No. 701,024. Patented May 27, 1902.

V. E. EDWARDS.

CONVEYER FOR METAL RODS OR BARS.

(Application filed Nov. 4, 1901.)

(No Model.) 2 Sheets—Sheet 1.

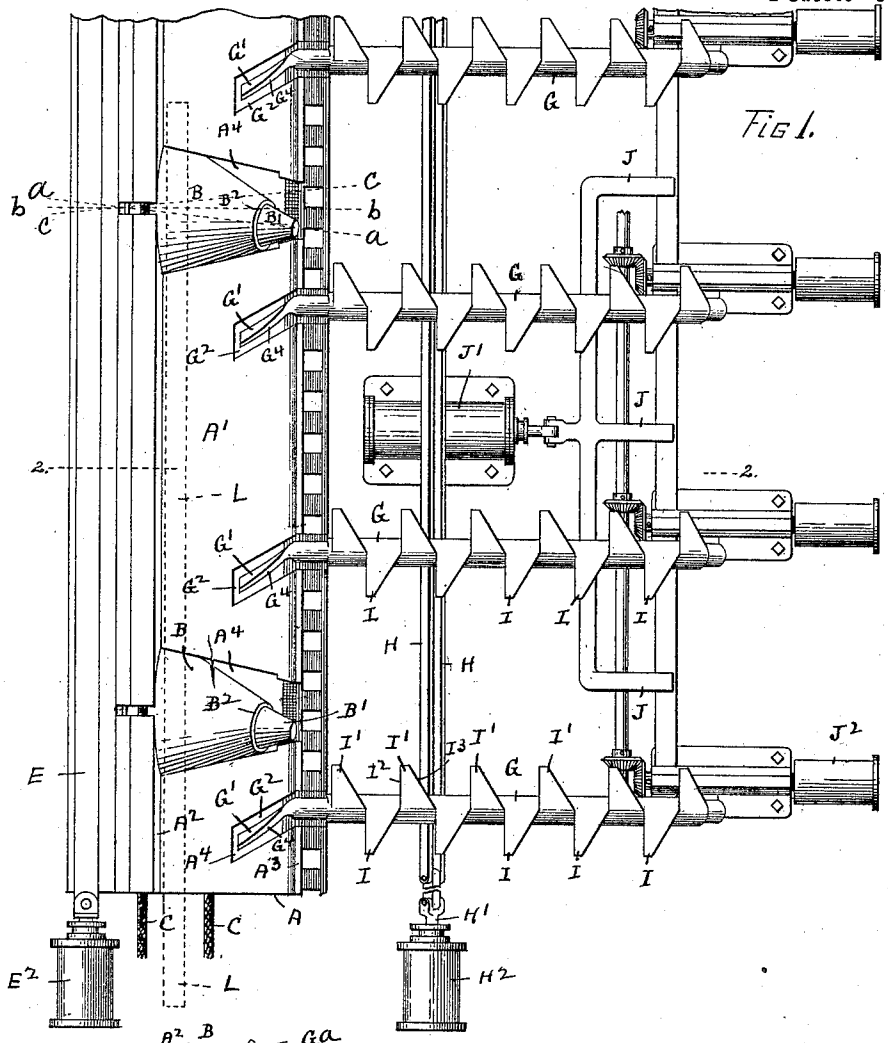

Fig 1.

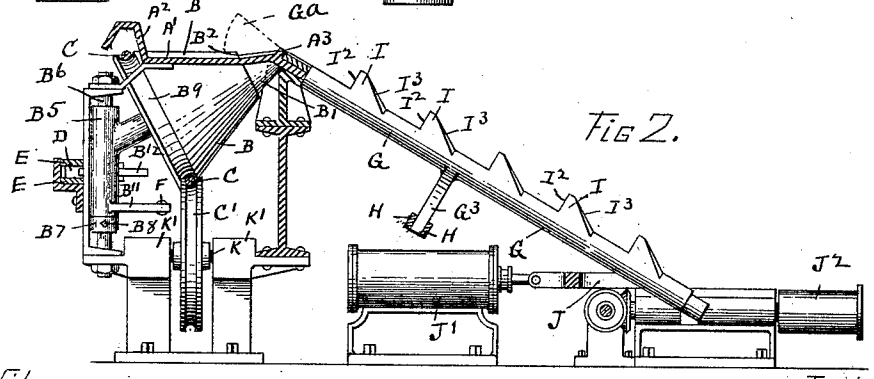

Fig 2.

Witnesses.
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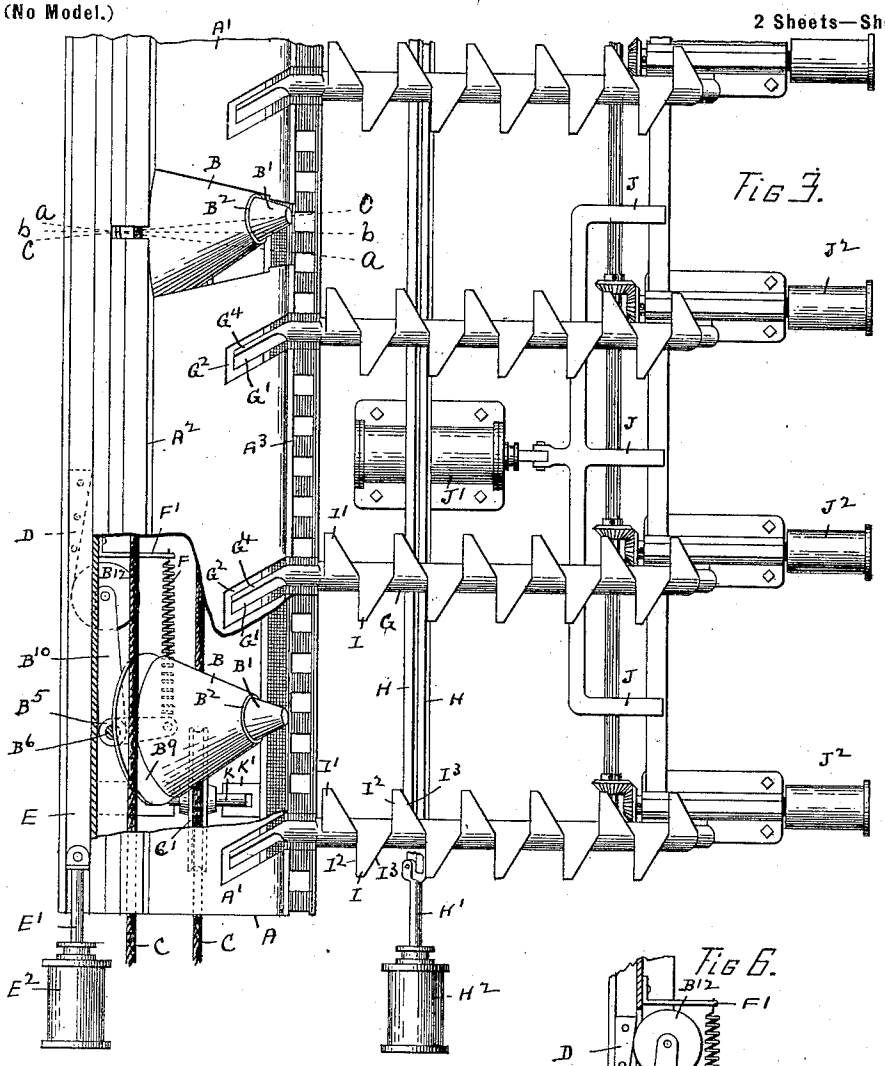

Fig 3.

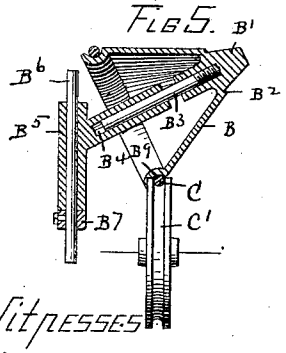

Fig 5.

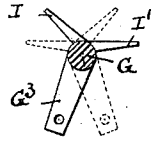

Fig 4.

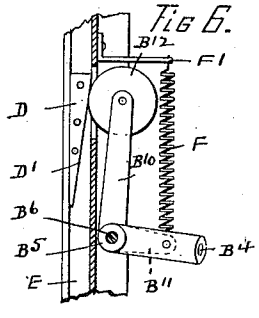

Fig 6.

Witnesses
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UNITED STATES PATENT OFFICE.

VICTOR E. EDWARDS, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE MORGAN CONSTRUCTION COMPANY, OF WORCESTER, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

CONVEYER FOR METAL RODS OR BARS.

SPECIFICATION forming part of Letters Patent No. 701,024, dated May 27, 1902.

Application filed November 4, 1901. Serial No. 81,034. (No model.)

To all whom it may concern:

Be it known that I, VICTOR E. EDWARDS, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Conveyers for Metal Rods or Bars, of which the following is a specification, accompanied by drawings forming a part of the same, in which—

Figure 1 represents a top view of a portion of a conveyer embodying my invention. Fig. 2 is a sectional view on line 2 2, Fig. 1. Fig. 3 is a top view of a portion of the conveyer with the conical conveyer-rolls in position to deliver the bar upon the ends of the inclined skids and having a portion of the trough between the conical conveyer-rolls removed to disclose a portion of the mechanism for shifting the axes of the conical conveyer-rolls. Fig. 4 is a transverse section through one of the inclined skids, the section being shown on line 4 4, Fig. 1. Fig. 5 is a vertical sectional view through the axis of one of the conical conveyer-rolls on line 5 5, Fig. 1. Fig. 6 is a detailed view of a portion of the mechanism for shifting the axes of the conveyer-rolls.

Similar reference-letters refer to similar parts in the different views.

My present invention relates to a conveyer for metal rods and bars, comprising an elevated trough provided at intervals with conveyer-rolls having their peripheries projecting through the bottom of the trough in position to contact with the bar or the rod and move it longitudinally along the trough and also comprising a series of inclined skids over which the bar or rod is conducted from the elevated trough to a lower level, said inclined skids having means for periodically arresting the downward movement of the metal bars; and my invention consists in the construction and arrangement of parts, as hereinafter described, the several features of novelty being pointed out in the annexed claims.

Referring to the accompanying drawings, A denotes an elevated trough consisting of a bottom A′ and raised sides A^2 and A^3. The trough A is provided at intervals with openings A^4, in which are placed conical rotating conveyer-rolls B, with their upper sides projecting through the openings A^4 and lying in a horizontal plane parallel with the bottom of the trough A. The conical conveyer-rolls B are "stepped" by reducing the diameter at their smaller ends, as at B′, and forming a shoulder B^2 for the purpose hereinafter described. Each of the conveyer-rolls B is attached to a spindle B^3, which is journaled in a socket B^4, projecting obliquely from the side of a tubular sleeve B^5, capable of turning about a vertical shaft B^6 and vertically adjustable thereon by means of a collar B^7, attached to the vertical shaft B^6 by a set-screw B^8. The spindle B^3 of the conveyer-roll is capable of a slight longitudinal movement in the tubular socket B^4, and the base of the conveyer-roll is provided with a peripheral groove B^9, which rests upon an endless driving-cable C, which is carried upon pulleys or carrier-rolls C′ and driven by any suitable motive power. The sleeve B^5 is provided with radial arms B^{10} and B^{11}. The arm B^{10} carries in its free end a roll B^{12}, which rests against the edge D′ of a wedge D, which is attached to a pair of reciprocating bars E E, connected at their ends to the piston-rod E′ of a steam or hydraulic cylinder E^2. The radial arm B^{11} has its free end connected by a spiral spring F with a fixed bracket F′, by which the periphery of the roll B^{12} is held against the inclined edge D′ of the wedge D, so that the reciprocation of the wedge D will cause the sleeve B^5 to swing on the vertical shaft B^6, thereby imparting a swinging movement to the conical conveyer-roll from the position shown in Fig. 1 to that shown in Fig. 3, and vice versa. In the position of the conveyer-rolls shown in Fig. 1 when the wedge D is at the end of its reciprocating movement the axes of the rolls are moved into the position indicated by the broken line *a a* and at one side of a line *b b*, which is at right angles to the side of the trough A, the axis of the roll then forming an oblique angle with the line of motion of the bar, the position of the rolls being such as to cause the bar as it passes over the conveyer-rolls to be moved sidewise against the side A′ of the trough. When the bar has nearly reached

the position in which it is desired to transfer it to the inclined skids, the conical conveyer-rolls are shifted to bring their axes from the position *a a* to the position *c c* in order to transfer the bar by a sidewise movement to the small ends of the rolls, thereby nearly stopping the longitudinal movement of the bar sufficiently to allow it to be more readily lifted by the rocking movement of the wings G′. When the bar has reached this position, the wedges D are reciprocated, allowing the spiral springs F to swing the conveyer-rolls into the position shown in Fig. 3, with their axes corresponding to the broken line *c c* and forming a similar oblique angle to the line of motion of the bar, but upon the opposite side of the right-angled line *b b*. In the latter position the rolls will carry the bar sidewise toward the smaller ends of the rolls over the shoulder B^2 and cause the bar to rest upon the reduced ends B′, in which position the bar is held from lateral movement in one direction by the side A^3 of the trough. The conveyer-rolls may be shifted into their first position, with their axes on the lines *a a*, to receive the next succeeding bar, and the bar already on the small ends of the rolls will then be held from sidewise movement by the shoulders B^2, thereby allowing a second bar to be received on the large ends of the conveyer-rolls before the preceding bar has been lifted by the wings G′ from the small ends of the rolls.

While the bar is being carried upon the small ends of the conveyer-rolls its longitudinal movement is reduced, owing to the decreased diameter of the rolls, thereby allowing the second bar entered upon the conveyer-rolls to overlap the first bar and permitting the bar supported upon the smaller ends of the conveyer-rolls to be transferred to the skids without the necessity of a long gap between consecutive bars.

Journaled in suitable bearings at one side of the trough A are a series of inclined skids G, having their upper ends terminating in oblique wings G′, which are inclosed in openings G^2 in the trough A, and the bar is supported by the reduced ends B′ of the conveyer-rolls over the oblique wings G′. The skids G are provided midway their length with a depending arm G^3, pivotally attached to the reciprocating bars H, which are connected with the piston-rod H′ of the steam or hydraulic cylinder H^2, by which a rocking motion is imparted to the skids G, thereby raising the oblique wings G′, as shown by broken lines G^a in Fig. 2, and lifting the bar off the ends of the conveyer-rolls and supporting it upon the inclined edges G^4 of the wings. The inclination of the edges G^4 is sufficient to cause the bar to slide by gravity upon the skids G until it is carried against the uppermost horizontal row of a series of projecting arms I.

The skids G are provided with a series of arms I, projecting from one side, and a series of similar arms I′, projecting from the opposite side and alternating with the arms I and arranged in different planes, so that the rocking of the skids by the reciprocating bars H will alternately carry the arms I and the arms I′ from a position above the skids G to one below them, thereby allowing the bars to slide from one horizontal row of arms to the next lower row. The upper sides I^2 of each of the wings I I′ are at right angles to the skids G and serve as stops to limit the downward-sliding motion of the bar; but the lower sides I^3 of the arms form an oblique angle to the skids, and as the skids C are rocked the bars are successively lifted upon the inclined edges I^3 of the arms, which are sufficiently inclined to cause the bar to be quickly moved by gravity down the skid until it is arrested by the next lower series of arms on the opposite side of the skids. A step-by-step movement is thus imparted to the bars as the skids G are rocked until they reach the lower end of the skids G, where the bars are delivered upon a platform, from which they are pushed by a reciprocating pusher J, actuated by a steam or hydraulic cylinder J′, upon conveyer-rolls J^2. The driving-cable C, by which the conical conveyer-rolls B are rotated, is supported upon pulleys or carrier-rolls C′, which are attached to spindles K, journaled in boxes K′ and capable of a longitudinal movement therein, so that as the sleeves B^5 are vertically adjusted on the shafts B^6 the pulleys C′ will be capable of a lateral movement to accommodate them to the position of the driving-cable C and allow the position of the conical rolls B to be adjusted toward the side A^2 or the side A^3 of the trough, as may be required. The adjustment of the conical rolls by the vertical adjustment of the sleeves B^5 is permitted by the longitudinal movement of the spindles B^3 in the sockets B^4.

The operation of my improved conveyer is as follows: The conveyer-rolls B are placed in the position shown in Fig. 1, with their axes corresponding with the line *a a*, and the bar L (shown in broken lines) is entered into the trough A and moved along by the rotation of the rolls, which carries the bar L sidewise against the side A^2 of the trough. When the bar is advanced partially through the trough, the rolls are shifted to bring their axes into the position of the line *c c*, causing the bar to be moved sidewise against the side A^3 of the trough and be carried over the shoulder B^2 and upon the reduced ends B′ of the conveyer-rolls, where it is supported over the wings G′ of the skids G. The skids G are then rocked to lift the bar off the conveyer-rolls and cause it to slide down the inclined edges G^4 of the wings G′ and be stopped against the upper horizontal row of arms I and over the uppermost horizontal row of arms I′. The reverse rocking motion of the skids G lifts the bar upon the inclined edges 1^3 of the uppermost horizontal row of arms I′, from which the bar slides by gravity against the next lower row of arms

I', and over the second row of arms I, by which it is next lifted and caused to slide by gravity against the next lower row of arms, and so on until the bar reaches the platform J, from which it is pushed by the pusher-bars J' upon the conveyer-rolls J^2. The upper sides I^2 of each of the arms I and I' serve as stops to arrest the downward movement of the bars, and the lower inclined sides I^3 provide a momentary support for the bars of greater inclination than that of the skids G, which serve to accelerate the initial movement of the bar, thereby rendering its downward movement certain with a less inclination of the skids G. The conveyer-rolls ride upon the driving-cable C, which is supported upon the carrier-rolls C', the weight of the conveyer-rolls and of the bar thereon being supported by the cable which holds the conveyer-rolls with their spindles B^3 slightly lifted in the sockets B^4, as shown in Fig. 5, and each of the carrier-rolls C' is placed contiguous to one of the conveyer-rolls B, with the distance between the vertical planes passing through the centers of the carrier and conveyer rolls, respectively, less than one-half the sum of the diameters of the carrier and conveyer rolls. This relative position of the carrier and conveyer rolls causes the conveyer-rolls to be supported in a uniform vertical position independently of the sag in the cable C between the carrier-rolls in the same manner as they would be supported were they to be placed directly over the carrier-rolls, while at the same time the cable provides a slightly-yielding support, which overcomes any hammering action of the conveyer-rolls incident to the intermittent passage of a heavy bar over the conveyer-rolls. Instead of the platform J a car may be substituted or the bars may be delivered upon the floor.

So far as I am aware it is broadly new to employ a series of conveyer-rolls which are capable of having their axes shifted relatively to the line of movement of the advancing bar, and I do not wish to confine myself to the specific mechanism shown and described for swinging the conveyer rolls. Neither do I wish to confine myself to the employment of conical rolls, although I deem such preferable, as they reduce the speed of the longitudinal movement of the bar as it is moved from the larger to the smaller ends of the rolls.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a conveyer for metal rods or bars, the combination with a series of rotating conveyer-rolls arranged to support a bar thereon, of means whereby the axes of said rolls are shifted into a position at one side of a line at right angles to the line of longitudinal movement of the bar, whereby a sidewise movement will be imparted to the bar toward one end of the conveyer-rolls, a side wall for limiting the sidewise movement of the bar toward the end of the conveyer-rolls, means whereby the axes of said rolls are shifted from their first position to a position on the opposite side of said right-angled line, whereby a sidewise movement will be imparted to the bar toward the opposite end of the conveyer-rolls, a second side wall for limiting the sidewise movement of the bar toward the opposite end of the conveyer-rolls, and means for preventing the reverse sidewise movement of the bar when the conveyer-rolls are again shifted to their first position, substantially as described.

2. In a conveyer for metal rods or bars, the conveyer-rolls, having means for rotating said rolls and having means for shifting the axes of said rolls from one angle with the line of longitudinal movement of the bar supported on said rolls to another and a different angle, whereby the bar will be moved toward either end of said rolls, means for limiting the sidewise movement of the bar as it is moved toward either end of said rolls, substantially as described.

3. The combination with a series of rotating conveyer-rolls capable of moving a bar longitudinally supported thereon, of means for changing the angle of the axes of the rolls with the line of longitudinal movement of the bar, whereby the bar is moved sidewise toward either end of said conveyer-rolls and side walls by which the sidewise movement of the bar is limited in either direction, substantially as described.

4. The combination of a series of rotating, conical conveyer-rolls having their upper surfaces arranged in the same plane in order to support a bar thereon said rolls having their axes placed obliquely to the line of longitudinal motion of the bar, whereby the bar is moved by a sidewise movement to either the larger or smaller ends of said rolls, said rolls being capable of having their axes shifted in order to reverse the sidewise movement of the bar, substantially as described.

5. The combination with a series of rotating conveyer-rolls for moving a bar longitudinally said rolls having a reduced section at one end forming a step and having their axes capable of being placed at an oblique angle to the line of longitudinal movement of the bar, whereby the bar is moved sidewise toward the reduced end of the conveyer-rolls and over said step, substantially as described.

6. The combination of a series of rotating, conical conveyer-rolls having their small ends reduced in diameter forming steps, means whereby said rolls are shifted in position to bring their axes obliquely to line of longitudinal movement of a bar on said conveyer-rolls, whereby a bar is moved sidewise upon the reduced ends of said rolls, means for limiting the sidewise movement of said bar, a series of oscillating wings placed obliquely to their axes of oscillation and beneath a bar held on the reduced ends of said conveyer-rolls, and means for oscillating said wings, whereby a bar is lifted off said rolls, substantially as described.

7. In a rod or bar conveyer an endless driving-cable, a series of conical rolls provided with grooves at their large ends with said grooved ends resting upon said driving-cable, oblique spindles attached to said conical rolls rotating in sockets and capable of a rising-and-falling movement therein said sockets being held in vertically-adjustable sleeves means for adjusting said sleeves and carrier-rolls by which said driving-cable is supported beneath said conveyer-rolls said rolls being capable of a horizontal, sidewise adjustment, substantially as described.

8. In a rod or bar conveyer the combination of a series of conveyer-rolls, a driving-cable beneath and supporting said rolls and carrier-rolls beneath and supporting said cable said conveyer-rolls being placed contiguous to said carrier-rolls, whereby said conveyer-rolls are maintained in substantially the same horizontal plane and are also allowed a slight yielding motion, substantially as described.

9. The combination with a series of conveyer-rolls of a series of oscillating inclined skids, wings projecting obliquely from the ends of said skids and normally beneath a bar or rod held on said conveyer-rolls and means for oscillating said skids in order to lift a bar off said rolls by the oscillating movement of said wings, substantially as described.

10. The combination with a series of conveyer-rolls, of a series of inclined skids journaled in bearings, wings projecting from the ends of said skids and obliquely thereto, said wings lying normally beneath a bar or rod supported on said conveyer-rolls, means for oscillating said wings having inclined bar-supporting surfaces when raised over which a bar is moved by gravity upon said inclined skids, substantially as described.

11. The combination in a rod or bar conveying mechanism, of a series of inclined skids journaled in bearings and having a series of arms projecting therefrom on opposite sides of said skids and arranged in horizontal rows, with the horizontal rows on one side of said skids alternating with the rows on the opposite side of the skids, with the upper sides of said arms forming stops for a bar in its downward movement by gravity over said inclined skids and the lower sides of said arms forming oblique angles to the skids and constituting surfaces of greater inclination than the inclination of the skid, whereby an accelerated, initial movement is imparted to a bar in its movement from one row of arms to another, and means for oscillating said skids, substantially as described.

12. The combination with a series of inclined skids and means for oscillating said skids, of a series of arms projecting from said skids and provided with inclined sides arranged to be brought beneath a bar as it is moved by gravity downwardly over said skids and to raise the bar by the oscillation of the skids, whereby an initial impetus is given to the bar at each series of arms, substantially as described.

13. The combination with a series of conveyer-rolls of a series of oscillating wings, said wings being placed obliquely to their axis of oscillation and held normally beneath a bar or rod supported on said conveyer-rolls and means for oscillating said wings, whereby a bar or rod is lifted off said conveyer-rolls, substantially as described.

Dated this 30th day of October, 1901.

VICTOR E. EDWARDS.

Witnesses:

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M. M. SCHUERMANN.