Oct. 10, 1933. K. FELLER 1,929,487

MECHANISM FOR HANDLING ROLLED STOCK

Original Filed June 6, 1931 2 Sheets-Sheet 1

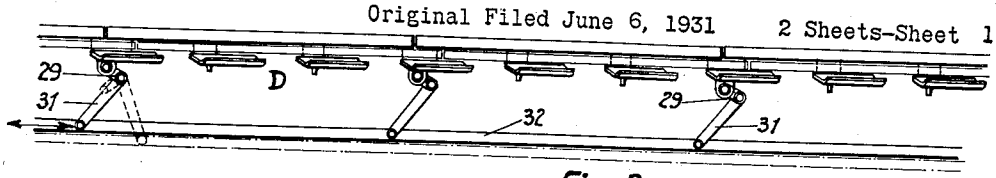


Fig. 2

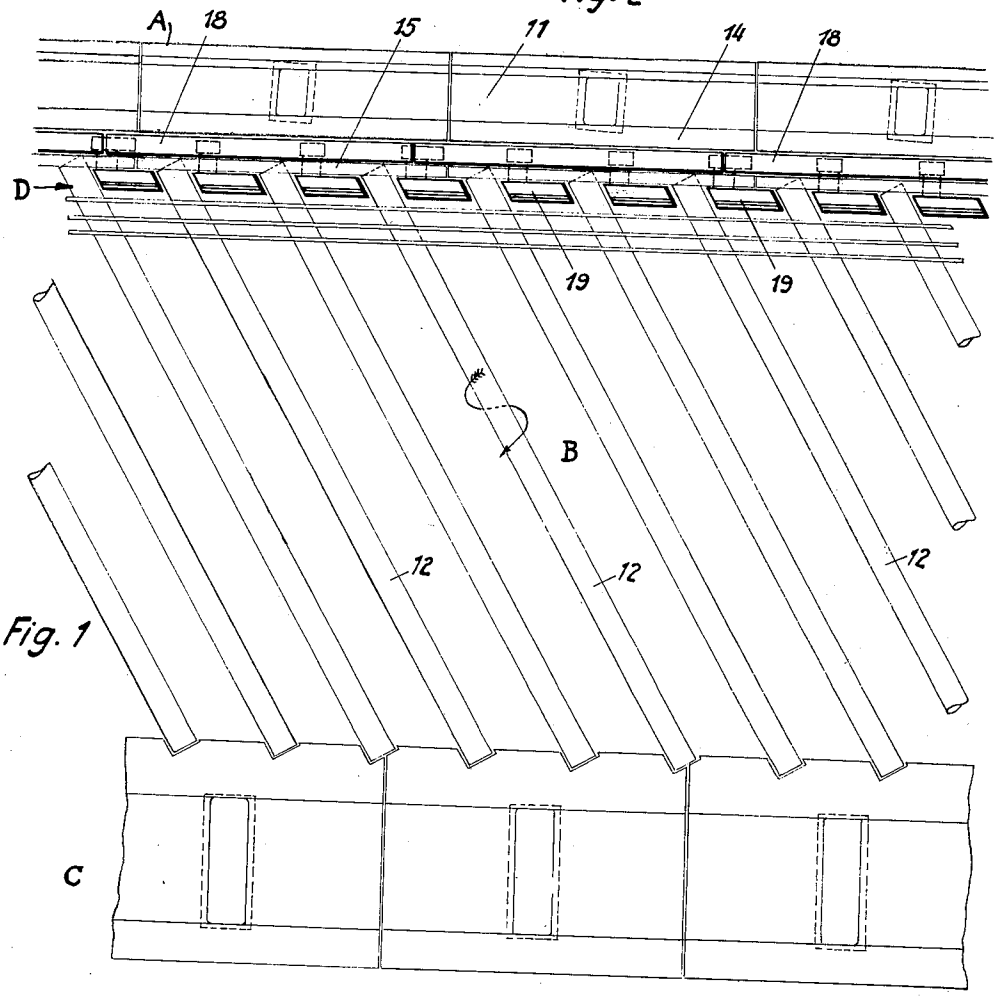


Fig. 1

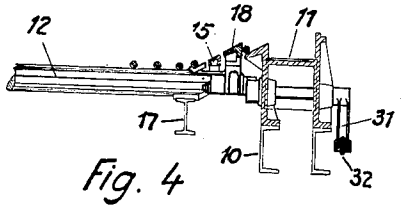


Fig. 4

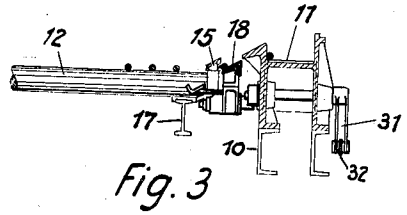


Fig. 3

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Fig. 5

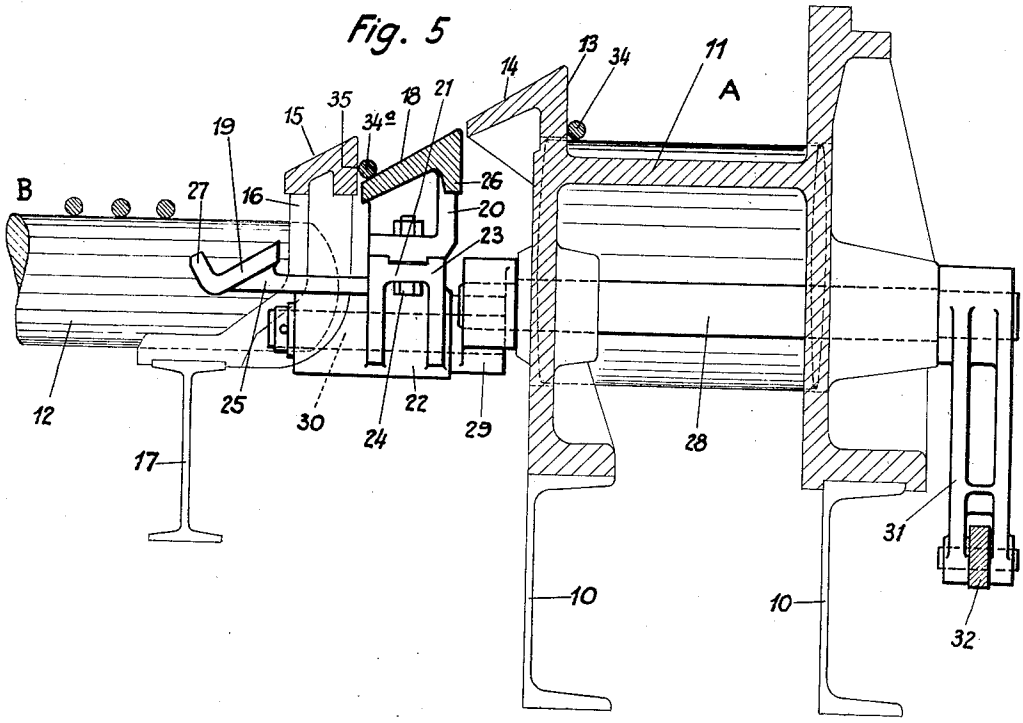
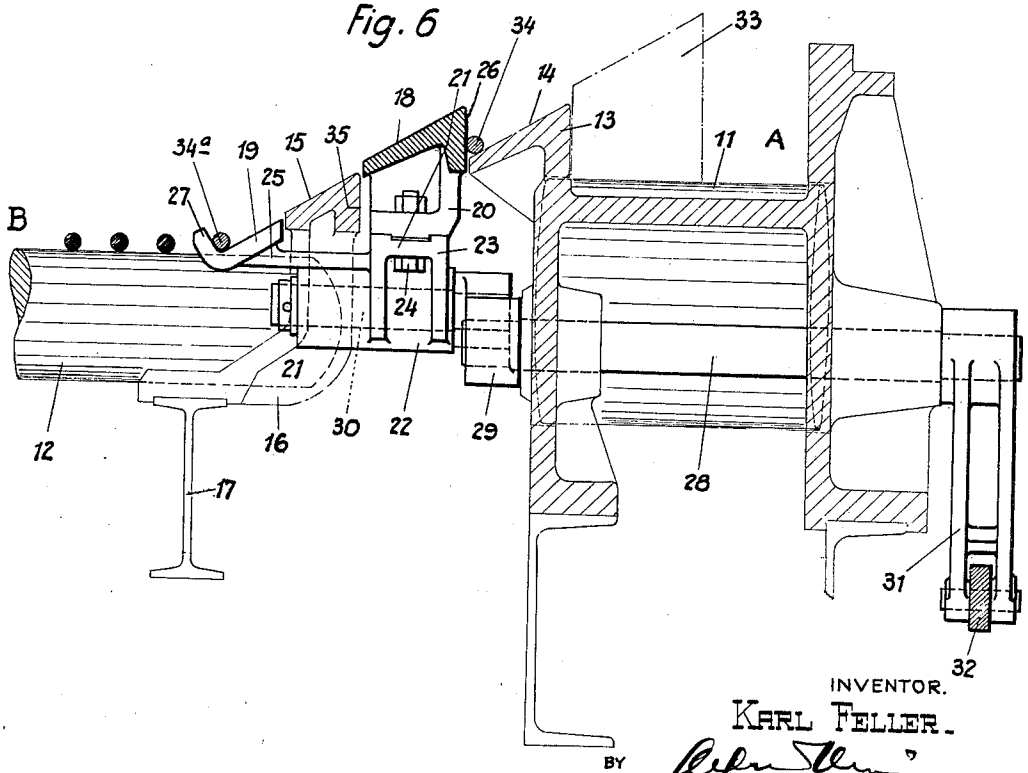


Fig. 6



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MECHANISM FOR HANDLING ROLLED STOCK

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Renewed April 5, 1933

2 Claims. (Cl. 80—42)

This invention relates to a mechanism for handling rolled stock such as rods, bars, rails and the like following their delivery from the forming rolls of a rolling mill, and has particular reference to an improved mechanism for effecting transfer of rods, bars, rails and the like from a run-out table to a hot bed for transfer by the latter to a shear table.

Rolled stock such as rods, bars, rails and the like as delivered from the forming rolls of a rolling mill onto a run-out table may not be perfectly straight, or if straight when delivered to the run-out table, may become bent by reason of being lifted from the run-out table for delivery to an associated hot bed. Accordingly, the general object of the present invention is to provide means for effecting transfer of rolled stock from a run-out table to an associated hot bed or other support, which means is operable to effect straightening of the stock during such transfer.

Another object of the invention is to provide a transfer means which is effective to accomplish the purpose mentioned in a thoroughly reliable and efficient manner, and which is of simple construction and capable of being economically installed in operative association with existing run-out tables substantially without alteration to the latter.

With the foregoing and various other objects in view, which will become more fully apparent as the nature of the invention is better understood, the same consists in the novel features of construction, combination and arrangement of parts as will be hereinafter more fully described, illustrated in the accompanying drawings and defined in the appended claims.

In the drawings, wherein like characters of reference denote corresponding parts in the different views:

Figure 1 is a top plan view of a stock handling mechanism embodying the invention.

Figure 2 is a side elevation illustrating the lever arrangement for operating the present stock transfer means.

Figure 3 is a cross section through the run-out table and the present transfer means showing the latter in its lowered position.

Figure 4 is a view similar to Figure 3 showing the transfer means in its elevated position; and

Figures 5 and 6 are enlarged cross sections similar to Figures 3 and 4, respectively.

Referring to the drawings in detail, A designates, generally, a run-out table, B a hot bed, C a shear table, and D the present stock transfer means.

The run-out table A is in the form of a relatively narrow, elongated trough suitably supported, as upon channel members 10, to receive rolled stock such as rods, bars, rails or the like as they are delivered from the forming rolls of a rolling mill, and, in accordance with general practice, rollers 11 are suitably mounted with their upper faces projecting above the bottom of said trough to facilitate the advance of the stock therealong.

The stock transfer means D is disposed at the inner side of the run-out table A for effecting a step-by-step delivery of the stock from the run-out table onto the hot bed B, and, as shown, the hot bed B is disposed between the transfer means D and the shear table C to feed the stock to the shear table.

The shear table C is or may be of the same general construction as the run-out table A and preferably is disposed parallel to the run-out table, being adapted to advance the stock fed thereto by the hot bed to suitable apparatus for further treatment.

As shown, the hot bed B preferably consists of a plurality of diagonally disposed rollers 12 driven in any suitable manner whereby the stock delivered thereto by the transfer means D is fed laterally and longitudinally from the transfer means to the shear table. However, as the particular construction and mode of operation of the hot bed forms no part of the present invention, said table, and also the run-out and the shear tables, may be of any suitable construction desired.

Referring particularly to Figures 5 and 6 of the drawings, it will be observed that the inner side 13 of the run-out table or trough A has extending from the top thereof, at a downward inclination toward the hot bed B, a ledge or shelf 14, and that spaced inwardly from said ledge or shelf is a second ledge or shelf 15 which also extends at a downward inclination toward the hot bed, the top of said shelf 15 being disposed substantially in the horizontal plane of the lower or inner edge of the ledge or shelf 14.

While the ledge or shelf 14 may be formed as an element separate from the run-out table, and may be mounted in operative relation to said table in any suitable or desired manner, the same preferably is formed as an integral lateral extension of the inner side wall 13 of the run-out trough as shown, and, likewise, while the ledge or shelf 15 may be mounted in inward spaced relation from the ledge or shelf 14 in any suitable or desired manner, the same preferably is mounted by means of suitable bracket arms 16 on the

same supports 17 on which the hot bed rolls are mounted.

The stock transfer means D for cooperation with the ledges or shelves 14 and 15 to effect a step-by-step transfer of the stock from the run-out table to the hot bed preferably is composed of a plurality of duplicate sections or elements arranged in end to end relation as shown, but as will hereinafter become more fully apparent, said transfer means may readily be embodied in a single elongated section or element approximating in length the combined lengths of the plural sections.

Each of the several sections or elements of the transfer means D illustrated in the present instance comprises a ledge or shelf 18 located between the ledges or shelves 14 and 15 for cooperation with the latter, and one or more ledges or shelves 19 fixed with respect to the ledge or shelf 18 and disposed inwardly of the ledge or shelf 15 for cooperation with the latter ledge or shelf and also with the hot bed rollers.

Adjacent ends of adjacent ledges or shelves 18 are provided with bracket formations 20 as illustrated in Figures 2, 5 and 6, and by means of these brackets adjacent ends of adjacent ledges or shelves 18 are mounted on common supporting elements 21, each such supporting element comprising a hub formation 22 carrying bracket formations 23 upon which the bracket formations 20 are bolted or otherwise suitably secured as indicated at 24. The several ledge or shelf sections or elements 18 thus are connected together in end to end relation and constitute in effect a single elongated ledge or shelf.

From each supporting element 21, and also from each shelf section 18, an arm or arms 25 extend laterally inward beneath the ledge or shelf 15 and carry at their inner ends the ledges or shelves 19, which latter are of relatively short length and are arranged in end to end spaced relation for downward movement between adjacent hot bed rollers 12.

The upper faces of the ledge or shelf elements 18 are inclined downwardly and inwardly preferably but not necessarily at the same angle as the upper face of the ledge or shelf 14, and in addition, each of said elements 18 is provided at its side nearest the ledge or shelf 14 with a straight and flat vertical face 26 for a purpose which will presently appear. Similarly, the upper faces of the several ledges or shelves 19 are inclined downwardly and inwardly preferably but not necessarily at the same angle as the upper face of the ledge or shelf 15, which may have the same angularity as the ledges or shelves 14 and 18. In addition, each ledge or shelf element 19 is turned upwardly along its inner edge as indicated at 27 to provide a substantially vertical straight and flat face the purpose of which also will presently appear.

Mounted in suitable bearings at spaced points along the length of the run-out table is a plurality of horizontal shafts 28, one for each of the supporting elements 21, and upon the inner end of each of said shafts is formed or secured a crank 29 which is inclusive of a pin 30 extending through a hole in the hub formation 22 of the related supporting element. Thus, by rotation of the shafts 28 the several supporting elements 21, and consequently the several ledge or shelf elements 18 and 19, are adapted to be raised and lowered.

An arm 31 is formed on or fixed to the outer end of each shaft and said arms are connected together by a rod 32. Thus, by means of said rod the several shafts are rotatable in unison, whereby the ledges or shelves 18 and 19 are raised and lowered in unison, while obviously, by means of a suitable lever or other operating means (not shown) connected with the rod 32, the shafts may be rotated in either direction desired at any time desired. Moreover, in this way the desired amount of vertical movement of the ledge or shelf elements 18 and 19 may readily be obtained, and the said ledge or shelf elements may be supported in any position desired as long as desired.

The ledge or shelf elements 18 and 19 are movable between operative lowered and raised positions as illustrated in Figures 5 and 6, respectively, and, as shown, the ledges or shelves 19 are disposed below the ledges or shelves 18 an amount corresponding substantially to the difference in elevation of the ledges or shelves 14 and 15, respectively. When the ledges or shelves 18 and 19 are in their lowered position the upper inclined faces of the ledges or shelves 18 form in effect continuations of the upper inclined face of the ledge or shelf 14, or in other words, the uppermost portions of the ledges or shelves 18 are disposed substantially in alinement with the lowermost portion of the upper face of the ledge or shelf 14. Manifestly, therefore, when the ledges or shelves 18 are in their lowermost position, rods, bars, rails or the like may roll or slide from the ledge or shelf 14 onto the inclined upper faces of the ledge or shelf elements 18 unhindered. On the other hand, when the ledge or shelf elements 18 are in their raised position, as shown in Figure 6, the uppermost portions of said elements are disposed considerably above the lower inner edge of the ledge or shelf element 14, whereby the vertical faces 26 of said elements 18 constitute abutments or stops against which rods, bars or the like gravitating down the ledge or shelf 14 are adapted to strike. As a consequence, due to the impact of the rods or bars with the flat, straight surface 26, and to the tendency of the rods or bars to wedge themselves into the substantially V-shaped space formed by the flat surface 26 and the straight, flat upper face of the ledge or shelf 14, an initial straightening of the hot and relatively soft rods or bars is effected during the first stage of the step-by-step transfer of the rods or bars to the hot bed.

Due to the ledges or shelves 19 being disposed below the plane of the ledges or shelves 18 an amount as heretofore stated, the upper faces of said ledges or shelves 19 are disposed substantially flush with the upper face of the ledge or shelf 15 when the ledges or shelves 18 are in their raised positions aforesaid, and when the ledges or shelves 18 and 19 are in their lowered positions, as shown in Figure 5, the ledge or shelves 19 are disposed entirely below the uppermost faces of the hot bed rollers 12.

Means of a known type, or of any type desired, is provided for lifting the rods, bars, rails or the like out of the run-out trough A and for delivering the same onto the ledge or shelf 14, such means being conventionally indicated by dotted lines at 33 in Figure 6 of the drawings. That is to say, said means may consist in accordance with present practice of a series of flaps which are swingable between horizontal and vertical positions, said flaps preferably but not necessarily being interconnected with the operating means for the vertically movable ledges or shelves 18

and 19, whereby they are operated in harmony with said ledges or shelves. When said flaps are in their lowered positions they are disposed between and below the upper faces of the rollers 11 of the run-out trough, and the rods, bars or the like in passing into the run-out trough thus overlie said flaps so that when the latter are swung to a vertical position the rods, bars or the like are elevated. The free ends of the flaps are beveled or inclined inwardly as illustrated in Figure 6, and thus as the rods or bars are elevated they tend to roll or slide inwardly toward the inner side wall of the run-out trough. Consequently, as soon as the flaps 33 have been swung an amount sufficient to raise the rods, bars or the like above the top of the ledge or shelf 14, the said bars immediately roll or slide onto and down said ledge or shelf 14.

In view of the foregoing the operation of the mechanism will be apparent. Assuming a status of the mechanism as illustrated in Figure 5, with a rod or bar 34 disposed in the run-out trough A and a rod or bar 34*a* disposed on top of the shelf 18 and resting against the flat vertical face 35 of the ledge or shelf 15, it is apparent that upon elevation of the ledges or shelves 18 and 19 to the position shown in Figure 6 the rod or bar 34*a* will be lifted until it is free to roll or slide down the ledge or shelf 15 onto the ledges or shelves 19, which are now disposed flush or substantially flush with said ledge or shelf 15 as shown in Figure 6, and that in so rolling or sliding and suddenly being stopped by the flanges 27 a final rod or bar straightening effect is produced. If the flaps 33 are swung upward to the position shown in Figure 6 simultaneously with elevation of the ledges or shelves 18, 19, the rod or bar 34 will be elevated by said flaps onto the ledge or shelf 14 at the same time the rod or bar 34*a* is delivered onto the ledge or shelf 15, and thus, simultaneously with rolling or sliding of the rod or bar 34*a* down the inclined upper faces of the ledges or shelves 15, 19, the rod or bar 34 will roll or slide down the inclined upper face of the ledge or shelf 14 against the straight, flat inner face 26 of the ledge or shelf 18, effecting an initial straightening thereof. If now the ledges or shelves 18, 19 are lowered as shown in Figure 6, the ledges or shelves 19 by moving between the hot bed rollers 12 below the upper faces of said rollers, will deposit the rod or bar 34*a* onto said rollers and, by reason of the rotation and angular disposition of said rollers, the rod or bar will immediately be moved from a position overlying the ledges or shelves 19 so that upon subsequent elevation of the same the rod or bar will remain on the hot bed rollers for transfer by the latter to the shear table. At the same time the downward movement of the ledges or shelves 18 will result in release of the rod or bar 34 whereby said rod or bar may roll or slide down the upper inclined face of said ledges or shelves 18 against the flat vertical face 35 of the ledge or shelf 15, where a second straightening effect is produced by reason of impact of the rod or bar against said face 35 and by reason of tendency of the rod or bar to wedge itself into the substantially V-shaped space formed between the face 35 and the upper faces of the shelves 18. In other words, according to the present arrangement, as one rod, bar or the like is lifted from the run-out trough onto the ledge or shelf 14 another rod or bar is lifted by the ledges or shelves 18 onto the ledge or shelf 15 for delivery to the ledges or shelves 19, so that there is a continuous step-by-step transfer of the rods or bars from the run-out trough to the hot bed during the normal operation of the mechanism. In this connection it is apparent, of course, that the flaps 33 need not be elevated simultaneously with elevation of the ledge or shelf elements 18, 19, but may be elevated subsequently to elevation of said ledge or shelf elements. Moreover, it is apparent that the transfer mechanism may embody only a single transfer stage or any plurality of transfer stages desired.

From the foregoing description considered in connection with the accompanying drawings it is believed that the construction, operation and advantages of the invention will be clearly understood. It is desired to point out, however, that while a single specific embodiment of the invention has been illustrated in the present instance, the same is readily capable of various modifications and changes and embodiment in other mechanical structures within the spirit and scope of the invention as defined in the appended claims.

I claim:

1. In mechanism of the class described, in combination, a run-out table, a hot-bed of the spaced roller type to one side of said run-out table, a stationary shelf between said run-out table and said hot-bed, said shelf having a straight side facing the run-out table and having its top face inclined downwardly away from the run-out table and towards the hot-bed, a vertically movable shelf between the run-out table and said stationary shelf, the top of said vertically movable shelf being inclined downwardly away from the run-out table and towards said stationary shelf, means for moving said vertically movable shelf between upper and lower positions in which the plane of its top is disposed respectively above and below the plane of the top of the stationary shelf, means for delivering stock from the run-out table to the top of the vertically movable shelf when the latter shelf is in its lower position, whereby the stock gravitates down the top of said vertically movable shelf and by contact with the straight side of the stationary shelf is straightened, said vertically movable shelf operating when raised to its upper position to elevate the stock and to deliver the same to the top of the stationary table, and a plurality of shelf sections connected with said vertically movable shelf for movement therewith between upper and lower positions, said shelf sections being disposed between the rollers of the hot-bed and being inclined downwardly away from the stationary table and having abutments at their sides remote from the stationary table, said shelf sections when in their upper positions being disposed to receive stock gravitating down said stationary shelf, and to support the stock above the rollers of the hot-bed and when in their lower positions being disposed below the plane of the top of the rollers, whereby the stock is deposited on the rollers during downward movement of the shelf sections.

2. The combination as set forth in claim 1 in which a downwardly inclined stationary shelf is disposed between the run-out table and the vertically movable shelf, and in which the side of the vertically movable shelf adjacent to the run-out table is straight and constitutes an abutment against which stock gravitating down the last mentioned stationary shelf contacts when the vertically movable shelf is in its upper position.

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