrouds interlocking elements which will become positively engaged when the two pinions are brought together in operative relation to form a single mill pinion. One of the pinion members has the shroud portion 11 integral therewith having shoulders 12 or other elements for positive rotative connection and the other pinion portion having the shroud 13 including similar shoulders 14. The formation of the shoulders is clearly shown in Fig. 2. It will therefore be observed that when the two pinion portions are brought together with the inner ends in contact and the shrouds arranged as shown in Fig. 1, the shoulders 12 and 14 will contact whereby any rotary motion transferred to the neck 9 will be transferred

through the abutting shoulders 12 and 14 to the neck portion 8 and any motion imparted to neck 8 will be transferred to neck 9. Consequently, the rotation may be in either direction without causing separation between the two pinion portions. It will be observed, therefore, that by my invention I have provided an alloy steel two-part mill pinion having means for effecting positive driving connection in either direction of rotation between the two parts and that the driving is transmitted from one part to the other through a portion of the casting itself and not through the agency of any third member.

In Fig. 4 I have shown a modified form of mill pinion on which there is no neck portion cast, as under certain conditions of service it is impossible to afford room necessary to provide neck portions in connection with these pinions. Therefore, to provide means to drive pinion members 7<sup>a</sup> I form sockets 16 in the outer faces of the pinions which sockets are in shape anything but circular. For coöperating with these sockets, the coupling boxes may be provided with an end portion shaped to correspond to the contour of the sockets to effect positive rotary bearing connection therebetween. The other features of this modified form are the same as shown in the other figures.

For maintaining the pinion portions in axial alinement I provide a cylindrical shell 15, the outside diameter of which is such as to permit the shell to be tightly embraced by the enlarged ends of the members 5, 6, as clearly shown in Fig. 2, the purpose of the shell being merely to keep the two pinion portions 5 and 6 in axial alinement under all conditions of service. This shell performs no function with respect to the transmission of power from one portion to the other, its only function being to maintain in alinement the two pinion portions, hence, it is not subjected to any strain or shock.

I am aware that modifications of such a device may be made and such modifications as come within the scope of the appended claims, I consider as coming within the spirit of my invention.

I claim:

1. A mill pinion having two separable annular toothed members with interengageable portions for forming a positive drive connection.

2. A mill pinion having two separable annular toothed members with interengageable end portions for forming a positive drive connection.

3. A mill pinion including hollow transverse pinion sections, the meeting ends of said sections having a freely engageable interfitting driving engagement, and an alining member within the pinion sections.

4. A mill pinion including hollow transverse pinion sections, the meeting ends of said sections having integral freely engageable interfitting parts forming a driving connection between the pinion sections, and an alining member within the pinion sections.

5. A mill pinion including hollow duplicate transverse half sections, the meeting ends of said half sections having a freely engageable interfitting driving engagement, and an alining member within the pinion sections.

6. A mill pinion including hollow duplicate transverse half sections, each section having peripheral teeth and a shroud at its inner end, the shroud ends of the pinion sections having complementary interfitting shoulders and recesses forming a driving connection between the pinion sections, and an alining member within the pinion sections and bridging the joint therebetween.

7. In a device of the class described, in combination, two substantially hollow similar portions each comprising a neck and a pinion, each pinion portion having a shroud extending outwardly therefrom and having shoulders formed therein, said shoulders of one portion being arranged for positive engagement with the shoulders of the other portion when in operative relation, and a sleeve inserted in the enlarged portion of each member to maintain the same in axial alinement.

Signed at Chicago, Illinois, this 16th day of January, 1919.

EDWARD S. BLACK.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."