United States Patent [19]

Bachus

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[54] **MORTER DEBRIS CLEANOUT APPARATUS**

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[52] **U.S. Cl.** **52/122,** 52/127, 52/173, 52/749

[51] **Int. Cl.** **E04g 21/20,** E04f 17/10

[58] **Field of Search** ..... 52/749, 218, 219, 173, 122; 220/17, 18, 1 T; 15/162

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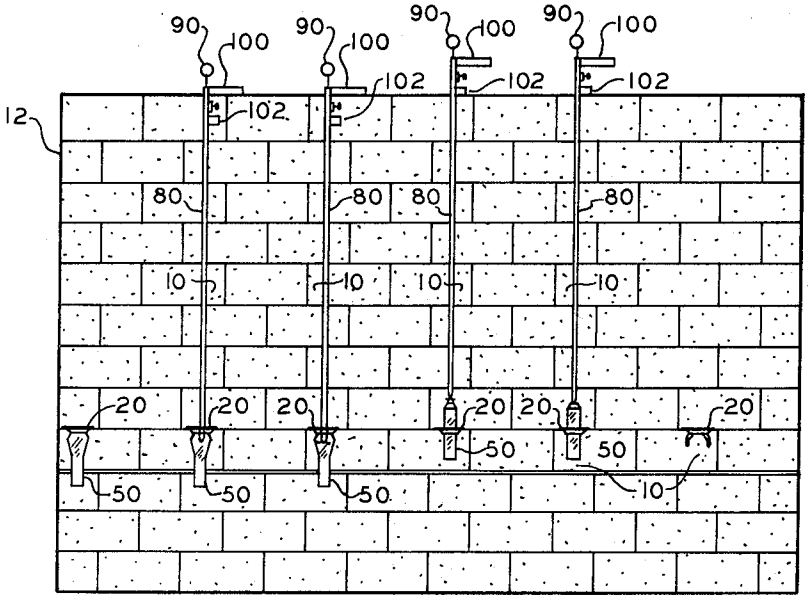
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Assistant Examiner—James L. Ridgill, Jr.
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[57] **ABSTRACT**

A morter debris collecting bag is supported in a vertical passage in a masonry block wall formed by vertically aligned holes in the blocks in which vertical reinforcing rods are to be installed. A metal frame with hooks supports the bag. The frame funnels debris into the bag which is belled. The bag has a drawstring and is withdrawn by a pole having extendible-retractable hooks at its lower end used to engage the drawstring.

6 Claims, 11 Drawing Figures



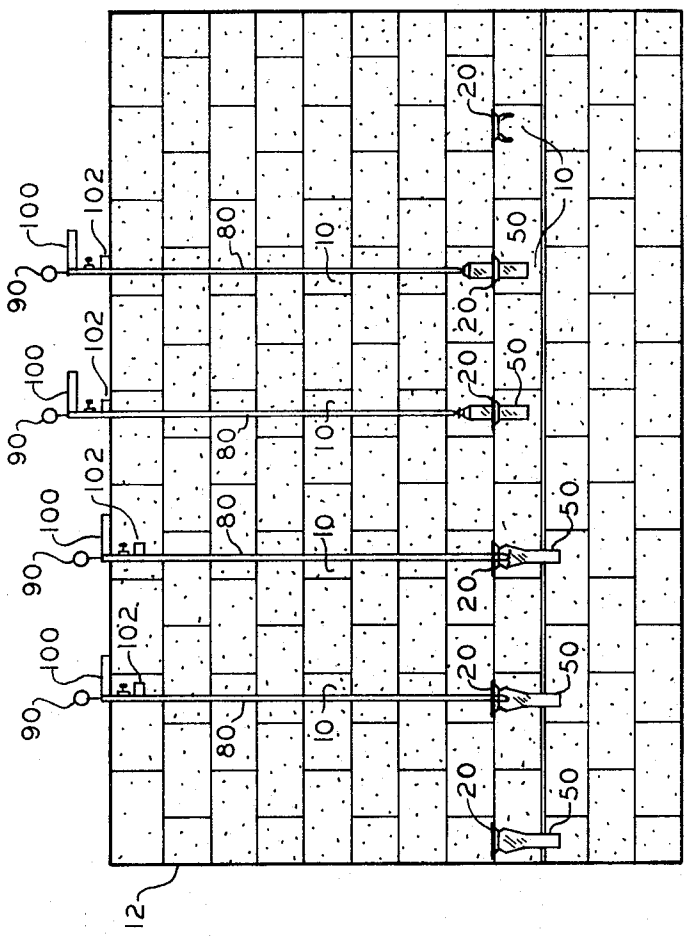


Fig. 1

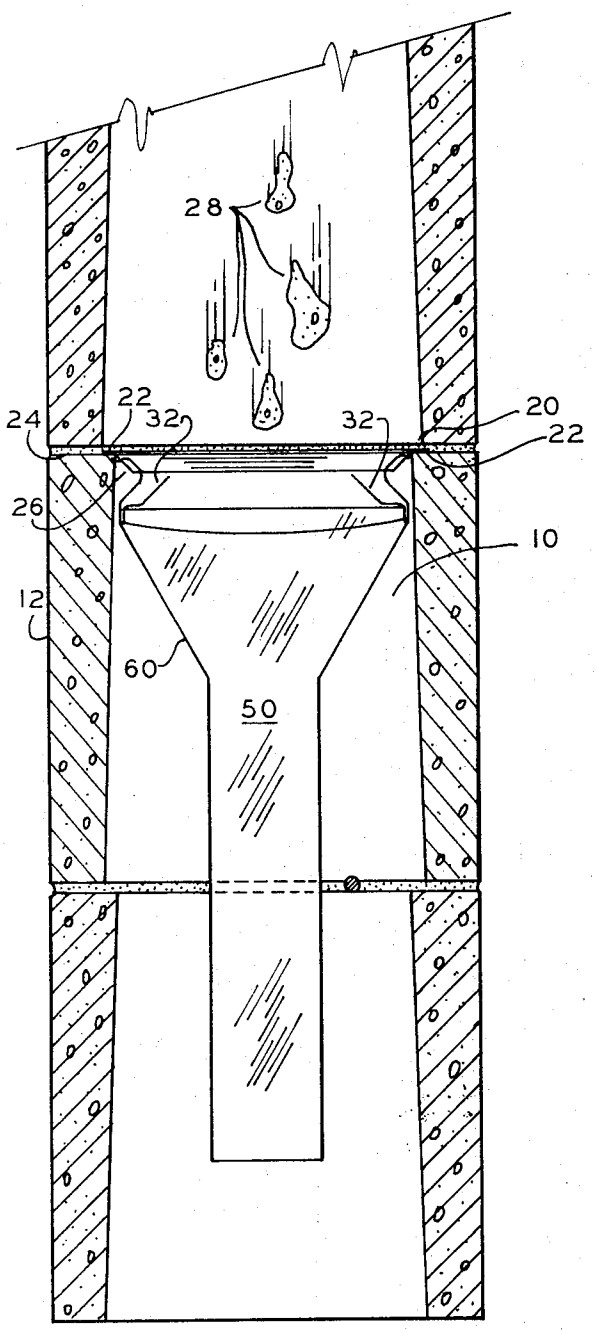


Fig. 2

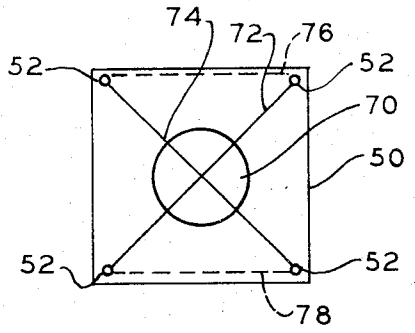


Fig. 3

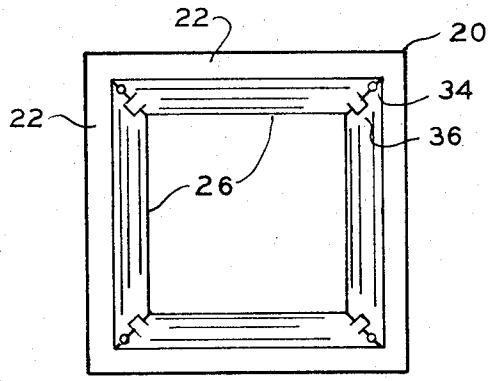


Fig. 4

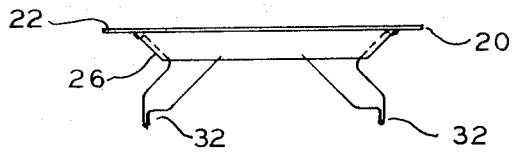


Fig. 5

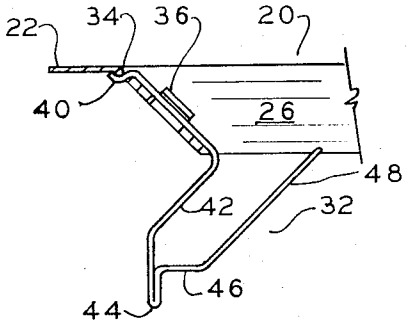


Fig. 7

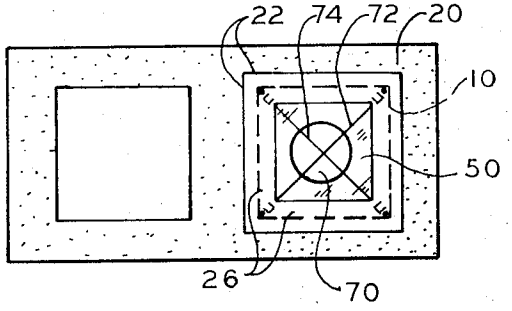


Fig. 8

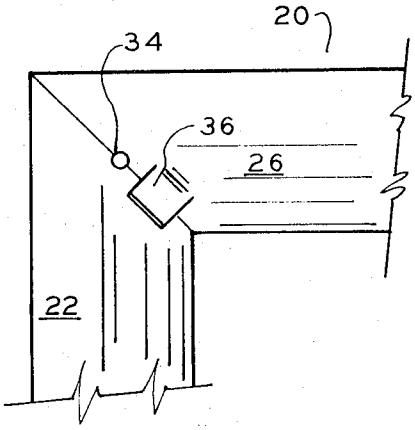


Fig. 6

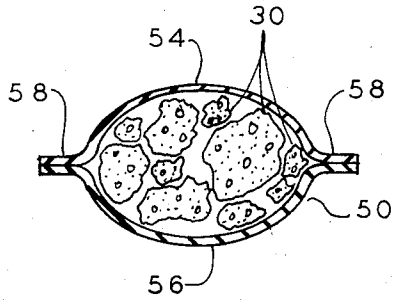


Fig. 9

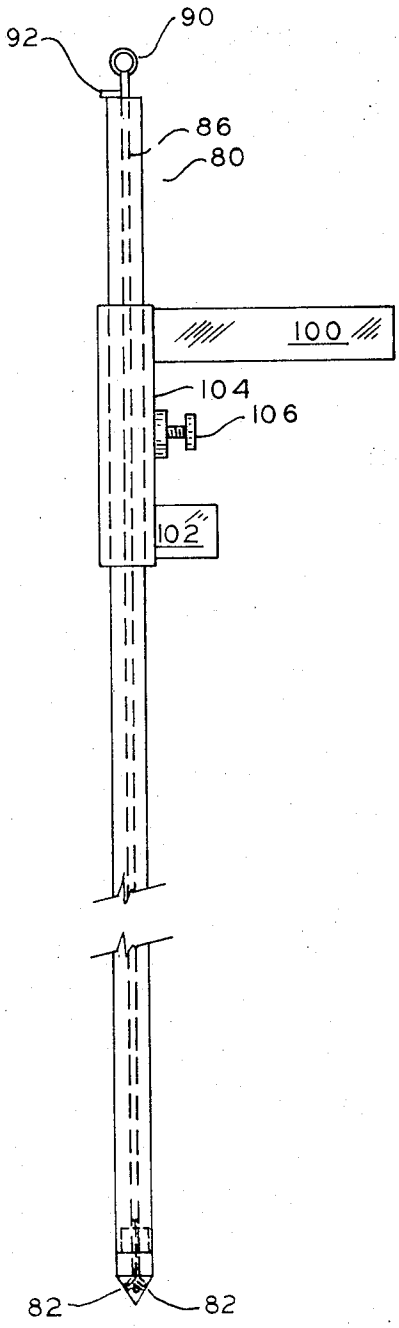


Fig. 10

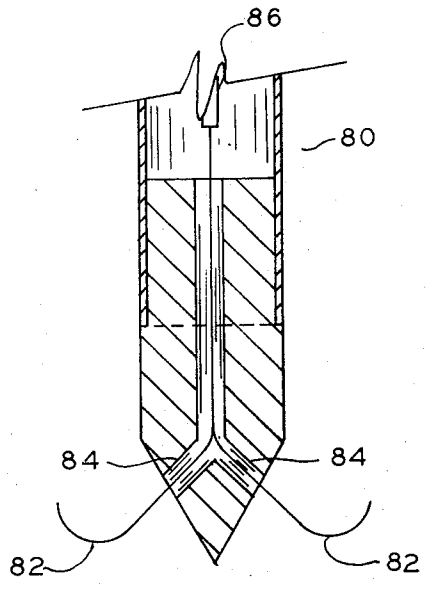


Fig. 11

MORTER DEBRIS CLEANOUT APPARATUS

BRIEF SUMMARY OF THE INVENTION

My invention relates, generally, to the problem of morter debris in the vertical passage described in the Abstract and, more particularly, to apparatus to save labor normally spent on cleaning out such debris, by collecting the debris in a container that later can be withdrawn from the passage.

Under certain building codes particularly in western states of the U.S.A., vertical reinforcing rods are required in masonry block walls, in order to gain stronger walls, particularly to better withstand earthquakes. Morter debris falls in vertical passages in such walls and interferes with installation and grouting of such rods. One objective of my invention is to provide morter debris collecting means so that morter will not have to be cleaned out of vertical passages to receive reinforcement by other means and methods requiring considerably more labor.

As will later appear in this description, such debris collecting means does not have to be installed at the bottom of the vertical passage, but instead can be positioned medial vertically of the passage, and it is a further objective of my invention to provide collection means and support means therefor adapted for such medial location.

Such vertical passages are not free of obstacles. For example, spiders to later orient reinforcing rods may be installed during wall layup, bridging the passages, and horizontal reinforcing rods may extend across the passages. Such spiders or reinforcing rods can be designed and located to provide at least about a 2 by 2 inches square area central of the passage for the operations to be later described, but this interference and space limitation is difficult work with, and may have been thought before my invention to make impossible the use of debris collecting means in the passage and the later removal of the same. Another object of my invention is to provide means for debris collection and for later removal of the debris collection apparatus adapted for use despite the obstacles of spiders or horizontal reinforcing rods.

It is an essential part of the invention that cost be reduced over other known alternatives. The main cost of present hand debris removal methods is labor. I must effect enough labor savings to substantially more than compensate for costs of materials and equipment used in my invention, and that is a further objective of my invention.

Other objectives include to provide apparatus that can be used without substantially adding to time involved in wall erection (before any cleanout), to devise a system which will work close to 100 percent of the time, to provide apparatus that can be used effectively within the normal expected skills of masons, and to design morter debris collection equipment which has due efficiency in the function of debris collection.

My invention will be best understood, together with additional objectives and advantages thereof, from the following description, read with reference to the drawings, in which:

FIG. 1 is an elevational view rather diagrammatically depicting a specific embodiment of my morter debris cleanout apparatus in use in the construction of a block wall.

FIG. 2 is an elevational view, on enlarged scale and partly in section, showing morter debris collecting means in use in a wall.

FIG. 3 is a plan view of a morter debris collecting bag.

FIG. 4 is a plan view of a frame used in supporting the bag.

FIG. 5 is an elevational view, partly in section, of the bag support means.

FIG. 6 is an enlarged, partial plan view of a portion of the frame.

FIG. 7 is a partial elevational view, on enlarged scale, of the bag support means, shown partly in section.

FIG. 8 is a plan view of a block having morter debris collecting means supported in one opening thereof.

FIG. 9 is a plan view, partly in section, of the lower end of the bag, depicting its condition when expanded by morter debris collected therein.

FIG. 10 is an enlarged elevational view of a pole used to retrieve morter debris collecting bags.

FIG. 11 is an enlarged elevational view, partly in section, showing details of hook means at the lower end of the pole.

The present invention has been demonstrated to representatives of the International Conference of Building Officials, 50 South Los Robles, Pasadena, Calif., and has been issued a "research card." This means that it can be used in areas under the jurisdiction of this organization. A research card is renewable until the time for revision of the Uniform Building Code when the subject may be made a part of the Code, and it is hoped the present research card will be so renewed and will later be incorporated into the Code revision. The International Conference of Building Officials is an organization made up of governmental and privat parties and affects building operations in certain western areas. Section 2415 (b) 3 of the Uniform Building Code provides that cleanout openings have to be provided at the bottom course of blocks as to vertical block passages in which vertical rod reinforcing is to be provided, if a wall is over four feet in height. To clean out such passages, prior to my invention usually sand is put in the affected holes after the first block course is laid. Morter falls into the passage as the wall progresses in height. The sand makes it easier to clean out the debris. To the extent the morter is set, and much of the morter will be more or less set, the morter residue must be chiseled out. The sand will then be blown out with a compressor. Access is through openings in sides of blocks (blocks are specially manufactured with such cleanout openings). The access openings have to be filled in, which is done by the use of planks and bracing over the openings before the vertical reinforcing rods are grouted in place, at which time the grout coming down the vertical passage and against the planks will fill the access openings, subject to any needed finishing operations later. According to my invention as herein described (which is the procedure that was the sugject of the research card), access openings in blocks are not needed, all morter debris that has to be removed is brought out in the container described, and no other cleanout is required.

As indicated above, the Uniform Code is concerned wtih debris in walls above four feet, so my collection apparatus does not have to collect all debris but instead only has to collect debris in upper wall layup. I prefer to provide my container support between the fourth

and fifth courses if blocks are 8 inches high, which means that the support is at about 32 inches. The container is suspended below the support and actually in this case will collect all morter debris in the affected vertical passages after the laying up of the fourth course. It will be understood from the following description however, that the invention would be operative at a somewhat lower or higher container level, and the level selected will depend on the choice of the mason or on Code control.

To summarize, the morter debris cleanout apparatus is specifically designed to keep vertical block cells clean that are to be grouted so that the grout pour may exceed four feet without providing cleanout openings as required by Section 2415 (b) 3 of the Uniform Building Code, and is generally designed, without reference to any particular existing code, to provide morter debris cleanout debris that can be installed in the lower portion of such vertical block cells, for later removal of debris, it being understood that this becomes particularly desirable when vertical metal reinforcing rods are to be grouted in place in such cells. The apparatus avoids cleaning out vertical passages, through cleanout openings, such as by a trowel, if the morter is not set up too much, or with a hammer and chisel if the morter is set. This apparatus applies generally to block walls with cells, of various materials, and of various sizes, as will be apparent. A common cement block size is 8 inches × 8 inches × 16 inches, but the invention can be applied to 12 inches wide blocks, although the sizes of morter debris collection bag or support means may have to be changed. Some other common block sizes are 6 inches × 8 inches × 24 inches (height, width, length), 8 inches × 4 inches × 16 inches, 12 inches × 8 inches × 16 inches, and 12 inches × 4 inches × 16 inches. Materials include cement, cinder, decomposed granite, and expanded shale. It will be understood that these sizes and materials are specified by way of examples and not by way of limitations.

FIGS. **1,3** and **8** may be taken as depicting a wall **12** formed of 8 inches × 8 inches × 16 inches cement blocks, or a single block of that size in the latter Figure. FIG. **1,** thus, would depict vertical passages **10** spaced 24 inches on centers to be cleaned out for installation of vertical reinforcement. The wall **12** is represented as being about 8 feet high, and the implication of FIG. **1** is that the morter receiving bags will be removed at that point. A wall, of course, may be higher, such as sixteen feet. An applicable procedure for such a wall would be to repeat the process. FIG. **1** also could be taken as a portion of a wall between 8 and 16 feet. Such matters as adaptation to height of the wall will be obvious to those skilled in the art, and this description will not be lengthened by unnecessary description of known, conventional or obvious matters including details of conventional practices in building and reinforcing a block wall.

FIG. **1** illustrates the installation of bag support frames at about 32 inches, although the exact height will be understood to be partly a matter of choice and also a function of block height. In laying up the wall, a metal frame **20** is installed (in this case between the fourth and fifth block courses). Frame **20** has outer horizontal flanges **22** which, depending on frame and block cell sizes, may more or less extend into the morter joint **24.**

Frames **20** preferably have inner flanges **26** downwardly and inwardly sloped to funnel morter debris (such as the debris **28** in FIG. **3** illustrated as falling into the debris collection means and the debris **30** shown in FIG. **9** in the bag) into the bag depending below.

A hook **32** is provided at each inner corner of the frame. In the simplest configuration, the hooks would be formed from tabs of the metal frame material extending inwardly from each corner, but this would require manual bending as a practical matter, and I am showing a wire hook configuration susceptible of manufacture with less manual operation. The wire hooks are secured by an opening **34** and a clip **36** in each frame corner. Each hook **32** has one end portion extending through opening **34** and having an end **40** bent up against flange **26.** An intermediate hook portion is secured by clip **36.** Clip **36** is formed by a U-cut in the metal which can resiliently clamp the wire. The wire preferably has its medial and other end portions bent as shown in FIG. **7** with a portion **42** extending outwardly and downwardly, a vertical return bend portion **44,** an intermediate horizontal portion **46** extending inwardly, and an end portion **48** extending upwardly and inwardly. The hook could be secured and formed differently but the details given: (a) permit economical fabrication of frame **20** and hooks **32,** and (b) the portions **42, 44, 46, 48** are designed to prevent the bag **50** (which has openings **52** in which the hooks are installed) or the bag drawstring **70** from becoming caught on the hooks against removal when the drawstring is caught by removal means and pulled upwardly, i.e., return bend **44** is to insure against bag or drawstring from getting on the wrong side of the hook bend. Part of the reason for the particular hook configuration is to provide essentially a rest for the bag on portion **46** at a location below sloping flange **26** so that morter debris will funnel into the bag and will not fall or wedge between frame **20** and the bag upper edges.

To design the bag support structure **20** at minimum cost is a difficult problem. I have shown one practical construction, but the ultimate configuration may change to achieve a further reduction in production costs. Whatever may be modified, I have shown several basic functional features: (a) frame means **20** to funnel debris into the bag, and (b) supporting means that permits bag detachment from the support upon upward force on the bag. As it is an objective to catch substantially 100 percent of debris, funneling means is basic to achieving this end. Whatever design is used to support the bag (whether integral with the funneling frame or separate), the mechanism is likely to be essentially hook means in function and probably a series of hook means will be used as shown to secure in a series of matched openings in the bag upper margin. Further, as indicated, the hook support means should support the bag upper edges substantially under the funneling means to catch all debris and to avoid debris passing or wedging between the frame and the bag.

After frame **20** is installed in place in the wall, morter debris collecting bag **50** can be secured in place depending from hooks **32.** Bag **50** has four openings **52** punched out of four upper corners and each opening can be installed on one of the hooks **32.** It will be understood that the bag can then be upwardly removed from the hooks by upward force during bag removal from the bag supporting and securing means **20.** Bag **50**

is preferably a disposable item after it has been used to collect morter debris and it is important to my design to provide a low cost receptacle. I prefer to form it out of plastic and, further, to fabricate it out of two blanks having generally the contour shown in FIG. 2. The two blanks are secured together by heat sealing the side and lower end margins. The heat sealing securing of the two blanks are illustrated in FIG. 9, i.e., blanks 54 56 are heat sealed at the margins 58. It will be understood that the two blanks lie flat against each other during manufacture but separate during use, i.e., when the four openings 52 are installed on hooks 32 this separates the upper portion. Debris falling into bag 50 will separate the lower portion of the bag, but I prefer during installation to drop a little debris in the bag to separate the lower portion against any failure to open. The upper portion 60 of the bag 50 is belled to catch material passing frame 20 and to funnel the debris into the lower portion of the bag. The bag is made essentially narrow, and the upper belled portion 60 is gathered by a drawstring to a narrow dimension, because of space limitations for bag withdrawal, which is a reason to have a wide bag dimension only at a gatherable top.

A single endless drawstring 70 (a single length of cord tied at its ends) is installed at the top of bag 50. As illustrated particularly in FIG. 3, drawstring 70 has essentially a figure-eight disposition having portions 72, 74 crossing at the center of the bag (in its expanded, installed condition), and then extending through openings 52, with portions 76, 78 on the outer surface of the bag. As indicated below, drawstring 70 has two functions: (a) means to be caught by pole hook means in withdrawing bag 50 upwardly through vertical passage 10 out of wall 12, and (b) drawing means to gather the belled upper portion 60 of bag 50 to reduce its dimension during withdrawal. The gathering function will be understood from the configuration. The figure-eight configuration of drawstring 70 is partly to cross at the center of vertical passage 10 (see FIGS. 3 and 8) for easy grasping by pole hook means.

In FIGS. 10 and 11 I have shown one version of pole means 80 with hooks to grasp drawstring 70 in withdrawing bag 50 up and out of vertical block cells passage 10. This is a sophisticated structure and the need for this complexity will partly depend on the nature of obstructions in passage 10. If the only obstructions are horizontal reinforcing rods, then it may be possible to use simply a pole with a hook at its lower end. At certain locations in the wall, one or two horizontal metal reinforcing rods may be use. These can be passed in about any configuration, although it may be desirable to specify generally where they pass passages 10 and the separation thereof if there are two. The real problem occurs if there are spiders in the section of vertical passage 10 to be passed. "Spiders" are wire fabrications commonly formed from four wires crossed in two spaced pairs at right angles. They are used to support and orient vertical reinforcing rods (i.e., the square center) to properly locate the rods before grout pour. If wall 12 were eight feet, it would be possible to locate one course of spiders below bags 50 and not provide another course below the top of the 8 foot wall. Avoidance of an upper course of spiders might not be possible if wall 12 were 12 feet (it would be possible to use my invention in the manner illustrated in FIG. 1 for 12 foot wall, for example, instead of an 8 foot wall). Getting a simple pole with a hook at the lower end past both horizontal tie rods and a spider could be a problem, to avoid catching, and the structure of FIGS. 10 and 11 (with retractable hooks) would be especially adaptable to that circumstance. If spiders are used in the passage, it may be desirable to specify spiders with, say spiders 2¼ inches center squares, rather than the normal 2 inches center squares, to provide more room for passage of pole 80 and bag 50.

Pole 80 can have any suitable length, depending on the maximum length of wall to which it is to be used. A pointed lower end, as shown, will best pass drawstring 70. Two, three or four spring steel hooks 82 can be used. They are disposed in openings 84 in the bottom end of pole 80. In FIG. 10 they are retracted substantially to the general configuration of the lower end of pole 80 (ends pressed against the pole) and in FIG. 11 they are extended into position to hook onto drawstring 70. They are extended and retracted by movement of central rod 86 (to which they are attached) which is shiftable vertically in the hollow center of pole 80. Rod 86 has handle means 90 on its upper end and a stop 92 therebelow. When stop 92 bears on the upper edge of pole 80, hooks 82 are withdrawn. When stop 92 has a lower position, then hooks 82 are withdrawn. When stop 92 has a lower position, then hooks 82 are extended. The manner of accommodating a lower position of stop 92 indicated is for the hollow center to be wide enough to accommodate the combined width of rod 86 and stop 92 in the lower position of stop 92 below the upper edge of pole 80. A more sophisticated version would provide a vertical slot in which stop 92 could ride, but this would require rotation of stop 92 or other structure to permit radial (clocked) adjustment in position of stop 92 out of the slot and into the slot.

Whether retractable hooks are used or not, it is desirable that rests 100, 102 be provided on pole 80. They are shown to be mounted on a sleeve 104 slidable on pole 80 and secured in adjusted position by a turnscrew 106. The adjustable mounting means can be set in one position for an eight foot wall with frames 20 about 32 inches from the bottom, for example, and can be adjusted to a different position if the height of the wall or the position of frames 20 (or, really, the resultant location of drawstrings 70 below frames 20) is changed. When rest 100 abuts the top of the wall, hook means 82 are at a level a bit lower than drawstrings 70. When rest 102 abuts the top of the wall, hook means 82 are at at level above flange 26 of frame 20 so the operator will know he cannot hook onto the flange and he will know he has pulled the bag 50 out of engagement with hook means 32. Normally it will be at this point that he will withdraw hooks 82, the ends of which will clamp the drawstrings 70 against the lower tapered surface of pole 80. Note the rest 102 is short enough to pass into vertical passage 10, but rest 100 is too long to pass into vertical passage 10, thereby guarding against dropping the pole 80 down the passage (which might dislodge bag 50 and which would cause a problem of pole retrieval).

The operation of the invention will be understood from the above description, but I will review the general operation, with special reference to FIG. 1. The showing of FIG. 1 can be viewed as generally sequential from left to right. The first showing to the left is of a bag 50 installed during fabrication of wall 12. The second showing from the left illustrates pole 80 being positioned down to the level wherein rest 100 abuts the top

of the wall. The third showing from the left illustrates hooks **82** being extended (at their level immediately below drawstring **70**). The fourth showing from the left illustrates raising pole **80** to the level where rest **102** abuts the top of wall **80**, bag **50** having been released from hooks **32**, drawstring **70** having gathered the belled mouth **60** of the bag, and flange **26** having been passed. The fifth showing from the left shows retracting hooks **82** clamping drawstring **70** to the pole. The sixth, and last, showing from the left illustrates the vertical passage **10** being free of bag **50** and pole **80**, with only frame **20** left in the passage.

from the above description, it will be understood how I have met the objectives of my invention. I have provided relatively simple operations to avoid the time-consuming task of cleaning out vertical passages by the former use of cleanout openings. I believe the vertical passage is cleaner with the use of my invention than after manual cleaning through a cleanout opening. Further, inspection time will be saved. Laying up a wall continuously can be achieved without a cold joint at four feet. This has been provided with economical disposable items (support means **20** and bag means **50**). Having thus described my invention, I do not want to be understood as limiting myself to the exact details shown and described. Instead, I wish to cover those modifications that will occur to those skilled in the art upon learning of my invention, and which are fairly within the scope of my invention.

I claim:

1. Mortar debris cleanout apparatus for a vertical passage in a masonry block wall formed by vertically aligned holes in the blocks in which vertical reinforcing rod means are to be installed and grouted in place comprising

support means positioned in said vertical passage during layup,

bag means removably attached to said support means for catching and retaining mortar debris,

said bag means having flexible lifting means positioned adjacent the top portion thereof to facilitate lifting the bag out of said vertical passage, and

bag removing means for lifting said bag out of said vertical passage to clean out the mortar debris,

said bag removing means comprising hook means for engaging said flexible lifting means to enable removal of said bag.

2. The combination according to claim **1** wherein said flexible lifting means comprises a drawstring which is endless and has a figure-eight configuration crossing over the center of the mouth of said bag to be engaged by said bag removing means.

3. The combination according to claim **1** wherein said support means includes a rigid frame having outer flanges fitting between the levels of an upper and a lower block and resting on said lower block at the location of said support means and said frame having inner flanges extending inwardly and downwardly to funnel mortar debris into said bag.

4. The combination according to claim **3** wherein said bag is upwardly belled so that the upper portion of said bag and said inner flanges of said frame substantially bridge said vertical passage.

5. The combination according to claim **1** wherein said bag removing means comprises a pole having a hollow center space, and

a rod disposed in said center space and movable in position vertically,

said hook means being secured to the lower end of said rod and said pole having opening means in which said hook means are positioned,

said hook means being extendable out of said opening means and retractable into said opening means by movement of said rod.

6. The combination according to claim **5** wherein said pole has a first and a second rest extending laterally from the upper portion of said pole and spaced vertically, the first rest being located so that when it abuts the top of said wall said hook means are located below said flexible lifting means in position to hook onto the same in upward movement, the second rest being located so that when it abuts the top of said wall said hook means are located above said support means so that if said hook means has hooked onto said flexible lifting means and has pulled said bag upwardly said hook means can be retracted without engaging said support means.

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