Aug. 21, 1945. B. L. KLEINSCHMIDT 2,382,998

SHEET PILE MARKER

Filed Aug. 2, 1941 4 Sheets-Sheet 1

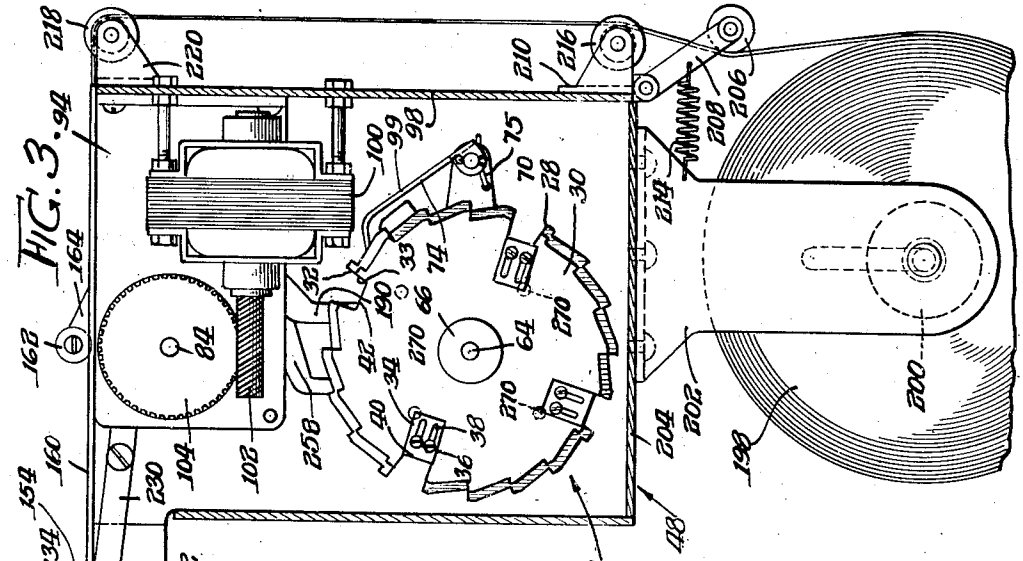


FIG. 3.

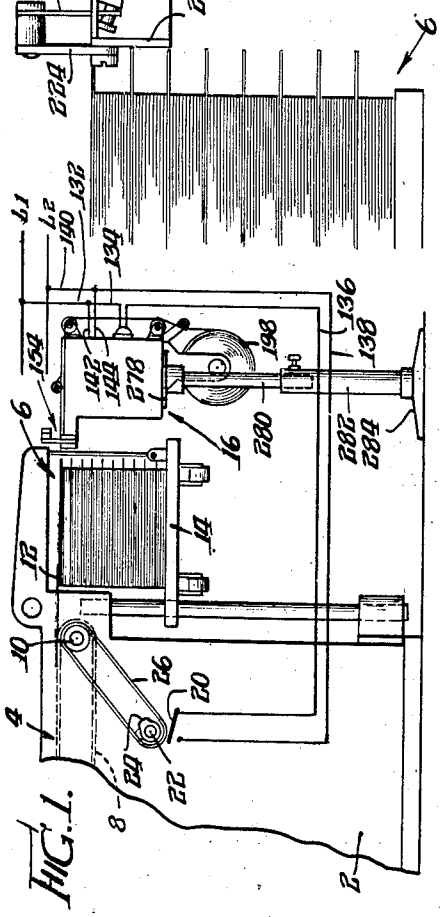


FIG. 1.

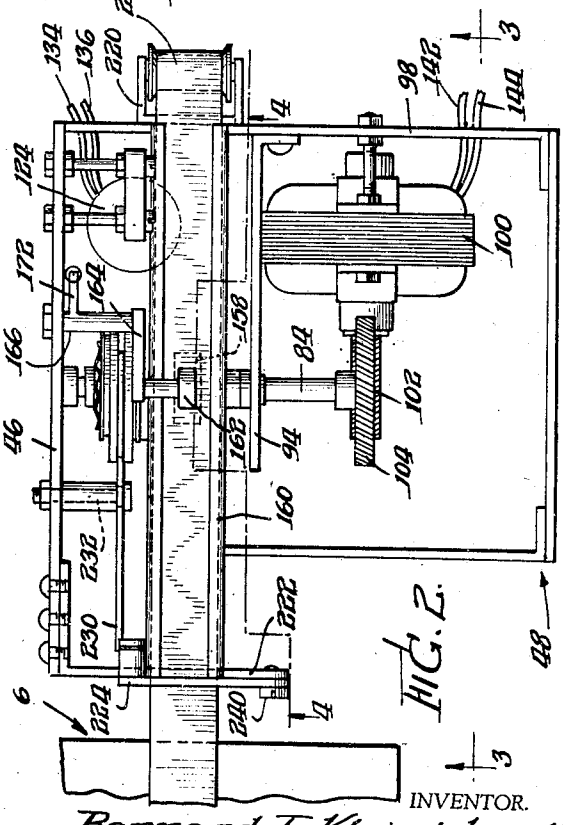


FIG. 2.

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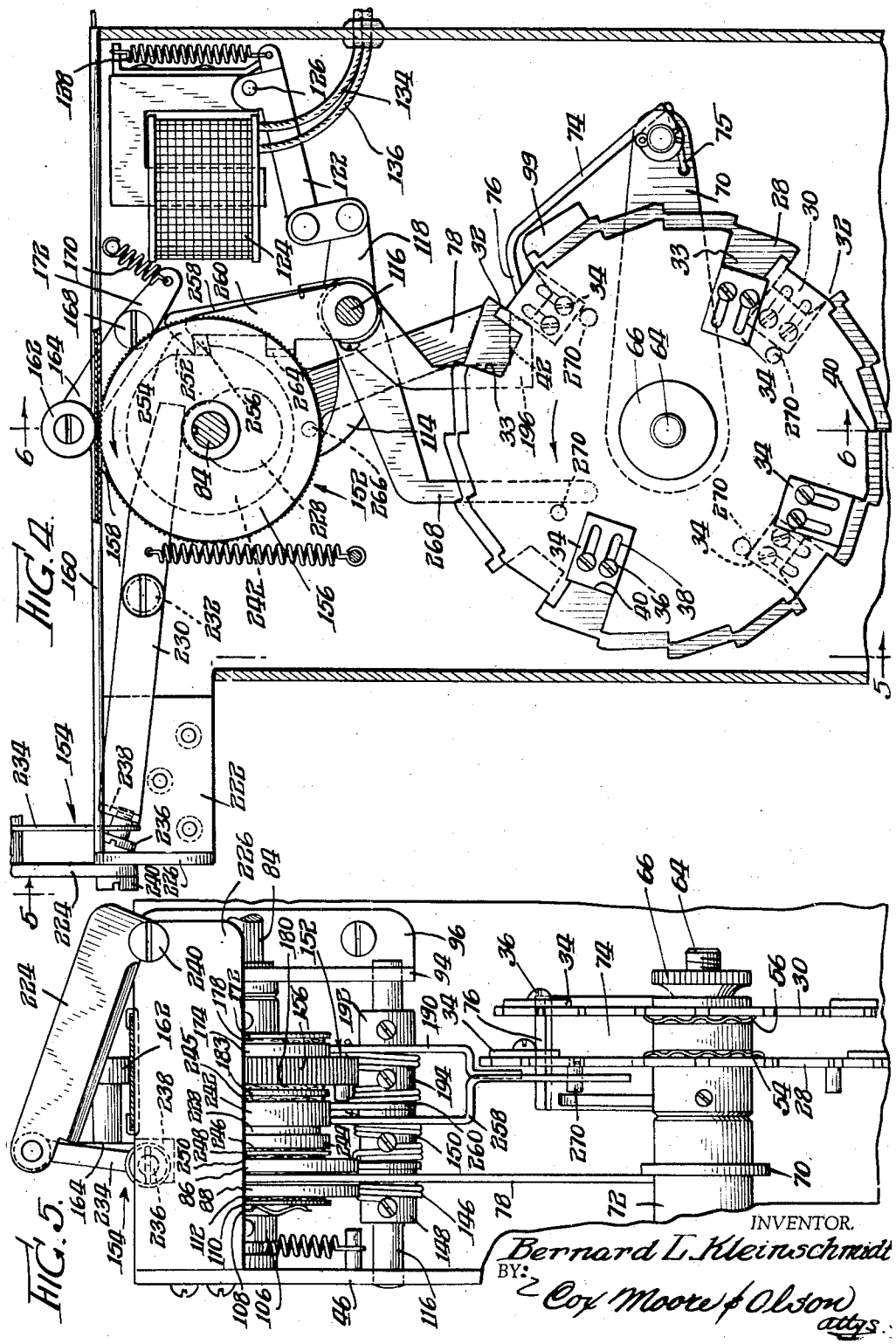


FIG. 4.

FIG. 5.

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SHEET PILE MARKER

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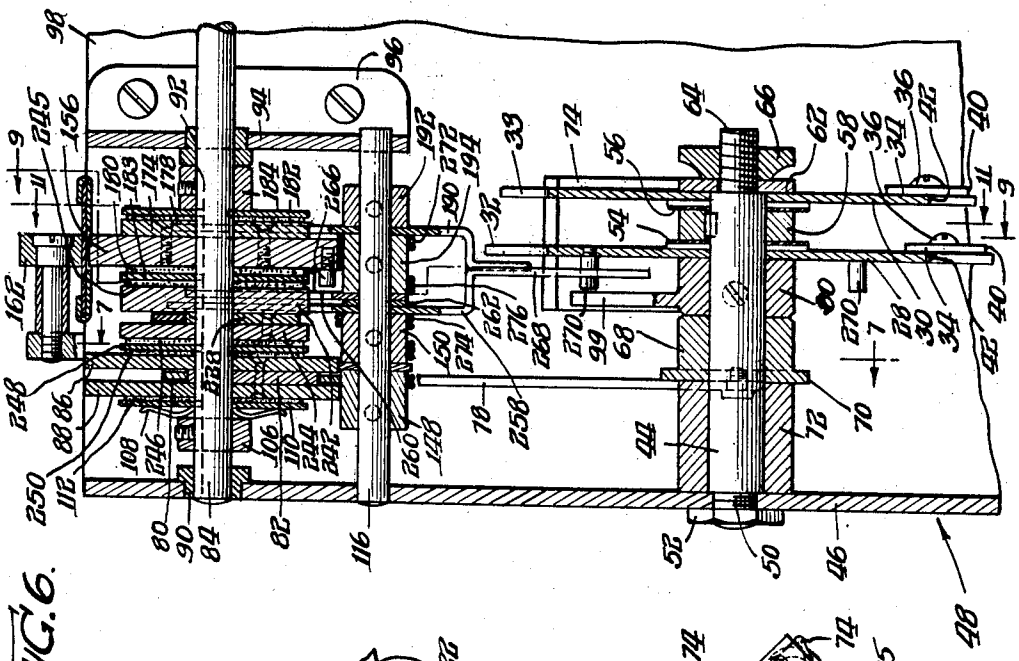


FIG. 6.

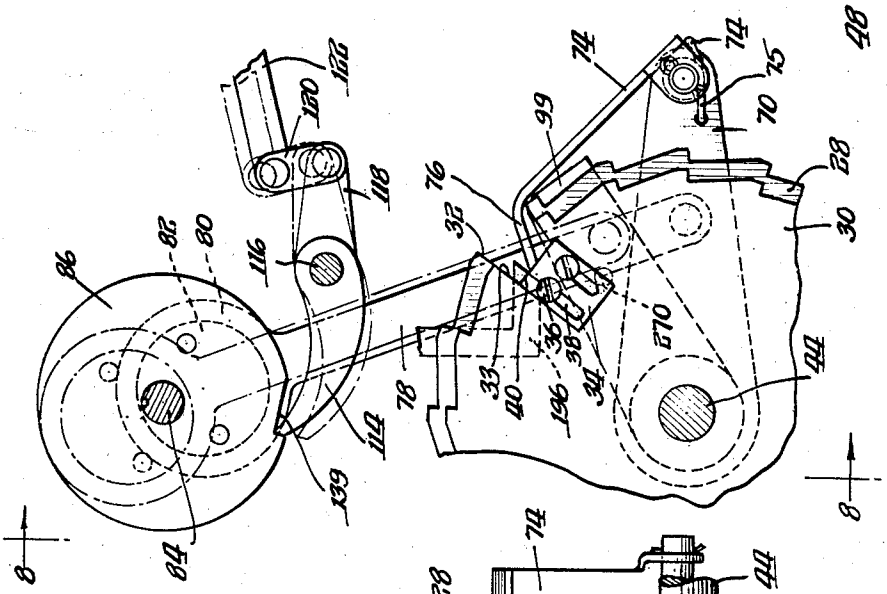


FIG. 7.

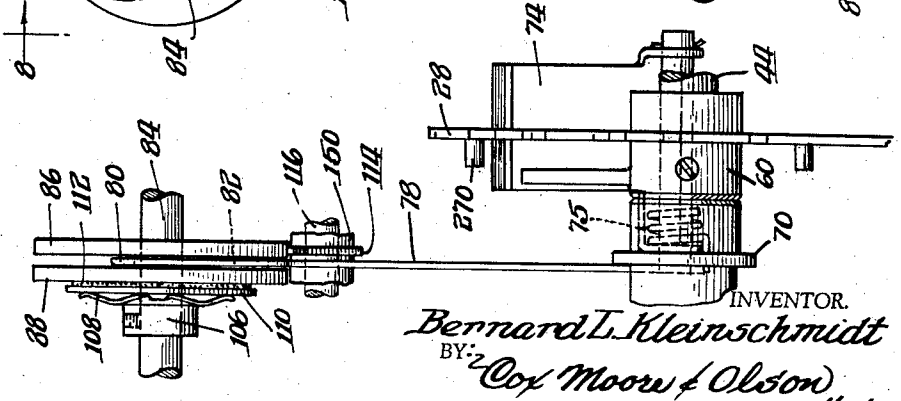


FIG. 8.

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SHEET PILE MARKER

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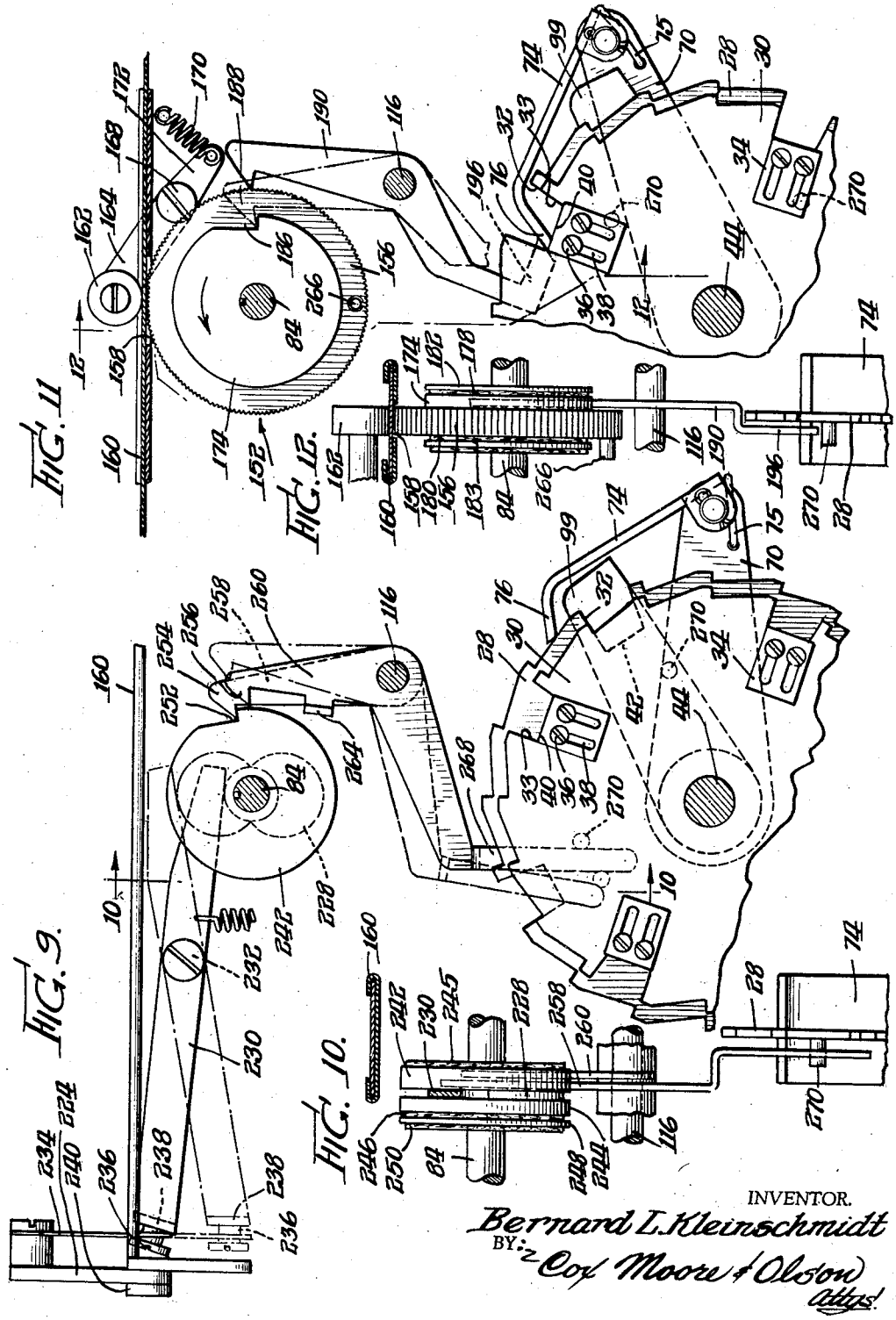


FIG. 11

FIG. 12.

FIG. 9.

FIG. 10.

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Patented Aug. 21, 1945 2,382,998

UNITED STATES PATENT OFFICE

2,382,998

SHEET PILE MARKER

Bernard L. Kleinschmidt, Highland Park, Ill.

Application August 2, 1941, Serial No. 405,150

12 Claims. (Cl. 93—93)

This invention relates to a machine for placing markers at predetermined intervals between articles being stacked or grouped, and more particularly to a machine for placing paper marking strips or tags at predetermined intervals between sheets delivered from a printing press to separate the sheets into bundles or groups, each containing a predetermined number of sheets.

It is an object of my invention to provide a machine of the above stated character, which is of such construction that it may be readily attached to or incorporated in a printing press and folding machine, sheeting machine or the like, delivering the article or sheets to a stacking device, table, or the like.

A further object of my invention is to provide a slip or marker inserting machine capable of simple and ready adjustment to effect automatically the insertion of the slip or marker between bundles or groups of substantially any desired number of sheets.

The invention contemplates the provision of an electrically operable slip or marker feeding device or attachment unit, which may be operatively associated with or attached to an existing machine or printing press by providing the machine or press with any desired form of electric switch operated synchronously with the delivery of the article or sheets by the machine or press.

A further object of the invention is to provide a machine for feeding a web of strip material upon the uppermost sheet of a stack of sheets delivered to the stack by a sheet feeding machine or printing press, and providing means for so controlling the web feeding means as to effect the feeding of the strip intermittently at periods determined by the rate of feed of sheets to the stack; and

Further, to provide means cooperating with the web feeding means and with said control means to cut the web of strip material after additional sheets, preferably of predetermined number, have been placed above the strip, so that the strip, after being placed upon the top sheet of the stack, will be positioned and retained in position by the web, of which it forms a part until sufficient additional sheets have been added to the stack to thereafter hold the strip in proper position.

Other and further objects and advantages of the invention will be apparent from the following description when taken in connection with the accompanying drawings, wherein:

Figure 1 is a fragmentary, diagrammatic view of a printing press equipped with a marking machine embodying the invention;

Figure 2 is a top plan view of the marking machine of Figure 1;

Figure 3 is an enlarged, fragmentary view in vertical section taken substantially along the line 3—3 of Figure 2;

Figure 4 is an enlarged, fragmentary view in vertical section taken substantially along the line 4—4 of Figure 2;

Figure 5 is a fragmentary view in end elevation and partly in section taken substantially along the line 5—5 of Figure 4;

Figure 6 is a fragmentary view in vertical section taken substantially along the line 6—6 of Figure 4;

Figure 7 is a fragmentary view in vertical section taken substantially along the line 7—7 of Figure 6;

Figure 8 is a fragmentary view in elevation taken from the left of Figure 7 and substantially along the plane of line 8—8;

Figure 9 is a fragmentary view in vertical section taken substantially along the line 9—9 of Figure 6;

Figure 10 is a fragmentary view in vertical section taken along the line 10—10 of Figure 9;

Figure 11 is a fragmentary view in vertical section taken substantially along the line 11—11 of Figure 6; and

Figure 12 is a fragmentary view in vertical section taken along the line 12—12 of Figure 11.

The machine of the present invention is for illustrative purposes shown applied to a printing press 2 (Fig. 1) having a printed sheet delivery mechanism 4 for delivering the sheets as they are printed to a stacking device 6. The delivery mechanism 4 may, for example, comprise feed tapes 8 driven or guided by a roller 10 at the forward end of the printing press, the roller 10 being so disposed in relation to the stacking device 6 that the sheets pass directly from the forward end of the feed tapes 8 to the top of the stack of sheets upon the device 6.

The device 6 may be of any conventional character, preferably of the type wherein the sheets 12, as they accumulate upon the stacking platform 14, cause automatically a lowering of the platform so that the top of the stack of sheets is always at substantially the same elevation.

The sheets so stacked are separated into bundles or reams, each containing a desired number of sheets. It is customary to effect this separation during the feeding of the sheets to the stack by operatives standing at the front of the ma-

chine, in the case of a sheeting machine, and counting the sheets one by one as they are delivered; or to form the stack subsequently into bundles in the case of a printing press.

A paper tag or strip is placed on the top sheet of the stack at the completion of each count. The accuracy of the count, however, is inherently undependable and inaccurate because of the speed at which in modern machines the sheets are delivered to the stack, and because of the inherent inaccuracies of counting by visual checking. Automatic counting and marking devices of various kinds have heretofore been proposed but have proved unsatisfactory because of their complexity; their unsuitability for use with modern, high speed printing presses, or other high speed sheet feeding and stacking machines; their high maintenance requirements; the high expense of their incorporation or attachment to existing machines; their difficulty of adjustment to vary the size of the bundles or groups in which the stack of sheets is separated; and for various other reasons, so that the use of operatives to mentally count the sheets as they are stacked, and to manually insert appropriate tags, is still the custom.

According to the present invention, a marking or strip feeding machine 16 is provided, which includes an impulse storing device 18 (Figs. 3 to 12) operable by a switch 20 (Fig. 1), which may be of any conventional structure capable of ready mounting on the printing press 2 in juxtaposition to a suitable shaft 22 of the printing press, which shaft, for the purposes of this invention, may be provided with a cam 24 for operating the switch 20 to open and close the switch in synchronism with the feeding of the sheet 12 to the stacking mechanism 6 by tapes 8 of the printing press, the press being "on impression" at the time the switch is closed. If desired, the shaft 22 could be any shaft of the printing press, which is driven at a speed constantly proportioned to the speed of driving of the tapes 8, or said shaft may be supplied as an auxiliary attachment and coupled to the shaft of the tape driving or guiding roll 10 by a suitable gearing or by the belt 26.

In the case of a printing press or other machine wherein the number of sheets fed to the stacking device is not always proportioned to the speed of movement of the feed tapes 8, any suitable part of the printing press, which experiences a movement governed by the feeding of the sheets, or which is responsive to the feeding of the sheets, may be adapted by means of suitable links, gearing, or other motion transmitting mechanisms, to the operation of the control switch 20; or a suitable photo-electric control arrangement whereon the sheets control the light to the cell may be used; each to effect closure of the switch simultaneously with the feeding of a sheet to the stacking device, and to reset the switch for subsequent operation upon the passage of the next succeeding sheet to the stacking device.

The impulse storing device 18 comprises a pair of ratchets 28 and 30, the ratchet 28 being of greater diameter than the ratchet 30. Each of the ratchets is formed with a plurality of angularly spaced notches or openings 32 or 33 (Figs. 3, 4, 6, 7, 9 and 11) extending inwardly from the periphery of the ratchet, and on one face of each ratchet there is provided for certain of the notches 32 and 33 control plates 34 adjustably mounted as, for example, by means of a pair of screws 36 threaded into the ratchet and passing through slots 38 in the plate 34. Each plate 34 may, therefore, assume one of two positions, in one of which the outer edge 40 of the plate forms an edge surface connecting with the ratchet teeth on opposite sides of the notch or opening 32 or 33, and in the other of which the control plate uncovers the notch or opening 32 or 33, and the outer edge 40 of the plate extends flush with, or inwardly of, the bottom edge 42 of the notch. The ratchets 28 and 30 are journaled on a stud 44 (Fig. 6) mounted on an upstanding wall 46 of a housing 48 as by means of a reduced threaded end portion 50 passing through the wall 46 and receiving a clamping nut 52. The ratchets are held against inadvertent movement on the stud 44 by a pair of corrugated resilient washers 54 and 56, and spaced by a collar 58 keyed to the stud 44 and pressing the ratchets into frictional engagement against a collar 60 pinned to the stud, and against a washer 62 clamped against a shoulder formed on the stud by means of a reduced threaded end part 64 receiving a clamping nut 66.

The stud 44 pivotally receives a boss or hub 68 of a lever arm 70 (Figs. 3 to 9 and 11), and a bushing 72 (Fig. 6) mounted on the stud is interposed between the wall 46 of the housing 48 and the hub 68 to hold the lever 70 against axial movement relative to the stud. A relatively wide or broad pawl 74 is pivoted to the outer free end of the lever 70 and extends over both ratchets 28 and 30 and is urged inwardly by a spring 75. The ratchet 28 being of larger diameter, the ratchet pawl 74 does not engage the teeth of the ratchet 30, except when the tooth 76 of the pawl registers with a notch 32 in the ratchet 28. The pawl 74 is moved forwardly or in a counterclockwise direction, as seen in Figures 3, 4, 7, 9 and 11, to advance the ratchet 28 one step, and backwardly to engage the next following tooth of the ratchet 28 by means of an eccentric comprising a link 78 (Figs. 4 to 8) having an eccentric strap portion 80 journaled on a disk 82 (Figs. 6 to 8) eccentrically mounted on a shaft 84. The eccentric disk 82 is fitted between and riveted or otherwise fastened to a pair of complementary disks 86 and 88. The shaft 84 is journaled in bushings 90 and 92 mounted in the side wall 46 of the housing 48 and the forwardly extending wall 94 of a bracket 96 fastened to the rear wall 98 of the housing 48. A pawl control arm 99 is formed on the collar 60 and extends beyond the ratchet to govern the engagement of the pawl with the ratchet 28. By angular adjustment of the collar, the arm is set to prevent the pawl from feeding the ratchet 28 more than one tooth when the ratchet is replaced by one of a different number of teeth.

A motor 100 (Figures 2 and 3), bolted to the rear wall 98 of the housing, drives the shaft 84 by means of a worm 102 secured to the motor shaft and a worm wheel 104 secured to the inner end of the shaft 84. The shaft 84 frictionally drives the eccentric through a positioning collar 106 (Figs. 5 and 6) pinned to the shaft, a corrugated, resilient washer 108 interposed between the collar 106 and a driving disk 110, splined to the shaft and a washer 112 of felt or other frictional material interposed between the disk 110 and the outer face of the disk 88 of the eccentric.

The eccentric is locked against movement by a pawl 114 (Figs. 4 and 7) pivoted on a stud shaft 116 and formed with a rearwardly extending arm 118, which is connected by means of a link 120 to a lever 122 raised by a relay or solenoid 124. The lever 122 is pivoted to the frame of the solenoid as at 126 (Fig. 4) and is moved to lowered

position by a spring 128, which spring thereafter acts to hold the pawl 114 in locking engagement with a notch 139 (Fig. 7) in the periphery of the disk 86 of the eccentric. The relay 124 is controlled by the switch 20 (Fig. 1) so that it is energized in synchronism with the feeding of each sheet to the stacking device 6 through a circuit, shown schematically in Figure 1, which extends from the supply line L1 through a wire 132, a wire 134, the relay 124 (Fig. 4), a wire 136, the switch 20, the wire 138, and the wire 140 to the supply line L2. The motor 100, as schematically indicated in Figure 1, is connected by wires 142 and 144 to the supply lines L1 and L2 through the wires 132 and 140.

The pawl 114 is normally urged into locking engagement with the notch 139 in the disk 86 of the eccentric by a coil spring 146 (Fig. 5), which is secured at opposite ends to collars 148 and 150 pinned to the stud shaft 116 and padding intermediately above the arm 118 of the pawl so as to normally urge this arm downwardly and thereby urge the pawl upwardly, as seen in Figure 7.

Thus the impulse storing mechanism 18 is operated in synchronism with the feeding of the sheets to the stacking device 6, and the relay 124 of this mechanism, when energized, releases the pawl 114 from the locking notch 139 of the disk 86 of the eccentric, which thereupon is frictionally driven by the continuously operating driving shaft 84 to effect a counterclockwise or feeding movement of the pawl 74. Where the ratchet 28 is provided with four equiangularly spaced notches 32, and is further provided with four radially directed pawl engaging tooth portions between each adjacent pair of notches, a notch 32 of this ratchet will register with the pawl on the completion of each fourth return movement of the pawl, so that, upon each fifth movement of the pawl in a counterclockwise or feeding direction, the tooth 76 of the pawl will simultaneously engage the teeth of the ratchets 28 and 30. Where the ratchet 30 is similarly provided with four equiangularly spaced notches 33 and with four radially directed pawl engaging tooth portions between adjacent notches 33, the pawl, upon completion of each fourth return movement, will, unless prevented by the ratchet 28, register with a notch 33 in the ratchet 30. It will be evident of course that the ratchets 28 and 30 may be provided with any desired number of teeth and with any desired number of notches 32 and 33, depending upon the requirements of the particular installation. The ratchets 28 and 30 may obviously, if desired, have different numbers of teeth, depending upon the requirements of the installation.

In the device shown for illustrative purposes it is assumed that in the particular installation chosen for this purpose it may be required to separate or mark sheets into bundles of not less than twenty-five sheets and not more than four hundred sheets, and it is furthermore required that between these limits, bundles of sheets differing in the number of sheets by five or more, be provided. Hence, the ratchets 28 and 30 are shown in the drawings as each being provided with sixteen teeth, four notches 32 or 33 (forming four additional teeth), and three adjustable control plates 34 for the ratchet 28 and three such plates for the ratchet 30.

The ratchets 28 and 30 control, upon the storage of a number of impulses equal to the number of sheets desired in each bundle, a strip feeding device 152 (Figs. 4, 5 and 11) and a cutting mechanism 154 (Figs. 3 to 5 and 9) for cutting the marker strips from the web of strip material after it has been fed by the device 152 upon the topmost sheet of the stack in the stacking device 6.

The strip feeding device 152 comprises a roller 156, having a knurled periphery, and mounted on the shaft 84. The roller 156 passes through a slot 158 (Figs. 11 and 12) in a strip feeding track 160 into driving engagement with the strip material in the track. A roller 162 carried on the upper end of a lever 164 secured to the sleeve 166 (Fig. 2) journaled on a pin 168 (Figs. 4 and 11) is constantly urged downwardly by a spring 170 fixed at one end and secured at the other to an arm 172 formed integrally with the sleeve 166. The spring-pressed roller 162 maintains the strip in frictional driving engagement with the knurled periphery of the roller 156.

The feed roller 156 is pinned to a disk 174 (Figs. 5, 6 and 12) the roller and disk being in face-to-face engagement with washers 178 and 180 of felt or other suitable frictional material. A metal driving disk 182, splined to shaft 84, is interposed between the felt washer 178 and a collar 184 pinned to the shaft 84. A similar metal driving disk 183 splined to shaft 84 engages washer 180. The disk 174 is provided with a peripheral locking notch 186 (Fig. 11) for reception of the locking tooth 188 of a pawl 190 journaled on the stud 116 between collars 192 and 194 (Figs. 5 and 6) pinned to said stud. The pawl 190 is provided with a tail piece 196 (Figs. 4, 7 and 11) in juxtaposition to the ratchet 28 and in position to be engaged by the tooth 76 of the pawl 74 when, after registering with a pair of alined notches 32 and 33 in the ratchets 28 and 30, the pawl then moves forwardly to move both ratchets. Accordingly, when notches 32 and 33 of the ratchets 28 and 30 are alined and register with the tooth 76 of the pawl 74 (neither notch being covered by a control plate 34), the pawl 190 will be operated upon the next forward movement of the pawl 74, thereby releasing the disk 174 and its attached strip feeding roller 156 for driving by the continuously rotating shaft 84. The roller 156 is frictionally driven by the shaft 84, the disk 182, the felt washer 178, the disk 183 and the felt washer 180. The resilient corrugated washer 108 maintains the felt washer 178 in sufficient frictional engagement with the disk 174 and the disk 182, and the disk 183 in sufficient frictional engagement with the washer 180 to effect this driving of the feed roller 156.

The web of strip material is fed from a roll 198 (Fig. 3) carried by a roller 200 journaled in spaced depending brackets 202 (of which one only is shown in the drawings) fastened to the bottom wall 204 of the housing 48. The web of strip material passes from the roll 198 over a tensioning roller 206 carried by a depending lever 208 secured in a bracket 210 fastened to the rear wall 98 of the housing 48. A spring 214 is secured to one of the brackets 202 and at the other end to the lever 208, and urges the roller 206 inwardly to tension the web of strip material. From the roller 206 the web of strip material passes about a guide roller 216 secured to the bracket 210 and spaced inwardly from the rear wall 98 of the housing, and then about a similar guide roller 218 carried by a bracket 220 fastened to the rear wall 98 at the upper rear corner of the housing, the roller 218 being so positioned that the web of strip material passes from the roller in the plane of the track 160 and along the track to the forward end thereof. The track 160 may be secured in any convenient manner to the upper edge of

the rear wall 98 of the housing, and to the upper edge of an L-shaped bracket 222 fastened to the side wall 46 of the housing 48 at the forward upper end of said wall.

The strip cutting mechanism 154 comprises a knife or shearing blade 224 (Figs. 2 to 5 and 9) cooperating with the forward face or surface 226 of the bracket 222 to cut a strip, fed upon the topmost sheet of the stack of sheets in the stacking device 6, from the web of strip material. The knife 224 is operated by a cam 228 (Figs. 4 to 6 and 9) through a linkage system comprising a lever 230 pivoted intermediately on a stud 232 bolted to the side wall 46 of the housing and a flexible strap or link 234 pivotally secured at its upper end to the free end of the knife 224, and provided at its lower end with an enlarged opening for receiving the reduced shank of a cap screw 236 threaded into the inturned end 238 of the lever 230. The knife 224 is pivoted at its other end to the bracket 222 as by a cap screw 240.

The cam 228 is mounted on the shaft 84 between a pair of disks 242 and 244 to which it is pinned, the disks 242 and 244 being of greater diameter than the cam 228, so that the disks receive between them the free end of the lever 230 to form a guide for the lever in its up and down movements. The disk 242 engages a friction washer 245 and the disk 244 engages a similar friction washer 246. The friction washer 246 is interposed between the disk 244 and the metal disk 248 which also engages a friction washer 250 interposed between said disk 248 and the disk 86 of the eccentric which drives the pawl 74, the disk 248 being splined to the shaft 84. Thus it will be seen that the cam will be frictionally driven by the shaft 84 through the disk 183, the friction washer 180, and the disk 242, and will also be driven by the shaft 84 through the disk 248, the friction washer 246 and the disk 244.

The disk 242 is provided with a peripheral locking notch 252 (Figs. 4 and 9) for the reception of the locking teeth 254 and 256 of pawls 258 and 260. The pawls 258 and 260 are journaled on the stud 116 between the collar 194 (Figs. 5 and 6) and the similar collar 150 also pinned to said stud, and a washer 262 is interposed on the stud 116 between the pawls 258 and 260. The pawl 260 is provided above the stud 116 with a laterally extending lug 264 (Figs. 4 and 9) for engagement by an operating pin 266 secured to the inner face of the strip feeding roller 156.

The pawl 258 is provided with a depending tail piece 268 extending below the stud 116 in juxtaposition to the ratchet 28 for engagement with and operation by one of four pins 270 secured to the ratchet 28. The pins 270 are secured to the ratchet 28 in such angular relation to the notches 32 that a pin will engage the tail piece 268 of the pawl 258 at a certain predetermined interval after the strip has been fed to the topmost sheet of the stack so that, during this interval, a predetermined number of sheets will be fed to the stack and positioned above the strip before the strip is cut from the web. This prevents displacement or discharge of the strips by the subsequently fed sheet or sheets.

In the machine shown in the drawings the pins 270 are positioned so that one pin will engage the tail piece 268 and operate the pawl 258 as a fourth sheet is placed above the last fed strip and the pawl 74 is moved forwardly for the fourth time, following the feeding of the strip by the feed roller 156.

The pawls 190, 258 and 260 are urged into locking position by means of springs 272, 274 and 276, respectively (Fig. 6), each secured at one end to one of the collars pinned to the stud 116, and bearing at its opposite end against its respective pawl.

The strip feeding and cutting or marking machine 16 may be supported in any desired manner, as upon a platform 278 (Fig. 1) having a depending rod 280 adjustably telescoping with a tube 282 of the standard 284, so that the paper feed track 160 may readily be adjusted to the proper elevation for the feeding of the strip upon the topmost sheet of the stack of sheets in the stacking device 6.

The operation of the machine is as follows: The motor 100 operates continuously. As each sheet is fed upon the stacking device the switch 20 (Fig. 1) is closed by the cam 24 to energize the solenoid 124 (Fig. 4) through the circuit previously described. The solenoid 124 raises the lever 122 to swing the pawl 114 in a counterclockwise direction from the full line position of Figure 7 to the dotted line position, wherein the disk 86 of the eccentric is released, whereupon the eccentric disk 82 is frictionally driven by the shaft 84. The eccentric disk 82 is normally positioned, as shown in the dotted lines in Figure 7 and, accordingly, during the first half of its revolution causes the pawl 74 to move in a counterclockwise direction, the pawl first engaging a radially directed tooth portion of the ratchet 28, and then moving the ratchet an angular distance equal to one tooth against the frictional braking force of the spring washer 54. The operation of the machine will of course be originally initiated (as shown in Fig. 3) with the tooth 76 of the pawl 74 in position to engage, on its forward movement, the first radially directed tooth portion of the ratchet 28 following a notch 32, the companion notches 32, and 33 of the ratchets 28 and 30 being in alinement. It may be assumed that it is desired to place a strip between each group of twenty-five sheets and, in accordance with this assumption, all of the control plates 34 will be adjusted to their innermost radial positions uncovering all of the notches 32 and 33 in the ratchets 28 and 30; and, consequently, after four sheets have been placed in the stacking device and the pawl 74 completes its fourth return movement (as shown in Fig. 4) it will fall into a notch 32 in the ratchet 28 and rest upon a land of the ratchet 30 behind that first radially directed tooth portion of this ratchet 30 which follows the notch 33 that was originally alined with a notch 32 of the ratchet 28 just in advance of the pawl 74. Therefore, when the fifth sheet has been fed to the stacking device and the pawl is moved for the fifth time in its forward direction, both ratchets 28 and 30 will be moved in a counterclockwise direction a distance of one tooth.

Similarly, following the placing of the tenth, fifteenth, and twentieth sheet on the stack, the pawl 74 will operate both ratchets. Following the twenty-fourth return movement of the pawl 74 after having fed the ratchet 28 forwardly for the twenty-fourth time, the tooth 76 of the pawl will register with and fall into a pair of alined notches 32 and 33 in the ratchets 28 and 30 (as shown in Fig. 7) and the tooth of the pawl, being thereby permitted to move inwardly a sufficient distance, will, after the twenty-fifth sheet has been placed on the stack, and as the pawl makes its twenty-fifth forward movement, engage the rear edge of the tail piece 196 of the pawl 190,

thereby moving this pawl in a clockwise direction, as seen in Figure 11, to release the locking disk 174 of the strip feeding device 152.

Since the pawl 74 moves forwardly during the first half of the revolution of the eccentric disk 82 and moves rearwardly during the second half of the revolution of this eccentric disk, the pawl 190 is released from the pawl 74 before the locking disk 174 and the paper feed roller 156 have completed a ful revolution. The pawl 190 is, accordingly, positioned to be projected by its spring 272 into the locking notch 186, as the roller 156 and disk 174 complete one revolution. The paper feed roller 156, as it rotates, causes the pin 266 carried thereby to engage the lug 264 of the pawl 260 to move this pawl in a clockwise direction from the position of Fig. 4 to the position of Fig. 9, thereby releasing this pawl from the disk 242 of the cutter driving mechanism. The locking tooth 254 of the pawl 258 is positioned slightly in advance of the locking tooth 256 of the pawl 260, and hence, upon release of the pawl 260 from the disk 242, the disk is moved until the radial edge of the locking notch 252 is engaged by the tooth 254 of the pawl 258. The cutter operating cam 228 is so designed that, during this slight movement, no movement of the lever 230 is effected. As the pin 266 passes the lug 264, the pawl 260 is released but the locking tooth 256 of this pawl does not fall into the locking notch 252, but engages the periphery of the disk 242 because this notch, by the slight rotation of the disk 242, has been moved beyond the locking tooth 256.

After a desired number of sheets of the next group have been superimposed on the strip, a pin 270 of the pins carried by the ratchet 28 will, on the forward movement of the pawl 74, engage the tail piece 268 of the pawl 258 to rotate this pawl in a clockwise direction from the full line position to the dotted line position of Figure 9. The pawl 260 having been previously released from the disk 242, the release of the pawl 258 permits the driving of the disk 242. The cam 228 thereby effects movement of the lever 230 in a counterclockwise direction from the full to the dotted line position of Figure 9, an the cutter blade 224 is thereby lowered to sever the strip placed on the stack of sheets from the web of strip material.

The feed roller 156 being stationary during the operation of the cutter mechanism, the pawl 260 is released during the movement of the disk 242, and is accordingly positioned for reception in the locking notch 252 of the disk as said disk completes one revolution. This insures stoppage of the disk 242 and prevents re-operation of the cutter mechanism, even if the locking tooth 254 of the pawl 258 be held released for a period greater than one revolution of the disk 242. The pawl 260 prevents operation of the cutter mechanism prior to the operation of the strip feeding device 152, even though a pin or pins 270 secured to the ratchet operate the pawl 258 before the pawl 190 is operated to release the feed roller 156. When the ratchets are initially set, as in Figure 3, a pin 270 will operate the latch 258 after nine, fourteen, nineteen, and twenty-four sheets have been fed to the stack, but this operation of the pawl 258 will not effect a release of the cutter drive mechanism because the disk 242 thereof will still be locked by the unoperated pawl 260. A pin 270 will again engage the tail piece 268 of the pawl 258 and operate the pawl after twenty-nine sheets have been fed to the stack. Since the strip feeding roller 156 has by this time been operated, the release of the pawl 258 at this time effects a release of the cutter drive mechanism and hence an operation of the cutter.

Thus, the strips will be cut each time when four or more sheets have been superimposed upon the last fed marking strip.

When it is desired to separate the sheets into groups or bundles of more than twenty-five sheets, the control plates 34 carried by the ratchets 28 and 30 may be adjusted to cover its, or their, corresponding notch, or notches 32 and/or 33. For example, if the control plates 34 associated with a pair of opposite notches 32 of the ratchet 28 are adjusted to cover those notches, fifty sheets will be fed to the stack between operations of the feed roller 156. In the illustrative example shown in the drawings, the ratchet 28 is provided with twenty teeth and the ratchet 30 is provided with twenty teeth. The maximum number of sheets which may be formed into a bundle is, accordingly, four hundred for in each revolution of the ratchet 28 the ratchet 30 must be operated at least one tooth, and one operation of the feed roller must occur during each revolution of the ratchet 30.

It will be evident that where desired a broader operating pawl 74 and three or more ratchets may be employed, in which case the ratchets would successively be of smaller diameters—the third ratchet being smaller than the second, the fourth smaller than the third, and so on. Thus, it will be seen that, by employing the principles of the invention, the machine may be designed to form bundles each having more than four hundred sheets if desired.

If it should be desired to separate the sheets into bundles of less than twenty-five sheets, the ratchet 30 may be removed from the stud 44. In such case the pawl 74 operates the locking pawl 190 of the feeding device 152 each time that the nose of the pawl is received in a recess 32 of the ratchet 28. If the ratchet 28 be provided with four equally spaced pins 270, as previously described, bundles having as few as five sheets each may be formed, and by adjustment of the control plates 34 of the ratchet 28, bundles having ten or twenty sheets each may be formed.

It will be further evident, of course, that the ratchets 28 and 30 may have different numbers of teeth, and that both of the ratchets may have any desired number of equiangularly spaced peripheral notches. For example, the ratchet 30 may have forty teeth and, if each of the ratchets is provided with four equally spaced notches, the marking strips may be fed at such intervals as to separate the sheets into bundles of from fifty to eight hundred sheets each, while utilizing only two ratchets. Further, by way of example, each ratchet might be provided with sixteen teeth (four teeth being provided by four notches) to form bundles each having sheets in number a multiple of four and from sixteen to two hundred and fifty-six sheets each. Further, by way of additional example, the ratchets 28 and 30, having twenty teeth each, may each be provided with five equally spaced peripheral notches to provide with five equally spaced peripheral notches to provide a finer degree of adjustment of the machine in respect to the number of sheets in each bundle.

It will be seen from the foregoing that applicant has provided a strip feeding and cutting or marking machine, which is of such construction that it is readily attachable to an existing machine or printing press, delivering the sheets to

a stacking device, table, or the like, and which is capable of simple and ready adjustment to effect automatically the insertion of a slip or marker between bundles or groups of substantially any desired number of sheets within predetermined limits; and wherein means is provided for so controlling a means feeding a web of strip material as to effect the feeding of the strip intermittently at periods determined by the numbers of sheets delivered to the stack; and wherein means is provided in cooperation with the web feeding means and its control means to cut the marking strips from the web after placing the strips upon the top sheet of the stack, so that said strip is positioned and retained in position by the web until sufficient additional sheets have been superimposed upon the strip to hold the strip in proper position.

Changes may be made in the form, construction and arrangements of the parts without departing from the spirit of the invention or sacrificing any of its advantages and the right is hereby reserved to make all such changes as fairly fall within the scope of the following claims.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A sheet pile marker comprising means for feeding a web of marking material to the pile, continuously operated means for actuating said web feeding means, releasable means for normally holding said web feeding means against actuation by said actuator means a counter, means operated synchronously with the feeding of the sheets to the pile for operating said counter and controlled by said counter for releasing said holding means after a predetermined number of sheets have been fed to the pile, means for cutting a marker from the web of marking material, and means for actuating said cutting means after a number of sheets have been fed to the pile above the last placed marker.

2. A sheet pile marker comprising pawl and ratchet means operated synchronously with the feeding of the sheets to the pile, the ratchet having a plurality of angularly spaced peripheral notches permitting inward movement of the pawl, marker feeding means, means for controlling the operation of the marker feeding means and including mechanism positioned for actuation by the pawl and ratchet means when the pawl is received in one of the notches of the ratchet, and means for selectively covering said notches to prevent inward movement of the pawl into selected ones of said notches.

3. A sheet pile marker comprising pawl and ratchet means operated synchronously with the feeding of the sheets to the pile, said means comprising a pair of ratchets each having a plurality of angularly spaced peripheral notches, one of said ratchets being larger in diameter than the other and permitting inward movement of the pawl when registering with a notch of the larger ratchet to engage the teeth of the smaller ratchet, notches in the ratchets when aligned permitting further inward movement of the pawl, marker feeding means, means for controlling the operation of the marker feeding means including mechanism positioned for actuation by the pawl and ratchet means upon inward movement of the pawl in a pair of aligned notches in the ratchets, and means for selectively covering the notches in the ratchets to adjustably predetermine the operation of said mechanism in accordance with the number of sheets fed to the pile.

4. A sheet pile marker comprising marker feeding means, a continuously driven shaft for actuating said marker feeding means, releasable means for locking said marker feeding means against actuation by said shaft, pawl and ratchet means adapted to be actuated by said shaft, releasable means for locking said pawl and ratchet means against actuation by said shaft, means operated synchronously with the feeding of the sheets to the pile for releasing said last mentioned locking means, said pawl and ratchet means including a ratchet having a notch permitting inward movement of the pawl periodically after a given number of actuations of said pawl and ratchet means, and means for locking the marker feeding means against actuation including mechanism positioned for actuation by said pawl and ratchet means upon inward movement of the pawl in the notch in the ratchet.

5. A sheet pile marker comprising means for feeding a web of marking material, a continuously driven shaft for actuating said web feeding means, a first releasable means for locking said web feeding means against actuation by said shaft, means actuatable by said shaft for cutting a marker from the web, a second releasable means for locking said cutting means against actuation by said shaft, pawl and ratchet means actuatable by said shaft, a third releasable means for locking said pawl and ratchet means against actuation by said shaft, means operated synchronously with the feeding of the sheets to the pile for releasing said third locking means, said pawl and ratchet means including a ratchet having a peripheral notch permitting inward movement of the pawl following a predetermined number of actuations of the pawl and ratchet means, the first releasable locking means including mechanism positioned for actuation by said pawl and ratchet means upon inward movement of the pawl in the notch in the ratchet, and means operated by the pawl and ratchet means for subsequently actuating said second locking means to release said cutting means for actuation by said shaft.

6. A sheet pile marking machine comprising electric switch means adapted to be attached to a sheet feeding machine and adapted for making and breaking a circuit in synchronism with the feeding of the sheets to the pile, a solenoid inserted in said switch circuit, an actuator, an electric motor for continuously driving said actuator, marker feeding means, friction drive means interconnecting said actuator and said marker feeding means, releasable means for locking said marker feeding means against actuation by said actuator through said friction drive means, impulse storing mechanism, a second friction drive means interconnecting said impulse storing mechanism with said actuator, a second releasable means for locking said impulse storing mechanism against actuation by said actuator through said second friction drive means, means operated by said solenoid for releasing said second locking means periodically in synchronism with the feeding of the sheets to the pile, and means controlled by said impulse storing mechanism for periodically releasing the first locking means at intervals predetermined by the number of impulses stored in the impulse storing mechanism.

7. A sheet pile marker comprising an actuator, an electric motor continuously driving said actuator, a solenoid, the circuit of which is periodically energized in synchronism with the feeding of the sheets to the pile, a marker feeding roll, a friction clutch interconnecting said marker feed-

ing roll with the actuator, a first pawl for locking said marker feeding roll against actuation, a second, swinging pawl, means including a second friction clutch interconnecting said second pawl with said actuator, means released by said solenoid for locking said second pawl against actuation by the actuator through the second friction clutch, means adapted to be engaged by said second pawl for releasing the first pawl, ratchet means for normally holding said second pawl out of engagement with said first pawl releasing means and formed to permit at predetermined intervals movement of the second pawl into engagement with said first pawl releasing means.

8. A sheet pile marker comprising an actuator, an electric motor for continuously driving said actuator, a solenoid, the circuit of which is periodically energized and deenergized in synchronism with the feeding of the sheets to the pawl, a feeding roll for feeding a web of marking material to the pile, a cutter for cutting a marker from the web, friction clutch means interconnecting said roll and said cutter with said actuator, a first pawl for locking said roll against actuation, a second, driving pawl, means including said friction clutch means for interconnecting said actuator with said driving pawl, means releasable by said solenoid for locking said driving pawl against actuation, means positioned to engage said driving pawl for releasing said first pawl, ratchet means for preventing engagement of said driving pawl with said first pawl releasing means, said ratchet means being formed to permit engagement of said driving pawl with said first pawl releasing means at predetermined intervals, means for locking said cutter against actuation, means operated by said ratchet means at predetermined intervals after engagement of the first pawl releasing means by the driving pawl for releasing the cutter locking means.

9. A sheet pile marker comprising an actuator, a electric motor for continuously driving said actuator, a solenoid, the circuit of which is periodically energized and deenergized in synchronism with the feeding of the sheets to the pile, a feeding roll for feeding a web of marking material to the pile, a cutter for cutting a marker from the web, friction clutch means interconnecting said roll and said cutter with said actuator, a first pawl for locking said roll against actuation, a second, driving pawl, means including said friction clutch means for interconnecting said actuator with said driving pawl, means releasable by said solenoid for locking said driving pawl against actuation, means positioned to engage said driving pawl for releasing said first pawl, ratchet means for preventing engagement of said driving pawl with said first pawl releasing means, said ratchet means being formed to permit engagement of said driving pawl with said first pawl releasing means at predetermined intervals, means for locking said cutter against actuation, said cutter locking means comprising a third pawl operated by said feeding roll, and a fourth pawl positioned for operation by said ratchet means at predetermined intervals after the engagement of the first pawl releasing means by the driving pawl.

10. A sheet pile marker comprising means for feeding a web of marking material to a pile, continuously operated means for actuating said web feeding means, releasable means for normally holding said web feeding means against actuation by said actuating means, a counter, a pawl operated synchronously with the feeding of the sheets to the pile for operating said counter, and means for releasably actuating said holding means and positioned to be engaged and operated by said pawl, said counter including means for holding said pawl out of engagement with said last mentioned actuating means and constructed to permit said pawl to engage said last mentioned actuating means after a predetermined number of sheets have been fed to the pile.

11. A sheet pile marker comprising an impulse storing mechanism operated in synchronism with the feeding of the sheets to a pile, web feeding means controlled by said mechanism for intermittently feeding a web of marking material to the pile at intervals predetermined by the number of sheets fed to the pile, means for cutting a marker from the web of marking material, a member operated by said impulse storing mechanism and controlling said cutting means to render said cutting means effective after a predetermined number of sheets have been fed to the pile above the web, and a member operated by said web feeding means and controlling said cutting means to prevent operation of said cutting means except after the feeding of the web of marking material to the pile and to permit said cutting means to be rendered effective by the member operated by the impulse storing mechanism after the web of marking material has been fed to the pile.

12. A sheet pile marker comprising pawl and ratchet means operated synchronously with the feeding of the sheets to the pile, the ratchet having a peripheral notch permitting inward radial movement of the pawl, means for feeding a web of marking material to the pile, means for cutting a marker from the web of marking material, means for controlling the operation of the web feeding means and including a shiftable member positioned for engagement and operation by the pawl and ratchet means when the pawl is received in the notch in the ratchet whereby to control the operation of the web feeding means in accordance with the number of sheets fed to the pile, means operating said cutting means, and a pair of shiftable members operatively connected to said operating means to render said operating means effective or ineffective to operate said cutting means, one of said members being controlled by said web feeding means and the other being controlled by said pawl and ratchet means to maintain said operating means ineffective to operate said cutting means except following the feeding of the web of marking material to the pile and to render said operating means effective after a predetermined number of sheets have been fed to the pile over the uncut web of marking material.

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