

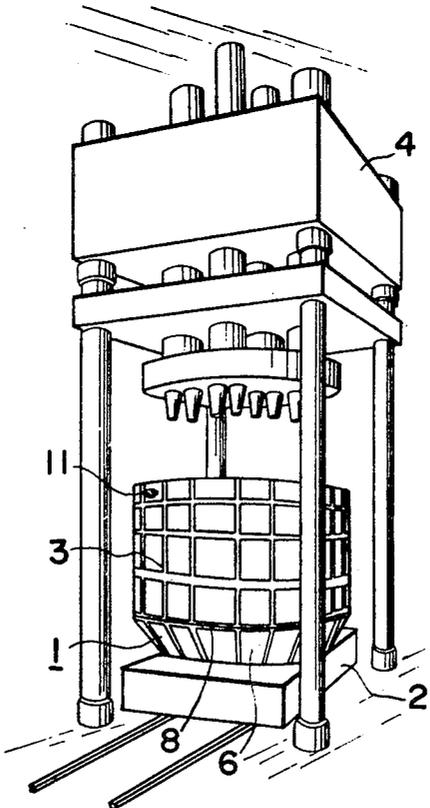
- [54] **APPARATUS FOR COMPRESSING SCRAP INTO A BLOCK AND CONVEYING THE SAME**
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- [51] Int. Cl.....**B30b 15/32**
- [58] Field of Search**100/218, 229, 295; 214/18; 294/69, 76, 77; 75/44 S**

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- Primary Examiner*—Billy J. Wilhite
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[57] **ABSTRACT**

An apparatus for use in compressing and conveying scrap metal or other blocks which includes a supporting chain comprising a plurality of segment chains releasably connected to each other by connecting pieces at both ends, an open ended tubular member forming press side walls and acting as a block carrier, and a base support provided with a groove for receiving the supporting chain. The supporting chain is secured to the bottom edge of the tubular member, and the tubular member is removably mounted on the support to receive the scrap which is pressed when the tubular member is mounted on the support. Upon removal of the tubular member, the supporting chain releasably supports the pressed block.

8 Claims, 6 Drawing Figures



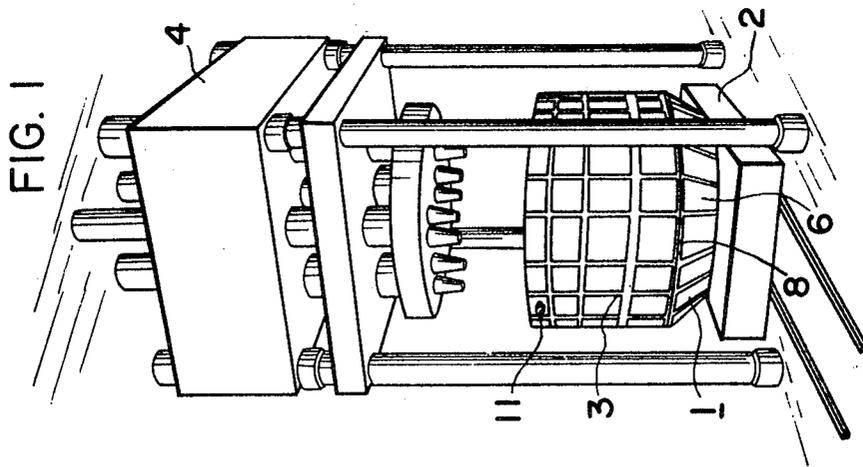


FIG. 1

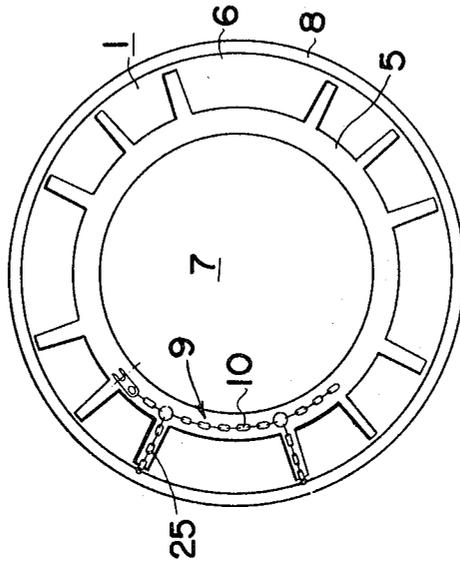


FIG. 2

FIG. 3

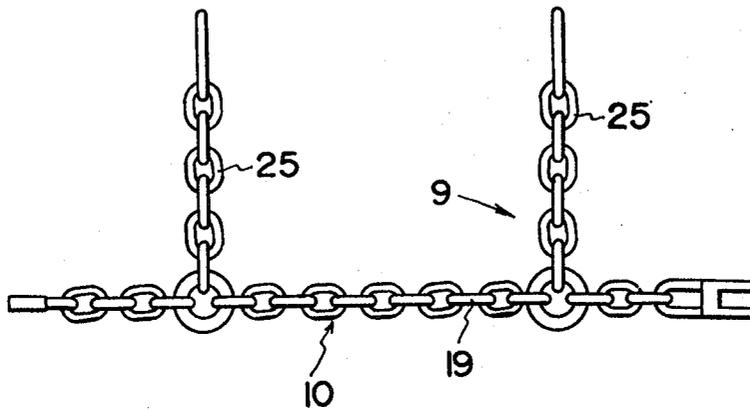
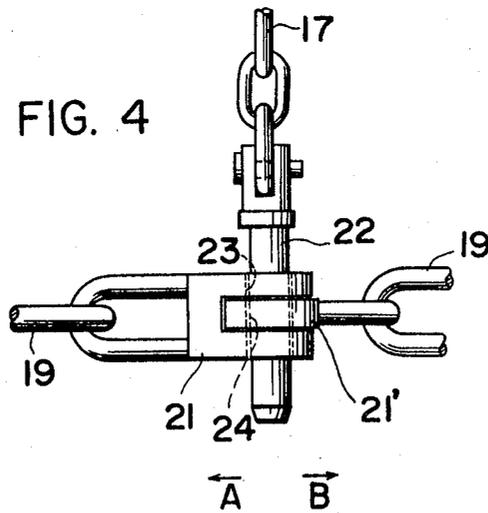
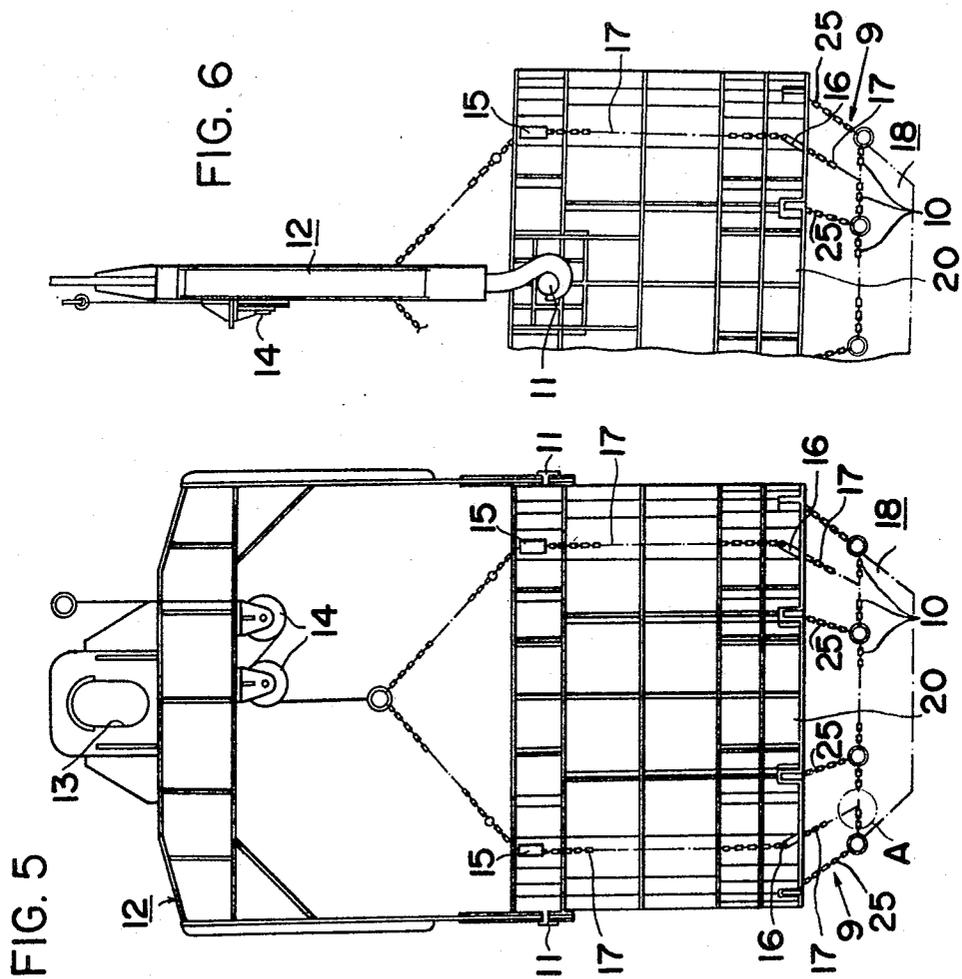


FIG. 4





APPARATUS FOR COMPRESSING SCRAP INTO A BLOCK AND CONVEYING THE SAME

The present invention relates to a press which is capable of compressing scrap into a block and conveying and placing the same in a desired location, for example, into an electric furnace.

In conventional apparatus of this type, pressed scrap blocks are pressed to the size of the electric furnace and inserted by means of wires, chains, hooks and the like.

However, such prior art processes have attendant disadvantages which limit their usefulness and application. Firstly, in order to prevent distortion or crushing of the compressed block during transportation from the press to the furnace it was necessary to ensure a relatively high apparent density, in the order of 1.7-2.0, and such high density blocks are difficult to melt, hanging in the furnace and requires excessive oxygen and powder consumption. Secondly, only relatively thin plate scrap could be used in order to ensure easy pressing. Such a limitation on scrap selection is disadvantageous from a cost standpoint.

The present invention relates to a novel apparatus for pressing and conveying scrap blocks, which overcomes the above mentioned defects of the conventional type apparatus and improves the operational conditions in the electric furnaces by preventing fall-off of scrap and reducing the power consumption. Moreover, the apparatus in accordance with the present invention enables transportation of scrap blocks with sure and safe manipulations to a desired location after easy pressing of the scrap.

SUMMARY OF THE INVENTION

More particularly, the apparatus of the present invention comprises a supporting chain for a scrap block, an open ended tubular member forming press side walls and acting as a carrier for the scrap block, and a base having a groove therein for receiving the chain. The supporting chain, which is secured to the lower edge portion of the tubular member, comprises chain segments which are releasably connected to one another by connecting pieces at each end to form an integral chain for scrap support. The tubular member is removably mounted on the base.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an oblique view of an embodiment to briefly explain the front structure of the apparatus at the time of pressing;

FIG. 2 is a plane view of the base to show the supporting chains in position therein;

FIG. 3 is a front view of the segment chains;

FIG. 4 is a front view of the connecting metal pieces;

FIG. 5 is a front view of the embodiment to show the scrap block being transported; and

FIG. 6 is a partial view of FIG. 5 in section.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

The apparatus in accordance with the present invention in brief may be separated into two main parts; i.e., a tubular member 3 to act as the press and carrier for the scrap block; and a base 1 for supporting said tubular member 3. The tubular member 3 is used during pressing and is used for transportation of the pressed scrap block to insert the same into the electric furnace. The support is so designed as to securely support the tubular member to facilitate the subsequent operations thereof when the tubular member is being mounted on the base for pressing scrap blocks.

With reference to FIG. 1, the support 1, which is substantially in the shape of a saucer, is fixed to the base 2. The tubular member 3 is pre-mounted to the support 1 by a crane or the like (not shown) and run to the scrap yard, where it is loaded with the scrap. Then the base 2 is pulled into the press 4 for pressing of the scrap. It is, therefore, necessary for the

support 1 to be capable of withstanding the pressing force of press 4. The support may be of any shape, size or structure so long as it fulfills this requirement. The support 1 is provided on its inside surface with grooves 5 for receiving chains, as shown in FIG. 2.

In FIG. 2, 6 represents the wall of the support 1 and 7 is the bottom thereof. The bottom 7 corresponds to the upper surface of the base 2. The grooves 5 must be such that the supporting chains 9 for scrap blocks (FIGS. 5 and 6) suspended from the tubular member 3 may be received therein without any difficulty when the tubular member 3 is mounted on the support 1 at the edge 8 which defines the open end of the support 1. The grooves 5 also need to have sufficient depth and width so that the chains 9 will not catch in the scrap material loaded over the grooves 5 on the support 1 when the chain is in position therein.

The chains 9 shown in FIG. 2 comprise segment chains 10 and connecting chains 25 which constitute the complete supporting chain 9 for a scrap block by integrally connecting with one another.

The tubular member 3 is of a size large enough to press scrap in a predetermined amount into a block and has open ends. At the bottom of the tubular member 3, the scrap supporting chain 9 is attached. Projections 11 (FIGS. 1, 5, and 6) are provided at the upper edge of the tubular member 3 to facilitate the transportation of the scrap block. The projection 11 are connected to a bail 12 (FIGS. 5 and 6) having a hole 13 for receiving a crane hook for hanging and transportation purposes. The tubular member 3 can swing about an axis through projections 11 when suspended on bail 12 when necessary. An appropriate number of pulleys 14 are attached to the bail 12 at a position approximately on the longitudinal axis of the tubular member 3. Wire or chain is suspended from said pulleys and connected to connecting metal pieces of each segment chain 10 via guides 15 provided on the outside surface of member 3 and apertures 16 at the bottom of the tubular member respectively. This constitutes the separating chain 17. The separating chain 17 can respond to an upward pulling force as described hereinafter.

The supporting chain 9 for the scrap block will come in contact with the outer periphery of the scrap block, as indicated in FIG. 5 and can withstand the weight of the scrap block. Referring to FIG. 3, supporting chain 9 is comprised of a plurality of segment chains 10 releasably interconnected. Each segment chain 10 comprises a plurality of chain links 19. Supporting chain 9 further comprises a connecting chain 25 for connection to the tubular member 3, and interconnecting pieces on each end thereof. One end of the connecting chains 25 is fixed to the bottom edge 20 of the tubular member (FIGS. 5 and 6).

Any type of connecting device may be used as the connecting metal piece for the segment chain 10. In the embodiment of the present invention shown in FIGS. 3 and 4 of the drawings, a pair of connecting pieces 21, 21' and a pin 22 are used. The pin 22 is secured to the end of the separating chain 17, and passes through apertures 23, 24 in the connecting pieces 21, 21' (FIG. 4) when the links 19 are connected to take the component of weight of the scrap block 18 (FIGS. 5 and 6) imposed in the direction of arrows A and B in the drawing (FIG. 4). The pin can be pulled out of the apertures 23, 24 by an upward pull of the separating chain 17 at any time, thereby separating the pair of connecting pieces and separating connecting chain 10 to drop the scrap block.

Thus, it becomes possible to remove a scrap block from the tubular member 3 very surely and safely. If the tubular member 3 is halted at a desired position and the chain 17 is pulled, the pin 22 will slip out of the connecting pieces and the supporting chain 9 will be divided into segments by the weight of the scrap block. This can, of course, be done by remote control, by remotely controlling the movement of separating chains 17.

Although in the conventional apparatus it was necessary to press scrap into a high apparent density block and to employ

relatively heavy and solid scrap because the scrap was inserted into the electric furnace after removing the scrap block from the tubular member, it is not necessary to particularly pressurize scrap when employing the present invention because the block is introduced into the electric furnace while still inside the tubular member 3 and then released therefrom. In operation, the scrap is pressed as shown in FIG. 1 and the scrap block 18 (FIGS. 5 and 6) is lifted by hoisting tubular member 3 off of the support 1. Tubular member 3 is transported to the furnace, inserted therein and chains 17 are operated to release supporting chains 9 and drop the scrap block. The tubular member 3 can then be simply and easily removed from the furnace. Therefore, the apparent density of the scrap block may be selected so as to result in the minimum cost in terms of operation of the electric furnace. The apparatus calls for no particular type of scrap because it is not necessary to remove the scrap block from the tubular member before insertion into the furnace. Damage to the scrap during transportation after pressing is prevented, thereby avoiding falling apart of the block.

The present invention thus offers many advantages to the steel processor but the invention is not limited to steel scrap only. As will be obvious to those skilled in the art the apparatus of the present invention has application in many other fields where bundling or pressing of scrap materials is practiced.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. Apparatus for use in pressing and transporting blocks of scrap material, comprising:

- a tubular member (3) open at both ends thereof and acting as a block carrier;
- a supporting chain (9) comprising a plurality of releasably interconnected chain segments (10), said supporting chain (9) being connected to said tubular member (3); and
- a rigid support member (1) provided with a groove (5) for

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receiving said supporting chain (9), said rigid support member (1) removably receiving said tubular member (3) at one of the open ends of said tubular member to form a scrap receiving receptacle, said scrap being pressed in said formed receptacle, whereby when said tubular member (3) is removed from said rigid support member (1) after a pressing operation for transporting the pressed scrap block, said scrap block is releasably retained in said tubular member (3) by said interconnected chain segments (10).

2. Apparatus according to claim 1 wherein said chain segments include releasable connecting pieces at ends thereof.

3. Apparatus according to claim 2 wherein said releasable connecting pieces each include a pin (22) coupled to a withdrawal means (17) for releasably retaining two ends of said chain segments (10), whereby withdrawal of said pin separates said chain segments to release a scrap block supported by said supporting chain.

4. Apparatus according to claim 3 wherein said withdrawal means comprises a separating line (17) carried by said tubular member (3) for selectively withdrawing said pins (22).

5. Apparatus according to claim 1 further comprising a separating line (17) carried by said tubular member (3) and interconnected to said chain segments (10) for selectively releasing said interconnected chain segments (10).

6. Apparatus according to claim 1 wherein said supporting chain (9) includes a plurality of connecting chains (25) connecting said chain segments (10) to the lower edge portion of said tubular member (3).

7. Apparatus according to claim 1 wherein said tubular member (3) includes projections (11) extending from the walls thereof for suspending said tubular member.

8. Apparatus according to claim 1 wherein said tubular member (3) is mounted on said support member (1) about a vertical longitudinal axis thereof.

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