Sept. 24, 1968 A. SCHMERMUND 3,402,528

MACHINES FOR WRAPPING BLOCK-LIKE ARTICLES

Filed Sept. 29, 1965 5 Sheets-Sheet 1

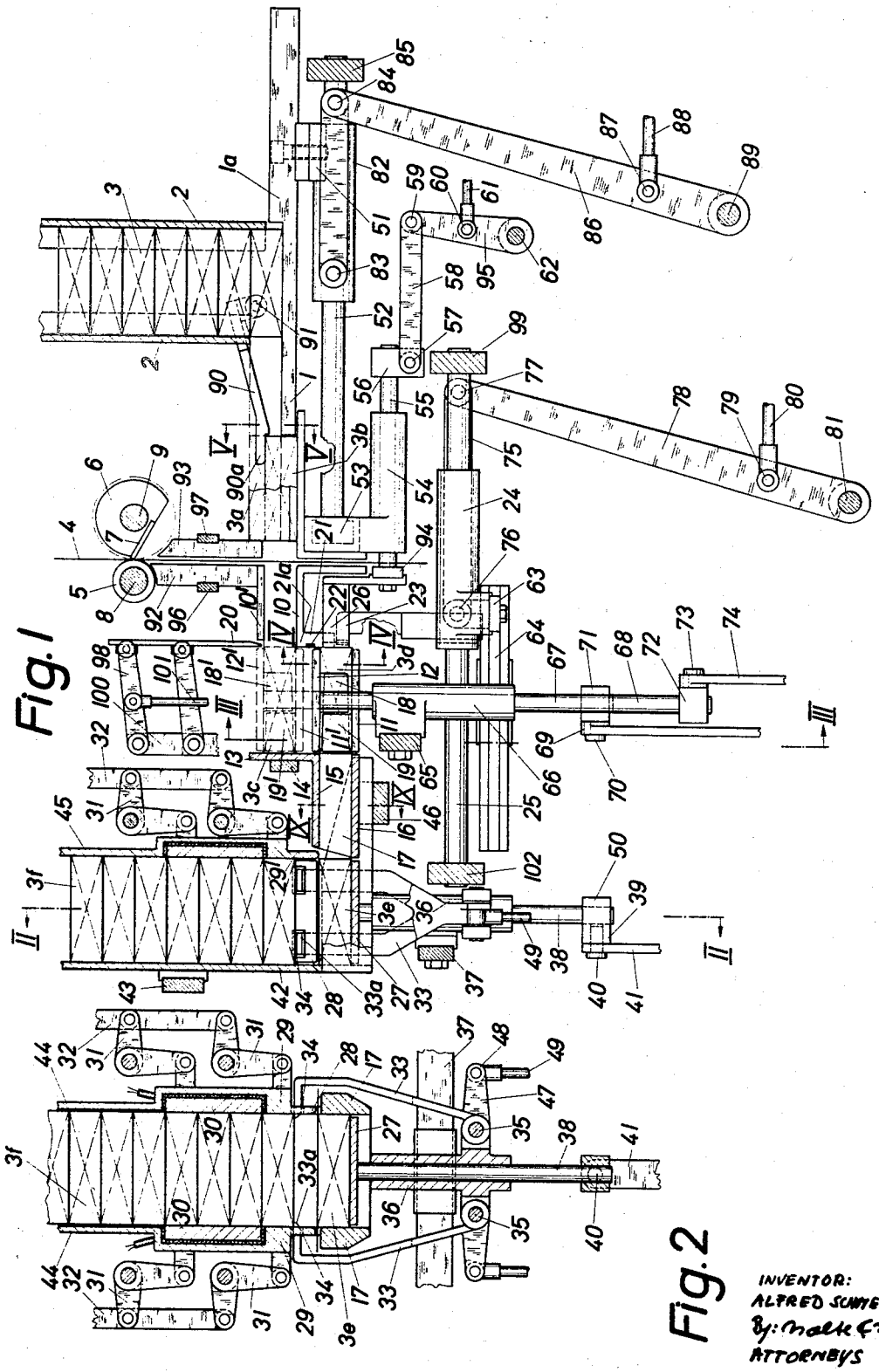

Fig. 1

Fig. 2

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MACHINES FOR WRAPPING BLOCK-LIKE ARTICLES

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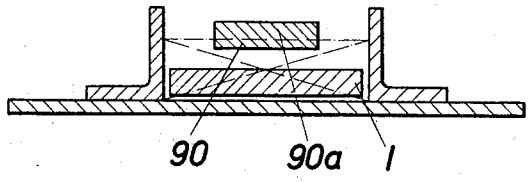

Fig. 5

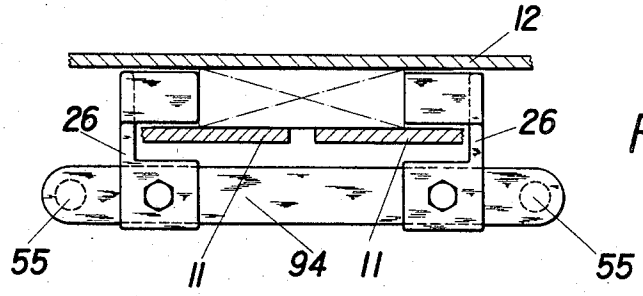

Fig. 4

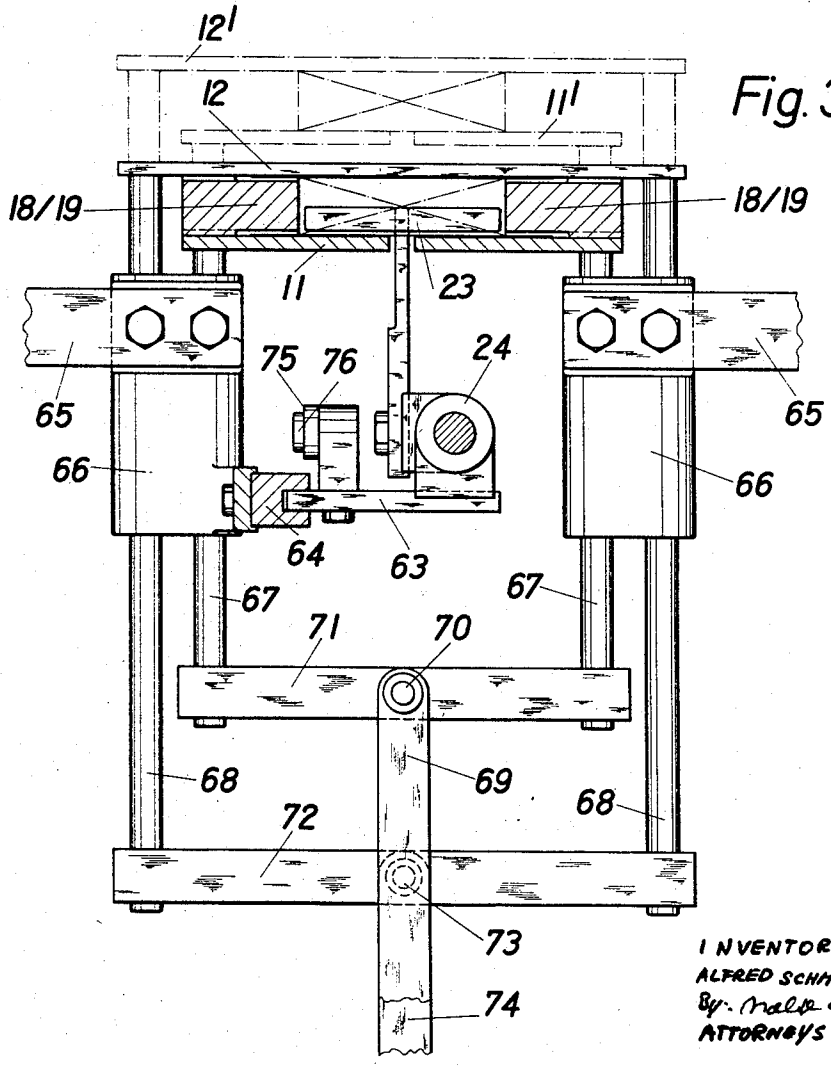

Fig. 3

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MACHINES FOR WRAPPING BLOCK-LIKE ARTICLES

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Fig.6

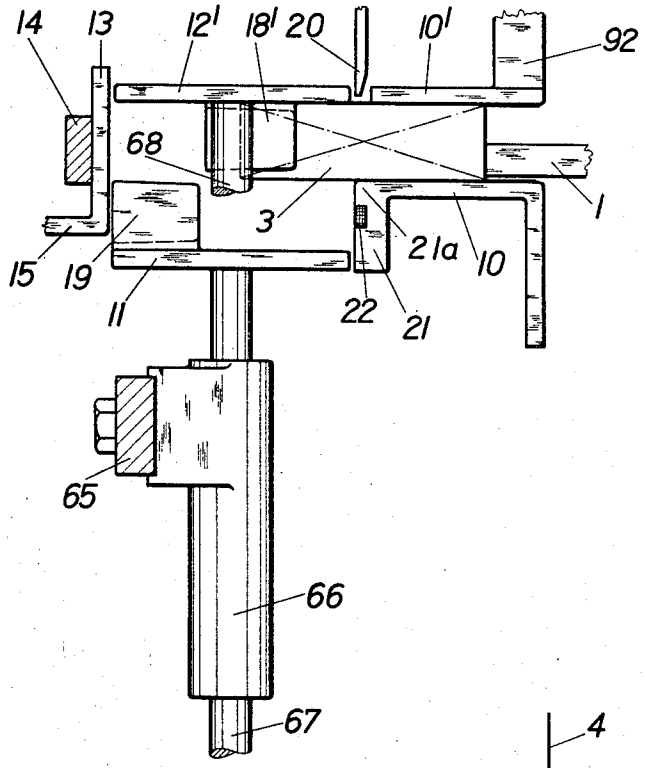
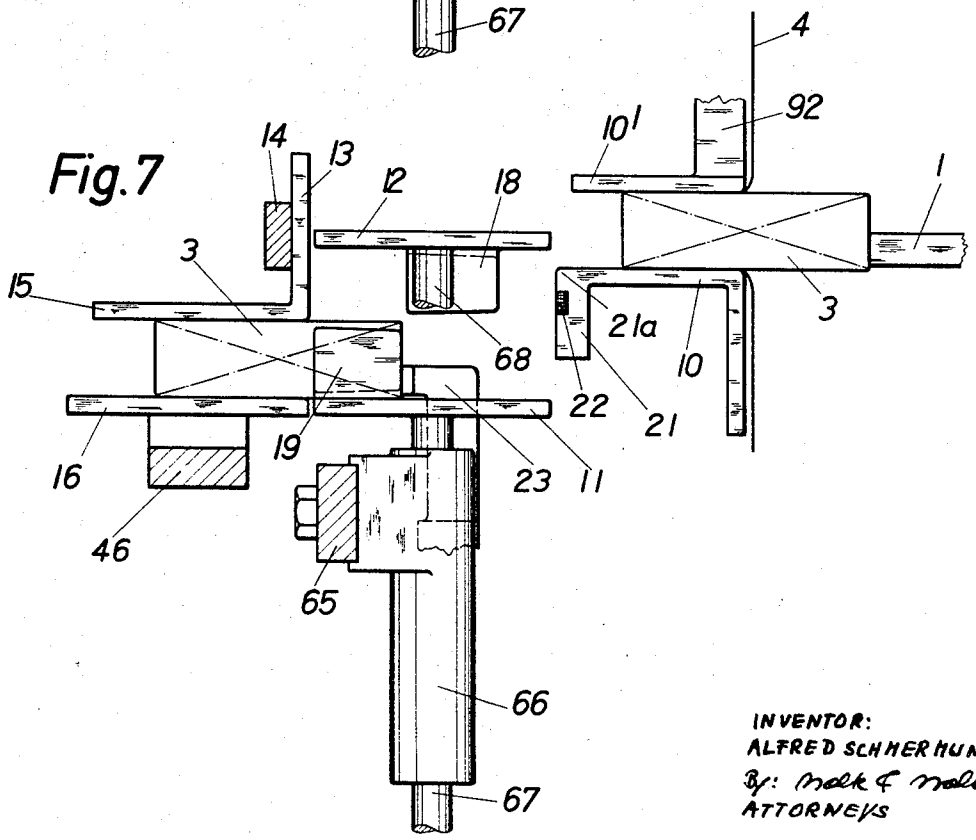


Fig.7



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Sept. 24, 1968 A. SCHMERMUND 3,402,528

MACHINES FOR WRAPPING BLOCK-LIKE ARTICLES

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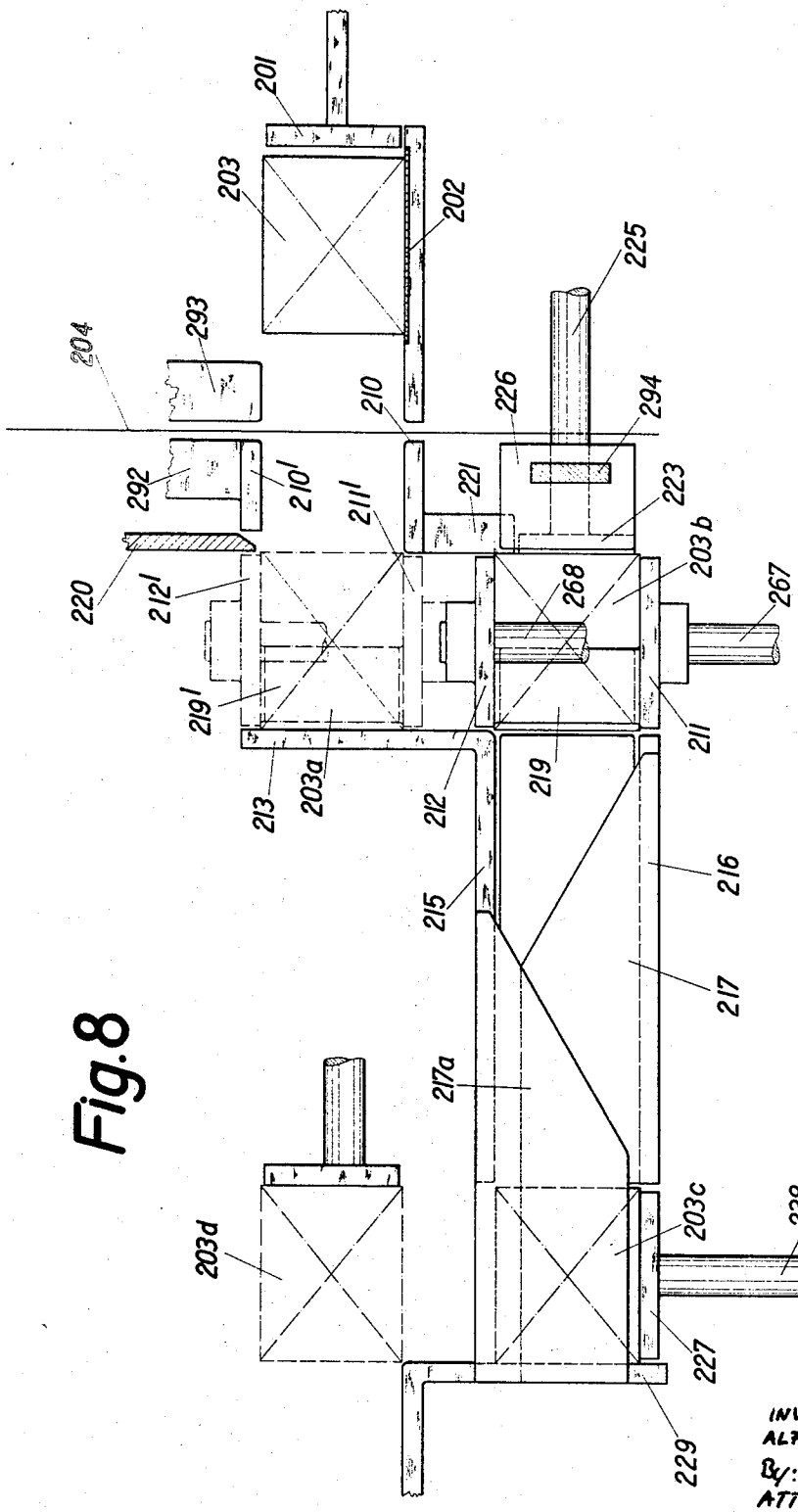

Fig.8

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MACHINES FOR WRAPPING BLOCK-LIKE ARTICLES

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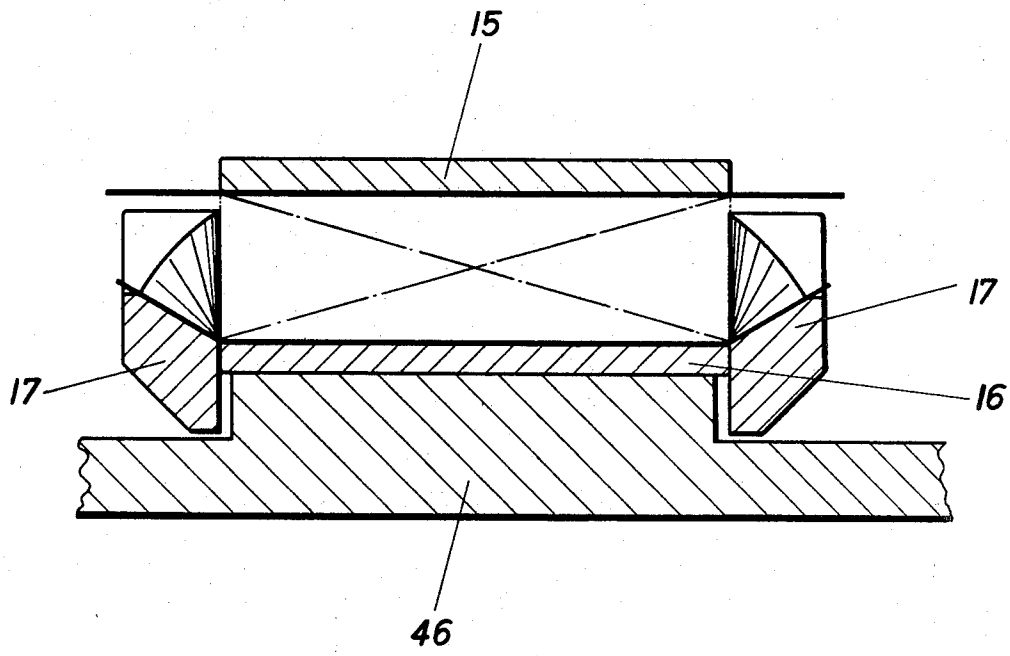
Fig. 9



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3,402,528

MACHINES FOR WRAPPING BLOCK-LIKE ARTICLES

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7 Claims. (Cl. 53—230)

ABSTRACT OF THE DISCLOSURE

A machine is described for wrapping block-like articles, for example blocks of cigarettes. The machine comprises a first push-member for feeding a block-like member past a feed path for wrapping material into a cell with the wrapping material partly wrapped around the block-like member, the cell having a top wall and a bottom wall, means for moving the cell with the block-like member therein downwards, a second push-member for removing the block-like member from the cell and means for moving the top wall and the bottom wall separately upwards, the top wall being moved first and the bottom wall being moved subsequently. Thereby, the wrapping process is accelerated since feeding of a next block-like member into the cell can begin as soon as the top wall has reached its uppermost position and before the bottom wall has reached its uppermost position. Folding members are provided for completing the wrapping during the movement of the block-like member.

Disclosure of the invention

The invention relates to machines for wrapping block-like articles, for example cigarette blocks or block-like assemblies of cigarette blocks.

It is an object of the invention to provide means for accelerating the wrapping process as compared with similar known means.

The invention consists in a machine for wrapping block-like articles, comprising a first push member for feeding a block-like article along a first feed path, a cell having a bottom wall and a top wall being arranged for receiving the article after it has been fed beyond a second feed path for wrapping material, the second feed path extending transversely to the first feed path, means being provided for reciprocating the cell in a substantially vertical direction for moving the article to a lower level than that of the first feed path, a second push member being provided for removing the article from the cell and moving it along a third feed path at the lower level.

To make the invention clearly understood reference will now be made to the accompanying drawings which are given by way of example and in which:

FIG. 1 shows an elevational view, partly in section, of a wrapping machine of the invention;

FIG. 2 shows a section along the line II—II of FIG. 1;

FIG. 3 shows a section along the line III—III of FIG. 1;

FIG. 4 shows a section along the line IV—IV of FIG. 1;

FIG. 5 shows a section along the line V—V of FIG. 1;

FIGS. 6 and 7 show details of the machine in different working positions;

FIG. 8 shows a modified machine of the invention; and

FIG. 9 shows a section along the line IX—IX of FIG. 1.

The machine illustrated in FIGS. 1 to 7 and 9 serves for wrapping blocks of cigarettes in transparent plastics sheet material. The machine comprises a channel **2** for cigarette blocks **3**, the walls of the channel **2** being held by bars of a machine frame (not shown). The blocks **3** are inserted into the channel **2** manually or by a suitable

supply device known per se. The blocks **3** leave the channel **2** at its lower end where a slide **1** is provided having a stepped part **1***a*. The slide **1** is mounted on a slide holder **51** guided by guide rods **52** of which only one is visible in the drawings. The guide rods **52** are mounted on transverse bars **53** and **85** of the machine frame. A pivot **83** links an operating rod to the slide holder **51**. A lever **86** is connected to the pull rod by a pivot **84**, the lever **86** being linked by a pivot **89** to the machine frame. The lever **86** is turnable about the pivot **89** by a rod **88** linked to the lever **86** by a pivot **87**.

A retaining bar **90** having a finger **90***a* is turnable downwards about a spindle **91** under the action of gravity when such turning movement is not impeded. At the transitional region between the bar **90** and the finger **90***a*, a step is formed.

A web **4** of wrapping material is fed to the machine in a manner known per se. Suitable lengths of wrapping material are cut from the web **4** by a cutter **7** mounted on a rotatable roller **6** mounted on a shaft **9**, the cutter **7** co-operating with a counter-roller **5** mounted on a shaft **8**. Transverse bars **96** and **97** of the machine frame hold guide means **92** and **93** which define a feed path for the lengths of wrapping material.

Guides **10** and **10'** are provided adjacent to the wrapping material when present and at its side remote from the channel **2**, the guides **10** and **10'** defining part of a feed path for articles to be wrapped and serving to bend the length of wrapping material around part of each article as the article passes through the feed path for the wrapping material, which, when seen sideways, assumes the shape of a U. Each article is moved horizontally from the channel **2** along its feed path, passes the feed path for the length of the wrapping material, and moves along its feed path between the guides **10** and **10'**. A cell having a bottom wall **11** and a top wall **12** is vertically movable, the uppermost position of the cell being indicated by broken lines at **11'** and **12'**, its lowermost position being indicated by full lines. When the cell is at its uppermost position **11'**, **12'** it receives an article when arriving, since in such uppermost position **11'**, **12'** the bottom and top walls of the cell are aligned with the guides **10** and **10'**. FIG. 3 illustrates further details of the cell. The top wall **12** is mounted on guided rods **68** which are slidable in twin guides **66** and are inter-connected by a transverse bar **72** to which a rod **74** is pivotally connected at **73**, the rod **74** being reciprocatable by a suitable cam arrangement not shown. The guides **66** are mounted on bars **65** of the machine frame.

The bottom wall **11** of the cell is slotted into two parts, each part of the bottom wall **11** being mounted on a guide rod **67**, the guide rods **67** sliding in the twin guides **66** and being inter-connected by a transverse bar **71** to which a rod **69** is pivotally connected at **70**, the rod **69** being reciprocatable by a suitable cam arrangement not shown. On the parts of the bottom wall **11**, at each side thereof folding blocks **19** are fixed for folding corner parts of the upper portion of the folding material while the article moves through the cell, as will be explained further below. From FIGS. 1 and 3, it will be noted that about centrally of the cell further folding blocks **18** are provided which are mounted on the top wall **12** of the cell. It is not absolutely necessary to mount the folding blocks **18** and **19** in the manner just described, but this kind of mounting is advantageous as will be explained further below. As can be seen from FIG. 1, the folding blocks **18**, **19** do not extend through the entire length of the cell.

On a transverse bar **14** of the machine frame a wall **13** is provided which closes the cell when in its uppermost position and thus forms an abutment for the article when introduced into the cell. To a holding member **100** of the machine frame, levers **98** are pivoted, which form

part of a parallelogram arrangement. A folding member **20** is pivoted to the levers **98**. The levers **98** and therewith the folding member **20** are movable by a pull rod **101**. The folding member **20** is provided at the rear of the cell. The guide **10** is provided with a depending guide wall **21** in which an electric heating member **22** is inserted. An edge **21***a* between the guide **10** and the depending wall **21** assists in the folding of the wrapping material as well be explained further below.

Adjacent the cell when in its lowermost position, a folding member **94** is provided which has a laterally extending folding finger **26** which can enter the cell from the rear (see also FIG. 4). The folding member **94** is mounted on guide rods **55** slidable in guides **54** mounted on a transverse bar **53** of the machine frame. The guide rods **55** are linked by means of a link **56** to an operating rod **58** pivoted at **57** to the link **56** and pivoted at **59** to a lever **95** which is pivoted to the machine frame at **62** and is connected to an operating rod **61** by a pivot **60**.

A push member **23** is provided which can enter the cell through the slot in the bottom wall **11** when the cell is in its lowermost position (see also FIG. 3). The push member **23** is mounted on a guide member **24** slidable along a guide rod **25** attached to transverse bars **99** and **102** of the machine frame. The guide member **24** is prevented from rotation by an element **63** attached thereto, the element **63** being slidable in a guide rail **64**. The element **63** carries a spindle **76** to which a rod **75** is pivotally connected which by means of a pivotal connection **77** is linked to a lever **78** which is pivoted at **81** to the machine frame and operable by an operating rod **80**.

When the cell is in its lowermost position, top and bottom walls **15** and **16** form a further feed path for the article to be wrapped, the further feed path being aligned with the cell. Preferably the wall **15** is made in one piece and held by the wall **13**. The wall **16** is mounted on a transverse bar **46** of the machine frame. Furthermore, a folding member **17** is provided for folding the lower part of the wrapping material upwards. The bottom wall **16** has a slot (see FIG. 9) so that the push member **23** can enter such slot, whereby it is possible for the push member **23** to move the article directly onto a platform **27** for moving the wrapped article upwards as will be explained further below. Thereby, it is achieved that each individual article is pushed onto the platform **27** by the push member **23**; it is thus not necessary that an article has to push another article in front of it.

The platfrom **27** is mounted on a guide rod **38** slidable in a guide **36** mounted on a transverse bar **37** of the machine frame. By means of a flange **50**, a connecting member **39** is attached to the guide rod **38**. An operating rod **41** which is movable by a cam not shown is pivotally linked by a spindle **40** to the connecting member **39**. The guide **36** carries pivotal spindles **35** (see FIG. 2) pivotally holding levers **33** having fingers **33***a* for supporting wrapped articles **3***f* when moved upwards by the platform **27**. The levers **33** have laterally arranged limbs **47** to which operating rods **49** are pivoted at **48**. Above the platform **27**, a channel is provided for wrapped articles. The channel has a stationary wall **42** fixed to a transverse rod **43** of the machine frame. The upper portions **44** and **45** of the remaining walls of the channel are also stationary, whereas the lower wall portions **29** of the channel are movable sideways by means of lever arrangements **31** operable, in known manner, by operating rods **32**. In the lower wall portions **29** heating plates **30** are provided for sealing the wrapping material around the articles under heat. In the lower wall portions **29**, perforations **34** are provided through which the fingers **33***a* extend. The lower margins **28** of the lower wall portions **29** are rounded off as shown in FIG. 2 for facilitating the entrance of wrapped articles into the channel.

The machine described operates as follows, reference being also made to FIGS. 6 and 7.

The block-like articles **3** which are to be wrapped are positioned in the channel **2** from which they are removed singly one by one by the slide **1** and its stepped parts **1***a*. All the movable parts of the machine are operated in timed relationship to one another by means of cams in a manner known per se. Each article **3** is first moved out of the channel **2** by means of the stepped part **1***a*, the retaining bar **90** with its finger **90***a* engaging the article when in the position **3***a* so that the slide **1** and its stepped part **1***a* can return to their initial position shown in FIG. 1, the article being held in the position **3***a* by the step between the finger **90***a* and the bar **90**. When the slide **1** has returned the article drops downwards from the positions **3***a* into the position **3***b* and now lies in front of the slide **1**. On the next stroke of the slide **1** the article is moved forwards from position **3***b* into the cell, which is in its uppermost position indicated by the broken lines **11'** and **12'** and assumes the position **3***c* within the cell, While travelling from position **3***b* to position **3***c* the article encounters a length of wrapping material, and moves beyond the feed path of the wrapping material which thereby is folded around the article in U-shape by the guides **10** and **10'**. While the article is introduced into the cell, the folding blocks **18** and **19**, which are in the position **18'** and **19'**, fold the wrapping material at the leading end of the article. Subsequently, the folding member **20** descends and turns the upper adjacent part of the wrapping material downwards. While the folding member **20** descends the cell is moved downwards, so that its bottom and top walls **11**, **12** are in the position shown in full lines, the article being now in the position **3***d*. While the article moves from position **3***c* to position **3***d*, the guide wall **21** and the edge **21***a* fold the lower part of the wrapping at the rear of the article upwards. The heating member **22** seals the wrapping material at the rear.

In the position **3***d*, the folding finger **26** folds the rear parts of the wrapping material at the corner and at the top. Simultaneously, the push member **23** moves forward and pushes the article from its position **3***d* out of the cell into the further feed path between the walls **15** and **16**, where the folding member **17** folds the lower lateral portions of the wrapping material upwards. When the push member **23** has left the slot in the bottom wall **11** of the cell for moving the article along the further feed path, the upwards movement of the cell starts while the push member **23** returns underneath the cell. Thereby a considerable gain of time can be obtained. The push member **23** moves the article into a position **3***e* on the platform **27** which is now lifted and thereby lifts all the articles in the second channel. In a maner known per se, the lower wall portions **29** and the fingers **33***a* of the channel are moved sideways.

A particular advantage is obtained by moving the bottom wall **11** and the top wall **12** of the cell separately upwards. FIG. 6 illustrates the movements of the parts of the cell. First, the top wall reaches its uppermost position **12'** so that movement of the next article **3** by means of the push member **1** can begin. Subsequently, after a delay, the bottom wall **11** reaches its uppermost position **11'**. The bottom wall should reach its upper position when the leading end of the article reaches the folding member **19**. When the article has been fully inserted into the cell both walls **11** and **12** move jointly downwards as hereinbefore described. As soon as the push member **23** has removed to the rear of the article out of the region of the folding blocks **18**, upwards movement of the top wall **12** begins as illustrated in FIG. 7. When the article has been completely ejected from the cell, the bottom wall **11** is moved upwards. The control of the movement of the bottom wall **11** and the top wall **12** may, for example, be effected in the maner known per se by control cams which become effective at different times. By such an arrangement a considerable reduction of time is obtained for a complete cycle of movements of the cell since the insertion of an article into the cell begins before the bottom wall has completed its

upward movement. Since the total mass of the cell has been divided in two and the two walls are accelerated successively, the maximum value of the forces required is reduced.

FIG. 8 shows a modification of a machine for wrapping a composite block of individual block-like articles. The composite blocks **203** are fed by means of a conveyor **202**. A slide **201** pushes the blocks into the cell when in the position **211'**, **212'**. Wrapping material **204** is fed between guides **293** and **292** forming a feed path for the wrapping material which is folded by the guides **210**, **210'** into U-shape.

When the article has been inserted into the cell it is in the position **203***a* after the folding blocks **219** in the position **219'** have become effective. However, the movable folding member **220** and the guide wall **221** are provided. In the lowermost position of the cell with the bottom wall **211** and top wall **212** the article assumes the position **203***b* and is located in front of the guide rod **225** and its push member **223**. On a transverse member **294**, folding members **226** are provided for folding the material at the rear of the article. The bottom wall **211** and the top wall **212** of the cell are mounted on guide rods **267** and **268**. In the feed path between the walls **215** and **216**, the folding members **217** and **217***a* are provided for folding the wrapping material at the top. Along the feed path between the walls **215**, **216** an article pushes articles in front of it until they reach the position **203***c* on the platform **227** mounted on the guide rod **238**. The platform **227** moves the article along a guide wall **229**. The articles reach the position **203***d* and are removed by a further push member. It is believed that the operation of the modified machine does not need any further detailed description.

It should be clearly understood that the embodiments of the invention hereinbefore described and illustrated in the accompanying drawings are given by way of example only. Many modifications, omissions and additions are possible without departing from the spirit of this invention.

I claim:

1. A machine for wrapping block-like articles, comprising a first push member for feeding a block-like article along a first feed path, a cell for receiving said article after it has been fed beyond a second feed path for wrapping material, said cell including a bottom wall and a top wall, said second feed path extending transversely to said first feed path, means for reciprocating said cell in a substantially vertical direction for moving said article to a lower level than that of said first feed path, a second push member for removing said article from said cell and moving it along a third feed path at said lower level and first means for moving said bottom wall of said cell, and second means for moving said top wall of said cell separately from said bottom wall from said third feed path to said first feed path.

2. A machine for wrapping block-like articles, comprising a first push member for feeding a block-like article along a first feed path, a cell for receiving said article after it has been fed beyond a second feed path for wrapping material, said cell including a bottom wall and a top wall, said second feed path extending transversely to said first feed path, means for reciprocating said cell in a substantially vertical direction for moving said article to a lower level than that of said first feed path, and a second push member for removing said article from said cell and moving it along a third feed path at said lower level, said bottom wall of said cell and said top wall of said cell being separately movable from said third feed path to said first feed path by two guide rods and two operating rods, said bottom wall being movable by one of said guide rods and one of said operating rods, and said top wall being movable by the other one of said guide rods and said operating rods.

3. A machine as defined in claim **2**, and comprising blocks in said cell for folding wrapping material at the leading end of said article on reaching said cell, wherein one of said blocks is carried by said bottom wall of said cell, another one of said blocks being carried by said top wall of said cell.

4. A machine as defined in claim **3**, and comprising a finger and a lever arrangement, said finger being arranged adjacent said cell when in its lowermost position for folding the wrapping material at the rear end of said article, said finger being movable by said lever arrangement to enter said cell while in the lowermost position.

5. A machine as defined in claim **4**, and comprising a further finger arranged adjacent said cell when in its uppermost position for folding an upper portion of the wrapping material, said further finger being reciprocatable in a substantially vertical direction.

6. A machine as defined in claim **5**, and comprising a further wall adjacent said cell.

7. A machine as defined in claim **5**, and comprising heating means provided in said further guide wall.

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