May 10, 1955 W. H. HOLCROFT ET AL 2,708,107

WORK CONVEYOR MECHANISM FOR HEAT TREATING FURNACES

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FIG. 1

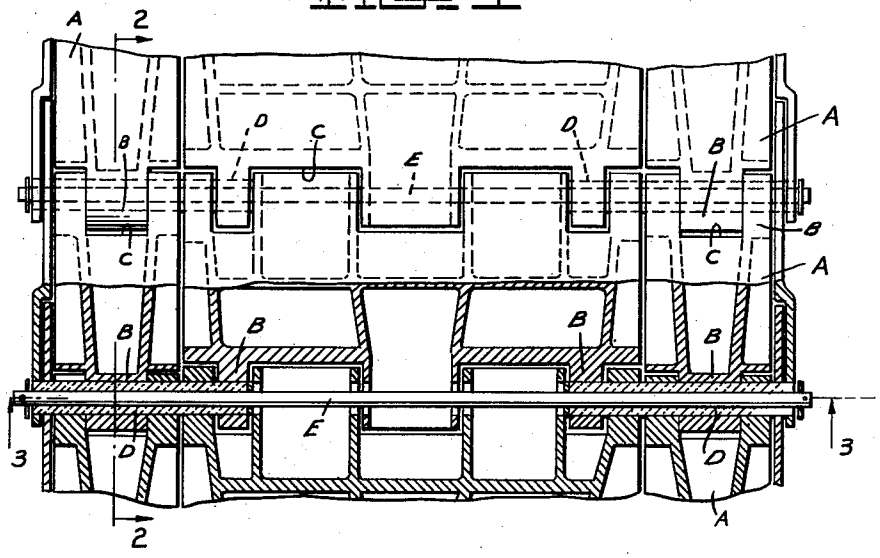


FIG. 2

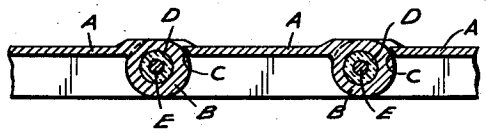
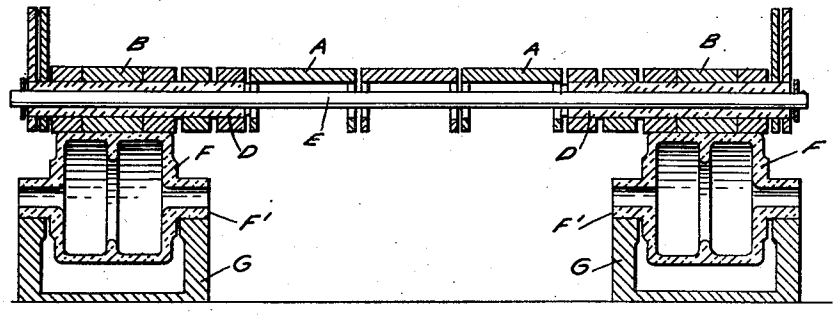


FIG. 3



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FIG. 4

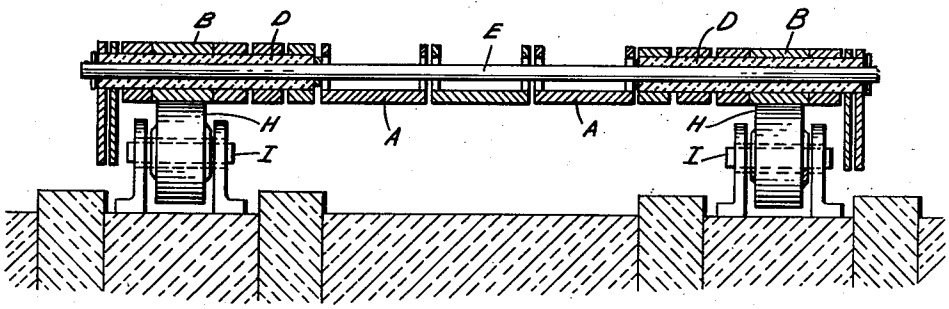
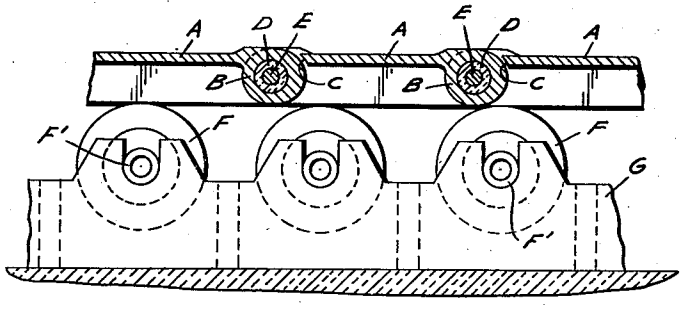


FIG. 5



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WORK CONVEYOR MECHANISM FOR HEAT TREATING FURNACES

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Application November 10, 1952, Serial No. 322,132

10 Claims. (Cl. 263—8)

The invention relates to heat treating furnaces in which the work is conveyed by mechanism operating under the high temperature of the furnace chamber. Such mechanism must be composed of elements capable of withstanding the high temperature and maintaining thereunder the required degree of rigidity and strength. Thus, steel and other metals used in the construction of mechanism for operation at ordinary temperatures cannot be used successfully in such furnaces and the structural elements must be formed from some refractory material, such as nickel chromium alloy. Another difficulty encountered in the construction of mechanism for use under such high temperatures is that the coacting elements in working contact with each other rapidly wear and require frequent replacement. This is primarily due to the fact that coacting working elements formed of material of the same character and having the same degree of surface hardness will cause a scuffing of the contacting surfaces, which would not take place if the surface of one element were harder than that of the other. However, there are so few metals or metal alloys which will withstand such a temperature that it is difficult to obtain any having different degrees of hardness.

It is the object of the invention to obtain a construction which overcomes the difficulties above set forth and which has a greater length of life. This we have accomplished by substituting for one of the cooperating elements which are in working contact with each other an element formed of ceramic material which possesses both the required rigidity and strength and also presents a very hard wearing surface. The invention therefore consists in a structure having such characteristics as hereinafter set forth.

In the drawings:

Figure 1 is a plan view partly in section of a portion of a conveyor mechanism embodying our improved construction;

Fig. 2 is a cross section on line 2—2 of Figure 1;

Fig. 3 is a vertical longitudinal section on line 3—3 of Fig. 1, showing the upper strand of the conveyor;

Fig. 4 is a similar view showing the lower strand of the conveyor and a modified construction of ceramic elements for supporting the same;

Fig. 5 is an elevation viewed at right angles to Fig. 3.

The general construction of the conveyor or other mechanism embodying our invention is immaterial, but, as shown, the conveyor is formed by a series of cross-bars or aligned sections of cross-bars pivotally attached to each other and together forming a flexible endless belt. Specifically each of these cross-bars A is formed on one side thereof with projecting lugs B and on the opposite side with corresponding recesses C for receiving the corresponding lugs B of an adjacent bar. These lugs are apertured to receive a connecting pivot pin member which transmits the draft of one bar to another and also permits pivoting in the return-bend portion of the conveyor. As constructed in the past all of these

elements have been formed of nickel chromium or other high fusing refractory alloy, and it has been found that both the pins and the bearings therefor wear rapidly and require frequent replacements.

One of the features of our improvement is the forming of the connecting pin D of ceramic material which has the requisite degree of strength and maintains its rigidity at the highest temperature within the furnace chamber. As shown this pin D is tubular so as to permit of inserting therethrough a tie-rod E which extends the full length of the cross-bar or aligned sections of cross-bar. The external surface of the pin is smooth and very hard so that in contact with the surface of the metallic alloy it will have an ironing effect instead of a scuffing action.

Another element of the conveyor construction is an anti-friction support therefor, which in the past has been made of rollers or wheels also formed of the metallic alloy. For these we have substituted a ceramic roller F arranged beneath a portion of the conveyor and having trunnions F′ at its opposite ends engaging bearings in a bifurcated supporting bracket G, as shown in Fig. 3. In Fig. 4, a modified construction is shown in which the roller H is mounted on a pin I extending into bearings in the bifurcated bracket. The roller may be made of ceramic material and the pin of metal, or the pin may be formed of ceramic material and the roller of metal. Obviously other mechanical elements than the members D, F and H and I above described may be formed of ceramic material for use in cooperation with adjacent elements formed of refractory metal or metal alloy. In each instance the hard surface of the ceramic element will have an ironing effect on the contacting metallic surface lessening the wear of either element.

Various compositions of ceramic material may be used in forming the ceramic elements above described, but one suitable composition is vitrified material of high alumina content.

What we claim as our invention is:

1. In mechanism operating under elevated temperatures, an element formed of vitrified ceramic material of high alumina content and a cooperating element formed of metal in slidable surface contact therewith.

2. In a conveyor mechanism for use in a heat treating furnace, cooperating elements in slidable surface contact with each other, one being metallic and the other formed of vitrified ceramic material of high alumina content.

3. The construction as in claim 2 in which the metallic element is formed of nickel chromium and the other of ceramic material.

4. The construction as in claim 3 in which two elements, each formed of metallic alloy, are pivotally connected by a pin formed of vitrified ceramic material of high alumina content.

5. The construction as in claim 4 having a series of aligned pins of the said ceramic material connecting metallic elements, each pin being tubular, and a rod extending through all of the tubular pins for tying the same and the cooperating elements to each other.

6. In mechanism operating under elevated temperatures, a roller for supporting a load and a supporting bearing for said roller in slidable surface contact, the one being formed of vitrified ceramic material of high alumina content and the other of metal.

7. The construction as in claim 6 in which the roller is the said ceramic element.

8. The construction as in claim 7 in which the ceramic roller has integral trunnions and the bearing formed of metal is bifurcated with the trunnions journalled in the furcations thereof.

9. The construction as in claim 7 in which the roller has an axial aperture therethrough and is sleeved on

a metallic pin forming the supporting bearing therefor.

10. The construction as in claim 6 in which the roller is metallic and the supporting bearing is a non-revoluble ceramic pin extending through an axial aperture in the roller.

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