Nov. 8, 1932. C. FIELD 1,886,664

CONVEYER AND STORAGE APPARATUS FOR METAL WOOL MACHINES

Original Filed June 18, 1927 4 Sheets-Sheet 1

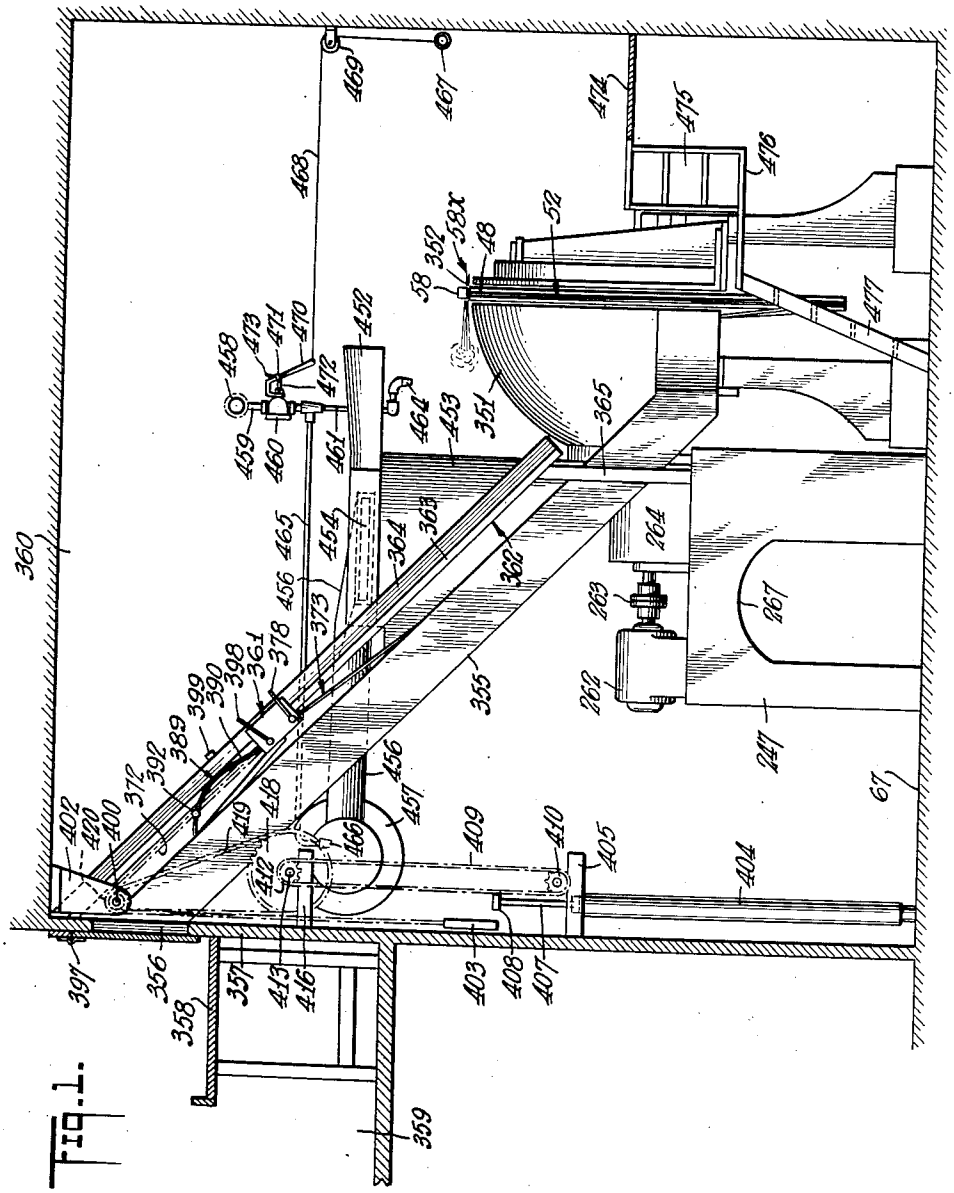


Fig. 1.

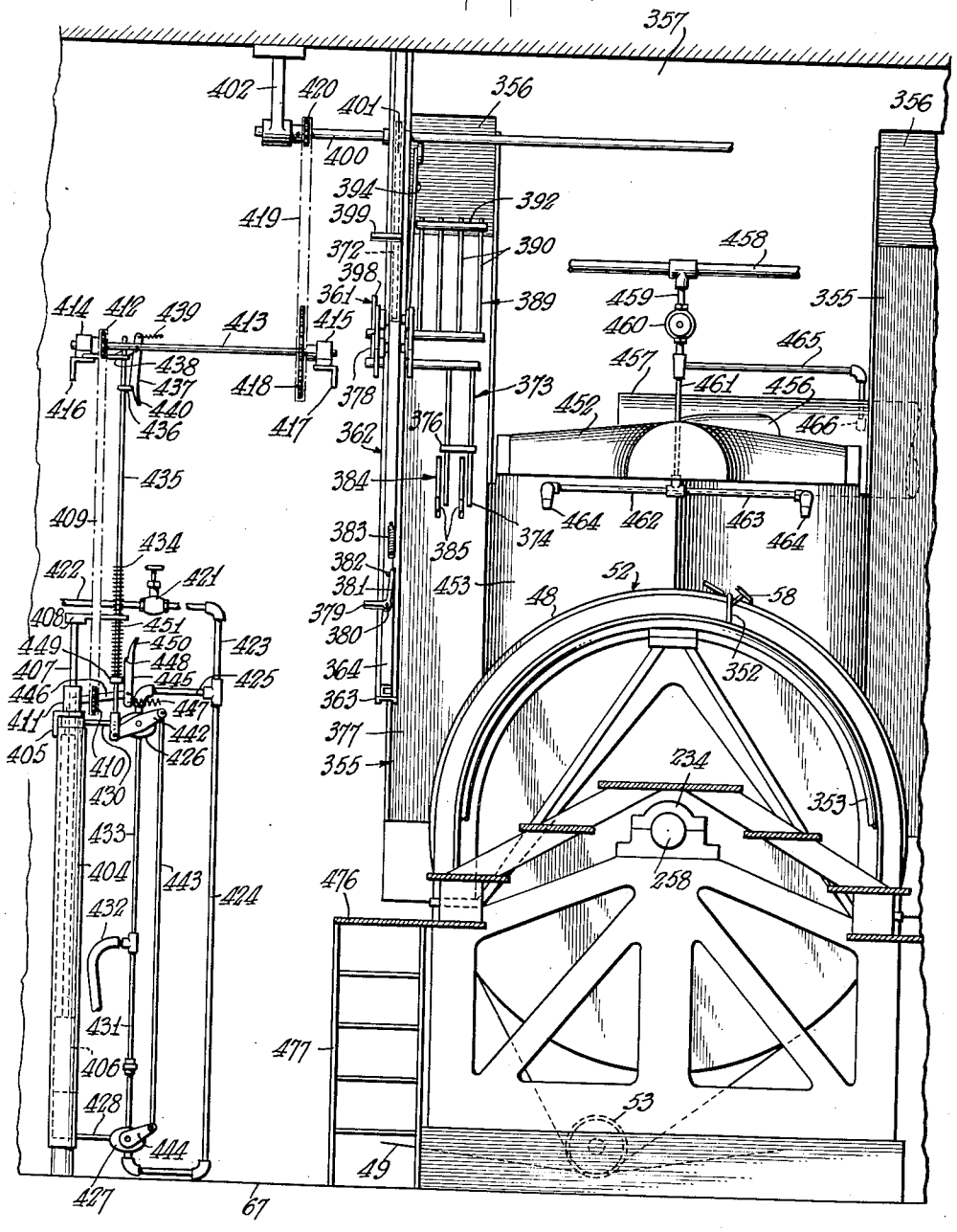
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CONVEYER AND STORAGE APPARATUS FOR METAL WOOL MACHINES

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Fig. 2.



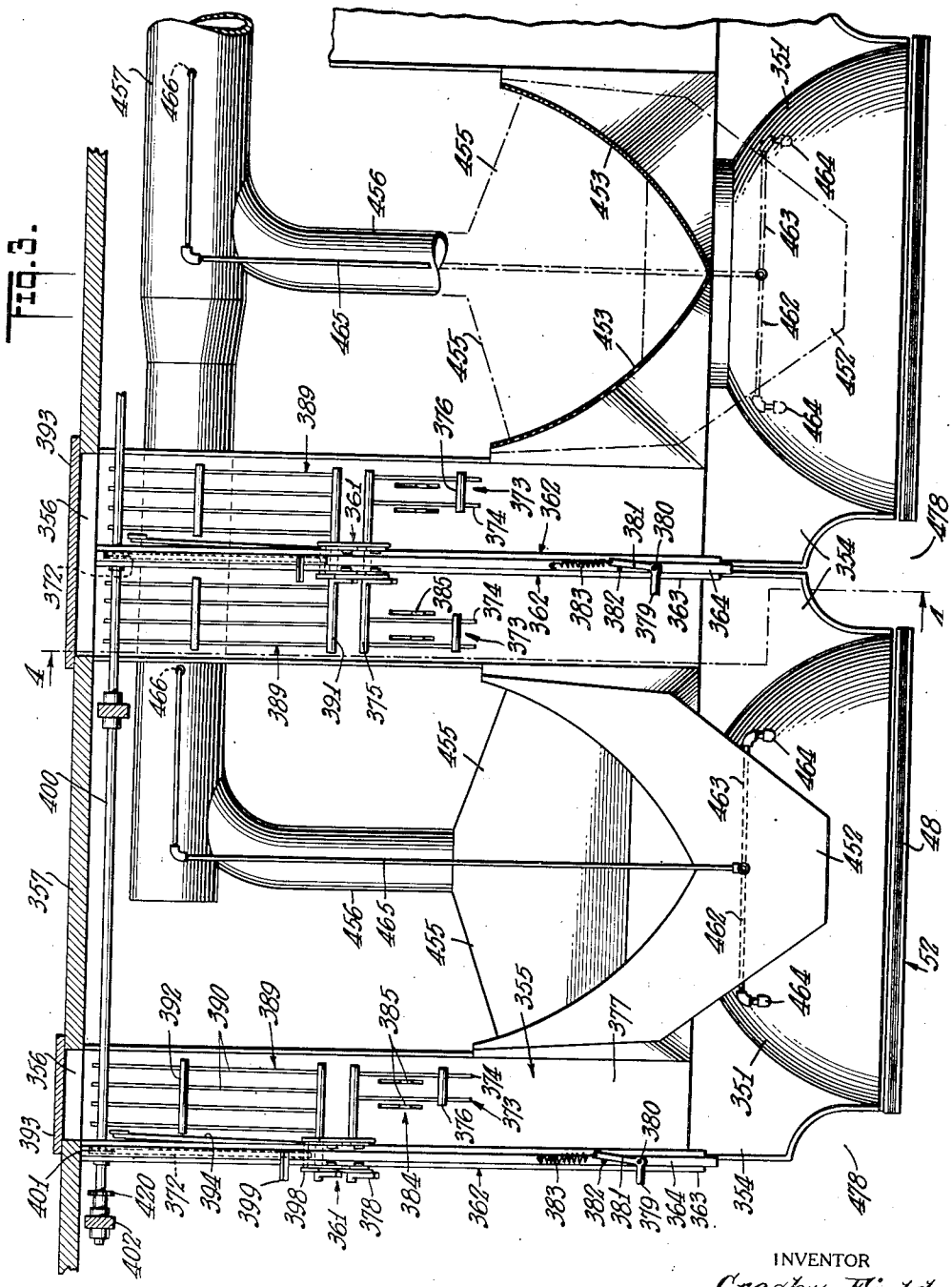
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CONVEYER AND STORAGE APPARATUS FOR METAL WOOL MACHINES

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FIG. 3.



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CONVEYER AND STORAGE APPARATUS FOR METAL WOOL MACHINES

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FIG. 4.

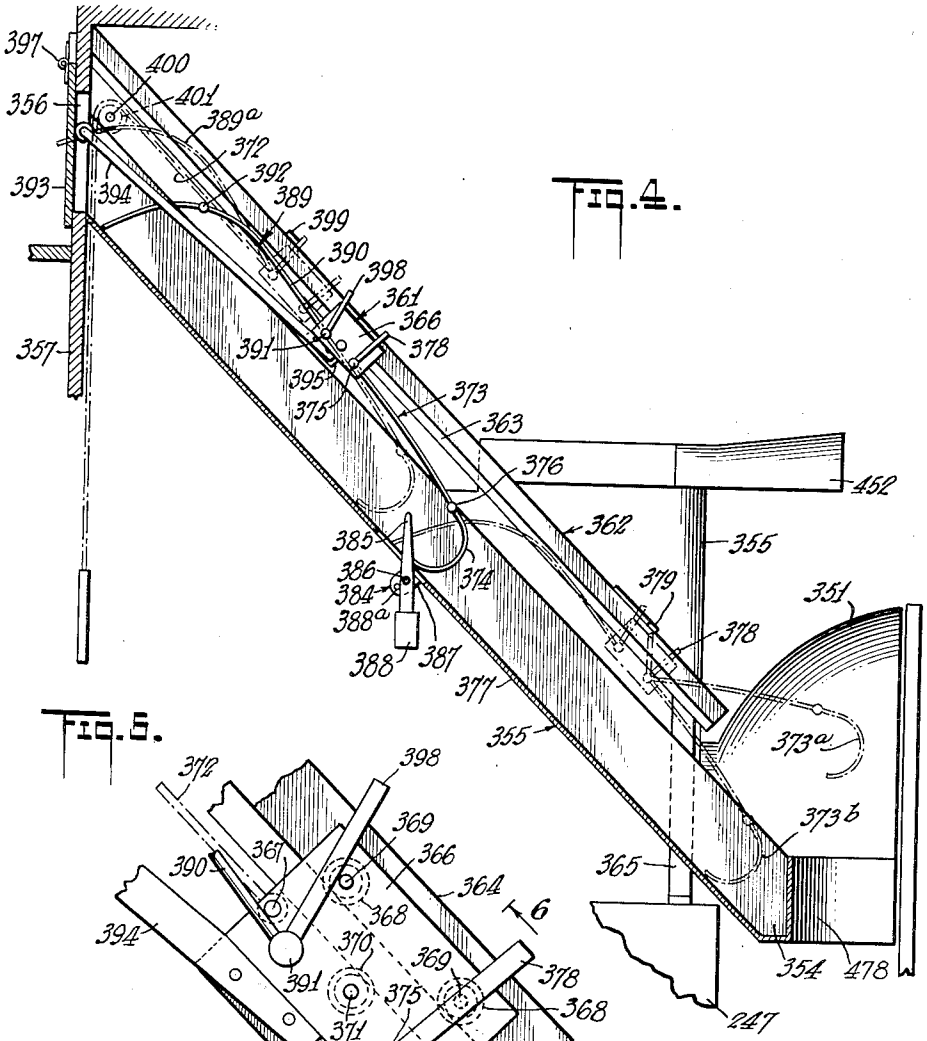
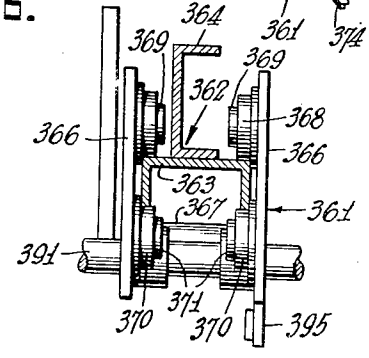


FIG. 5.

FIG. 6.



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1,886,664

UNITED STATES PATENT OFFICE

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CONVEYER AND STORAGE APPARATUS FOR METAL WOOL MACHINES

Original application filed June 18, 1927, Serial No. 199,692. Divided and this application filed August 3, 1928. Serial No. 297,317.

My present invention was designed as an element or subcombination of a complete plant for reducing wire to metal wool and scrap by a single pass through a machine comprising an organization of cutting units while automatically conveying away the wool to a separate storage compartment, as set forth in my application Ser. No. 199,692, filed June 18, 1927, of which this application is a division. It is obvious, however, that the specific arrangements for the disposing of the metal wool are capable of use in connection with one or more of the cutting units of said plant, or even a small wool cutting unit of any type.

As shown herein, a single wool conveyer can serve adjacent sides of two cutting units, so two of the units are shown. In this specific embodiment each of the cutting units includes a power driven, rotary bed in the form of a disc wheel having a plurality of adjacent grooves, formed in its periphery, in which the wire is held by friction in a plurality of parallel loops or strands and is carried by the wheel in operative relation to a series of cutters arranged around the periphery of the bed. As the wire leaves the last groove of each bed, it passes to the next succeeding bed where it enters the first groove thereof. Preferably, the wire passes in the loops and between the units, in single direction curves of greater or less radius but without reverse bending at any point.

The wool is carried from each knife by an air blast and suitable pockets are provided at the sides of each bed, from which pockets a guide shield or hood extends upwardly. It serves as a protector for the bearing of the bed and also receives the wool and conducts it into the pockets as it is blown away from the knives.

Fire is sometimes produced by the lubricant and the heating of the cutters due to their operation. The fire may be communicated to the fine wool in the pockets, or oil dust in the flues, which fire may spread rapidly and become of some appreciable size. I have made provision, however, to avoid the spread of fire. One feature is a sprinkler system which includes spray nozzles over the pockets and in the flue, said nozzles being connected with a water main. A series of quick opening valves are provided, one at each cutting unit, each of which may be operated by pulling a handle located at a convenient position and connected with the valve in any suitable manner. This enables the water to be sprinkled through said spray nozzles. This not only extinguishes the fire, but wets all surfaces in line of its possible progress, thus obstructing all channels for its spread.

An important feature for decreasing the fire hazard, as well to make the machine more completely automatic, is the conveying means associated with said pockets to remove the wool therefrom and conduct it to a suitable, preferably remote, place, where it can be readily accessible for storage or packing. The conveying means may include an inclined chute extending upwardly from each pocket. A rake is provided which is pivotally supported on a carriage suitably guided and caused to reciprocate back and forth over said chute. As the carriage descends, the rake is raised automatically and is then surdenly dropped to take hold of the wool in the pocket. The carriage then ascends, thus pulling the wool up the chute to a suitable wool holding means, arranged at an intermediate position in the chute, where the wool is held while the carriage again descends for another portion of wool from the pocket. While the carriage is descending, a second rake, supported thereby, is caused to take hold of the portion of wool held at an intermediate position in the chute and upon the following ascent of the carriage, this portion of wool is raised farther in the chute and is ejected through an opening in the wall of the room in which the wool producing machine is located; the ejected portion or bundle of wool being received on a bench in an adjacent room. The hole in the wall is at the upper end of the chute and is normally closed by a door. Suitable means operated by the wool elevating carriage, is provided to automatically open the door when the wool is to be ejected from the chute.

This bunching or bundle-forming and con-

veying mechanism is clumsy, complicated and expensive, as compared with innumerable conventional forms of conveyer mechanism that could be employed, but it has been worked out by long experiment as peculiarly adapted for the above described purpose of taking this peculiar product, namely, the heaped up strands of steel wool as blown from the knives and guided into the chute, and forming this material into loose roughly formed bundles of steel wool. The ultimate object is two-fold. One is to have more or less distinct bundles that can be ejected one at a time through the automatically opening door at the end of the conveyer and another is to have the product delivered in convenient form, and of fairly uniform density, for handling and subdivision into pads and rolls in the packing room. How this is accomplished by the two reciprocating rakes with their trip mechanisms and the cooperating intermediate detent will be more fully explained hereinafter.

The operation of the wool conveying means, including the elevator or carriage, may be controlled at will. To this end there may be provided a valve by which water may be admitted to a hydraulic cylinder to operate a piston in opposite directions, connection being made from said piston to elevator. Means is also provided to automatically reverse the action of said piston so as to cause the reciprocatory movements of the wool elevating carriage. It will be understood that, by the provision of hydraulic means for operating the wool elevating carriage, that in case of a fire there is no great danger of injury to the wool conveying means and it may be kept operating for a considerable length of time before being disabled.

Another protection is means for exhausting the dust and smoke from the room, located at each cutting unit. This includes an inverted hood under which there are a plurality of openings through which smoke and dust are drawn by means of pipes connected with a common flue, at one end of which there may be provided an exhaust fan.

The above and other features of my invention will be more evident from the following description in connection with the accompanying drawings, in which

Fig. 1 is an end view of a cutting unit and shows the means for conveying the strands of wool from the cutters to the pockets and from the latter to another compartment; also means for exhausting the smoke and dust and the fire protection system;

Fig. 2 is a front view of Fig. 1;

Fig. 3 is a top plan view of Fig. 1;

Fig. 4 is a sectional view taken on the line 4—4 of Fig. 3;

Fig. 5 is a detail view of the elevator carriage of the conveying means; and

Fig. 6 is a sectional view of the elevator carriage taken on the line 6—6 of Fig. 5.

In these drawings, the wool cutting units are more or less diagrammatically indicated and as in my Patent No. 1,608,481, dated Nov. 23, 1926, a single wire 49 may be conducted in single curvature loops, without reverse bending, from a supply reel or other source (not shown), through one or a succession of the cutting units. A unit includes a cylindrical bed 48 formed in the periphery of a traction wheel or disc 52, which is power driven as by electric motor 262, coupling 263 and reducing gear in casing 264. The wire is looped a number of times around the traction wheel 52 and a transfer guide roller 53, in successive parallel grooves, and is then conducted to the next cutting unit by suitable guide means. Knives or cutters, 58, are arranged in series around the upper half of the periphery of each bed and extend transversely of the bed, so that each knife edge operates simultaneously on the adjacent loops or strands of the wire 49. The loops or strands lie in grooves formed in the periphery of the bed and these grooves constitute cutter beds on which the wire is supported on practically non-slip engagement, to be carried by rotation of the wheel, into cutting engagement with the grooving knives which may be, say, 40 to 60 for each wheel. The knives are preferably made self-gauging by pivotal mounting and counter-weights as in said patents. The knives being grooved, as in my above mentioned patents, each knife presents a multiplicity of V-toothed edges to the wire and these operate to simultaneously cut from each loop of the wire, a multiplicity of separate fiber-like lengths constituting the metal wool product of the machine. In the preferred arrangement, fibers are non-positively floated away from the knives 58 by an air draft of suitable volume and velocity, supplied from a suitable source as diagrammatically indicated at 58x, Fig. 1. Such fibers settle on the shield guide 351, in very long filaments as described in said prior patents.

The guide shield 351 (Figs. 1 to 4) is concave and extends rearwardly from the periphery of the wheel bed so as to receive the wool as it is blown away from the cutters by air jets through nozzles 352 (Figs. 1 and 2), which are connected to an air supply pipe 353 as in my above mentioned patent. The wool is conducted by said guide into pockets 354, one at each side thereof, where it accumulates. Each guide also serves as a shield to protect the bearing 234 of the bed shaft.

To convey the wool away from the machine, to a place where it may be readily accessible for storage or packing, I provide, at each pocket 354, an inclined chute 355, extending upwardly to an opening 356, in a

wall 357. The wool may be elevated, by suitable means hereinafter described, and ejected from said opening to a bench 358 located in a room 359 (Fig. 1) adjoining the room 360 in which the shaving machine is located.

To convey the wool up the chute 355, I provide an elevator or carriage 361 arranged to travel up and down on a guideway 362, which may include a channel bar 363 reinforced by a second channel bar 364, said guideway being supported at its lower end by a bracket 365 supported on the foundation 247 upon which the wheel motor 262 is supported, the upper end of the guideway being supported against the wall 357. The carriage 361 may include two side plates 366 (Figs. 5 and 6) rigidly secured to each other by cross bars 367. Each side plate is provided with rollers 368 supported on headed studs 369 secured to the side plates 366, said rollers engaging the upper face of the channel bar 363. To assist in guiding the carriage and to retain it on the channel bar 363, I provide rollers 370 to engage under the channel bar 363, the rollers rotating on headed studs 371 secured to the side plates 366. The carriage is actuated in a manner hereinafter described, by means including a chain 372.

Each carriage is provided with a rake 373, to take hold of the wool which has been accumulated in the pockets 354. The rake has a plurality of prongs 374 carried by a rod or shaft 375 rotatably supported in the carriage 361, said prongs being secured to each other by a bar 376. The rake normally occupies a position near the floor 377 of the chute as indicated in full lines in Fig. 4, but when the carriage approaches the end of its downward movement, the rake is operated to swing it out of the chute to position 373*a*, so that it may pass over the mass of wool accumulated in the pocket 354 to draw it up in the chute. To swing the rake out of the chute, the shaft 375 has secured thereto an arm, 378, which is obstructed by a stop 379 so as to cause rotation of the shaft 375 to raise the rake to position 373*a*. As the downward movement of the carriage continues, the arm 378 moves clear of the stop 379, thus enabling the rake to drop into the pocket 354 to the position 373*b*, to take hold of the wool therein. The carriage is then moved upward along the guideway, thus elevating the mass of wool gripped by the rake. To enable the arm 378 to freely pass by stop 379, during the upper travel of the carriage, said stop may be supported on a pivot 380 (Fig. 2) secured to the channel bar 364 of the guideway; said stop being provided with an arm 381 which is normally held against a stop pin 382 by a spring 383. This permits the stop 379 to yield on the upward passage of the carriage. When the arm 378 has passed the stop 379, the latter is snapped back to its effective position by the spring 383.

When the bunch of wool reaches an intermediate position in its upward travel in the chute, it is pushed over a retaining device 384, shown as including two prongs 385 pivotally supported on a rod 386 carried by brackets 387 and adapted to engage or impale the rear portion of said bunch. The prongs may be provided at their lower ends with weights 388 which tend to keep them in an upright position. As the bunch of wool brushes by the prongs 385, while being pushed upwardly in the chute, said prongs swing rearward and downward in the direction of the travel of the wool, against the action of the weights 388. As soon as the wool has moved slightly past said prongs, they are returned to their normal positions by said weights 388, the return swing being limited by stops 388*a*. Thus, upon a subsequent descent of the carriage 361 for a fresh bunch of wool, the previously raised bunch is held in the intermediate position in the chute by the prongs 385.

A second rake 389 is supported by the carriage and includes prongs 390 extending from a shaft 391 which is also pivotally supported by the side plates 366 of the carriage 361, said prongs being secured to each other by a rod or bar 392. As the carriage descends, this second rake 389 brushes over the pack of wool retained by the detent prongs 385, at the intermediate position in the chute, and drops behind said wool so that upon subsequent ascent of the carriage 361 the bunch of wool is pushed upward from its intermediate position by said rake 389 and is ejected through the opening 356 in the wall 357.

The rakes segregate a bunch by simply tearing it loose from the supply and tend to bundle it on the up-strokes in a manner somewhat analogous to that in which a horse-rake in a hay field forms windrows of hay in fit condition for picking up on the hay fork for depositing on the hay wagon. In addition, it will be noted that the steel wool is a much finer, more elastic, more clinging, longer staple product than is the case with hay or any other known product, and the heap thereof to be attacked has entirely different physical characteristics from scattered hay or any other product found in any known art. For this reason, the reverse reciprocation of the rakes has effects not found in any hay-rake. For instance, the second or pusher rake brushes back over the top of the segregated bunch held by the detents and loose or projecting strands of wool engaged by the rake are carried back over the previously segregated bunch, tending to bind it in loose roll or bundle. No other conveying mechanism of which I am aware could have any such advantageous operation in

connection with this peculiar product, namely, steel wool strands as blown from the multiple cutter serrated blades of the wire shaving machine.

The hole 356 is normally closed by a door 393 which may be automatically opened when the bunch of wool is to be ejected. To this end, an arm 394 is secured to an extension 395 on one of the side plates of the carriage 361. Said arm is provided with a roller to engage the door 393 to swing it to open position, about a hinge 397, as the carriage advances, and prior to ejecting the wool through the hole 356.

To assist in ejecting the wool and clearing the pusher rake, said rake is swung upwardly to position 389*a* (Fig. 4) as the carriage approaches the end of its upward travel. For this purpose, the shaft 391 is provided with an arm 398 which is obstructed by a stop 399, secured to guideway 362, to rock the shaft 391 upon which the fork is supported.

The chutes between adjacent shaving units are close to each other as indicated in Fig. 3 and the carriage 361 instead of carrying a single pair of rakes as indicated in the left-hand end of Fig. 3 carries two pairs of rakes, one on each side thereof; the carriage guideway 362 being between said chutes. The rake supporting shafts 375 and 391 extend laterally from both sides of said carriage; each end of each shaft having a rake secured thereto. Where two chutes are close to each other, the hole 356 in the wall may be wide enough to accommodate both chutes, the door 393 being also wider to close the wider hole.

All of the wool elevating carriages 361 may be connected to a single shaft 400 extending along the shaving machine. Said shaft has secured thereto sprockets 401 over each of which extends one of the chains 372 from its connected carriage. The shaft 400 is supported by hangers 402 (Figs. 1 and 2) and is automatically and reversely rotated to operate the chains 372 to lower and raise the carriages 361. Counter weight 403 may be connected to the ends of chains 372 to balance the elevator carriages 361. Where two sets of rakes are supported by a carriage, the counter weights may be increased accordingly.

To operate the shaft 400, and thus cause the carriages to reciprocate on the guideway 362, there may be provided a pneumatic or hydraulic cylinder 404 (Figs. 1 and 2). Said cylinder may be vertically disposed and secured at its lower end to the floor 67 and at its upper end to the wall 357 by a bar 405. A piston 406, located within the cylinder has a piston rod 407 having at its upper end an arm 408 connected to a sprocket chain 409, said piston being operable in a manner hereinafter described to reciprocate in said cylinder to thus operate the sprocket chain 409 in opposite directions. The sprocket chain 409 may be guided at one end by a sprocket 410 which may be rotatably supported on a fixed bracket 411. The other end of the sprocket chain 409 engages a sprocket 412 secured to a shaft 413 to rotate the latter in bearings 414 and 415, supported on brackets 416 and 417 secured to the wall 357. A comparatively large sprocket 418 is secured to the shaft 413 and operates a sprocket chain 419 engaging with a smaller sprocket 420 secured to the carriage operating shaft 400. As the piston 406 is moved up and down in the cylinder 404, its movements are transmitted to the shaft 400 to cause it to rotate in reverse direction alternately and thus cause the wool elevating carriages 361 to move up and down on their guideways 362.

The operation of the piston 406 may be controlled by a valve 421 which may be located at a control board (not shown) to supply the liquid to the cylinder through a pipe 422 extending from any source to said valve. From the valve, the liquid is conducted through a pipe 423 having branches 424 and 425 through either one of which the liquid is conducted, according to the direction in which the piston is to move. When the parts are in the position indicated in Fig. 2, the liquid is prevented from flowing through the branch 425 by a three-way valve 426, which may be of any well known construction, and the liquid is conducted through the branch 424 to a three-way valve 427, controlling flow through a pipe 428 into the lower part of the cylinder 404, to drive the piston upward. This rotates the shaft 400 in a clockwise direction (Fig. 1), causing downward movement of the carriage 361. When the piston reaches its upper position in the cylinder, the valves 426 and 427 are automatically operated, in a manner hereinafter to be described, to stop flow of liquid through the branch 424 and admit the liquid through branch 425, valve 426 and a pipe 430, to the upper end of the cylinder 404, to thus force the piston 406 downwardly.

During the shifting of the valve 427, communication is established through the pipe 428 and a pipe 431 connected with a discharge hose 432 through which the liquid below the piston escapes as the piston is being forced downwardly. When the piston reaches its lowest position, the valves are again shifted to their former position to shut off the flow of liquid through the branches 425, 430 and again establish the flow through the branch 424. While the piston is being moved upwardly in the cylinder by the liquid admitted through the valve 427, the liquid above the piston is discharged through pipe 430, three-way valve 426 and pipe 433, which is also connected with the discharge hose 432.

To automatically shift the piston control valves 426 and 427 as the piston 406 approaches the upper end of the cylinder, an

arm 408 connected to the upper end of the piston rod 407, slides vertically on a valve operating rod 435, carrying upwardly a spring 434 which is coiled around said valve operating rod 435. The upper end of said spring engages a stop 436 before the piston rod reaches the upper limit of its travel, so that the spring is compressed to store energy for subsequent use in operating the valves 426 and 427. Said spring tends to move the valve shifting rod 435 upwardly, but said rod is locked against such upward movement by a shouldered pawl 437 pivotally supported on a fixed bracket 438, and held in engagement with the stop 436 by a spring 439. As the piston approaches its upward limit, the end of the arm 408 on the piston rod engages a tail 440 of the pawl 437 to swing the latter against the action of spring 439 out of engagement with the stop 436, whereupon the previously compressed spring 434 becomes effective to actuate the rod 435 and move it swiftly upwardly. The lower end of said rod is connected to a valve shifting lever 442 to swing the latter in a clockwise direction and thus operate the valve 426. The lever 442 is linked by a rod 443 to a valve shifting lever 444 of the valve 427 to operate the latter when the valve 426 is operated. Thus, when said valve operating rod 435 is moved upwardly, the valve shifting levers 442 and 444 are rotated in a clockwise direction so as to shut off the supply of liquid through the branch 424 and establish the flow of liquid through the branch 425 to reverse the movement of the piston 406.

During the shifting of the rod 435, a pawl 445 pivotally supported on a fixed bracket 446 is swung by a spring 447 to cause a shoulder 448 of said pawl to engage under a block 449 secured to the rod 435, to thus lock the rod, and the valves controlled thereby, in their shifted positions, while the piston is moved downwardly in the cylinder. As the piston approaches its lowest position, the arm 408 of the piston rod 407 engages a tail 450 to swing the pawl 445 out of engagement with the block 449. On the downward movement, a spring 451 similar to 434, is compressed between the block 449 and the arm 408, so that upon release of the rod 435 from the pawl 445, said spring 451 moves the rod 435 swiftly downward, operating the valve levers 442 and 444 in a counterclockwise direction to change the setting of the valves 426 and 427 to stop the flow of liquid through the branch 425 and re-establish the flow through the branch 424 for a subsequent upward movement of the piston. Thus, the rod 435, springs 434 and 451, pawls 437 and 445, and the blocks 436 and 449 constitute trigger mechanism for quickly operating the reversing valves 426 and 427.

To remove the dust and smoke which may be caused by the action of the cutters on the lubricated wire, I have provided exhaust means which may include a series of inverted hoods 452 one at each bed. Walls 453 extend downwardly and rearwardly from each hood to merge in the walls of the chutes 355. In the upper ends of said walls 453 and directly under the hood 452, are provided apertures 454 from which extend branches 455 of a pipe 456 connected with the flue 457. At one end of the flue there may be connected a fan to draw the smoke and dust, which gathers under the hood, through the apertures 454, branches 455, pipe 456 and flue 457 to discharge it through said flue.

The sprinkler system which is provided to prevent the spread of fire, when the wool ignites, which may result from the action of the cutters on the wire, may include a water main 458 extending lengthwise of the machines over all of the cutting units. At each cutting unit, there is a branch 459, extending from said water main, and connected to a normally closed valve 460. From the valve there extends a pipe 461 having two branches 462 and 463 which branches may be located under the hood 452, said branches being provided at their ends with nozzles 464 located above the pockets 354. From the pipe 461, another branch 465 extends rearwardly into the flue 457, where said branch is provided with a nozzle 466. In case of fire, the valve 460 may be operated by a ring or finger piece 467 (Fig. 1) located in a convenient place. The finger piece is connected to a cord or chain 468, conducted over stationary guide roller 469, to swing a valve operating lever 470 about a pivot 471, to thus move a stem 472 inwardly to open the valve, said stem or plunger being operated by a cam 473 of the lever 470. Said valve 460 is of the quick operating type and remains open after it is operated. Upon opening of the valve, the water is forced through the nozzles 464 and 466 to spray the wool in the pockets and also spray the flue; the nozzle 466 located in the flue being effective to spray the dust which may be accumulated on the walls in the flue and thus prevent any possibility of progress of the fire in the flue.

Said nozzles are not only effective to extinguish the fire, but they wet all surfaces in the line of possible progress of the fire.

Though not essential, a suitably supported platform 474 may be provided along which the attendants may walk from one shaving unit to the other. At each shaving unit there may extend from the platform 474, a series of steps 475 to each side of the shaft 258 and to individual platforms 476. From each of the individual platforms 476, there is a ladder 477 extending downwardly to the floor 67. To enable the attendant to descend the ladder without obstruction by the pockets 354, each pocket may be indented as at 478 (Fig. 3).

I claim:

1. In a machine for making metal wool, in-

cluding a shaving unit, guide means for collecting the shavings from said unit, a chute extending from the collecting point and reciprocable conveying means to advance the collected wool along the chute from said pocket to an intermediate position in said chute, said conveying means being effective on a subsequent operation to advance the said wool from the intermediate position to the end of the chute.

2. In a machine for making steel wool, including shaving mechanism, a chute, wool transfer mechanism movable lengthwise of said chute, a normally closed door at the end of said chute and means controlled by said transfer mechanism to open said door so that the wool may be discharged from said chute.

3. In a machine for making metal wool, including a unit to produce wool shavings from a wire, means including a pocket at said unit in which the wool accumulates, a wall having a hole therein, a door at said hole, intermittent conveyer means to conduct the wool from said pocket through said hole, and means actuated by the conveyer means to open and close said door.

4. In a machine for making metal wool, including two wool shaving units, means to accumulate the wool, two chutes extending from the shaving units, a reciprocatory carriage, two wool engaging devices on said carriage, one extending into each chute, a single self closing door at the end of said chutes, and means on said carriage to open said door for ejection of the wool, as the wool reaches the exit end of the chute.

5. In a machine for making metal wool, including a wool shaving unit, means for accumulating the wool shavings, and means to convey the wool from the accumulating means, including a chute, a carriage to reciprocate lengthwise of said chute, and an element on said carriage to engage the wool to advance it in the chute.

6. In a machine for making metal wool, including a wool shaving unit, means for accumulating the wool shavings, and means to convey the wool from the accumulating means, including a chute, a carriage to reciprocate lengthwise of said chute, an element on said carriage to engage the wool, said element being pivotally supported, and means to swing said element about its pivot as the carriage approaches the wool engaging end of its travel.

7. In a machine for making metal wool, including a wool shaving unit, means for accumulating the wool shavings, and means to convey the wool from the accumulating means, including a chute, a carriage to reciprocate lengthwise of said chute, and a rake on said carriage to engage the wool and draw it along in the chute.

8. In a machine for making metal wool, including a wool shaving unit, means for accumulating the wool shavings, and means to convey the wool from the accumulating means, including a chute, a carriage to reciprocate lengthwise of said chute, a rake pivotally supported on said carriage to engage the accumulated wool, and means to swing said rake about its pivot to pass over and engage behind said wool as the carriage approaches the rear end of its travel.

9. In a machine for making metal wool, including a wool shaving unit, means for accumulating the wool shavings, and means to convey the wool from the accumulating means, including a chute, a carriage to reciprocate lengthwise of said chute, a rake pivotally supported on said carriage and reaching into said chute, a guideway for said carriage, and a bypass pawl on said guideway operating to swing said rake momentarily out of the chute as the carriage moves rearward over the collected wool; but inoperative on the return movement.

10. In a machine for making metal wool, including a wool shaving unit, means for accumulating the wool shavings, and means to convey the wool from the accumulating means, including a chute, a carriage to reciprocate lengthwise of said chute, and a fork on said carriage to engage the wool shavings and push it along in the chute.

11. In a machine for making metal wool, including a wool shaving unit, means for accumulating the wool shavings, and means to convey the wool from the accumulating means, said conveying means including a chute, a carriage to reciprocate lengthwise of said chute, a fork on said carriage to move the wool to the exit end of the chute, said fork being pivotally supported, and means to swing said fork about its pivot to eject the shavings from the chute as the carriage approaches said exit end of the chute.

12. In a machine for making metal wool, including a wool shaving unit, a hood to receive the shavings, a collecting pocket to receive the wool shavings from the hood, a wall having a hole therein, and a chute extending upwardly from the pocket to said hole, reciprocable conveying means to advance a bunch of wool up the chute from the pocket to an intermediate position in said chute, means to retain the wool at the intermediate position while the conveying means descends for another bunch of wool, said conveying means being effective upon a subsequent ascent to advance the first bunch from its intermediate position while the second bunch is being brought to the intermediate position.

13. In a machine for making metal wool, including a wool shaving unit, means to accumulate the wool shavings, and a chute extending upwardly from the accumulation region, a reciprocable carriage, a rake on said carriage to advance a bunch of wool in

the chute to an intermediate position, means to retain the bunch of wool at the intermediate position while the carriage descends for another bunch of wool, and a fork on said carriage effective upon a subsequent ascent of the carriage to advance the first bunch from its intermediate position while the second bunch is being brought to the intermediate position.

14. In a machine for making metal wool, including shaving mechanism, reciprocatory conveyer mechanism to transfer the wool from the shaving mechanism, a cylinder, a piston operable by a fluid in said cylinder, means connecting said piston with the conveyer mechanism, and means to automatically reverse the operation of the piston to impart reciprocatory movement to the transfer mechanism.

15. In a machine for making metal wool, including shaving mechanism, mechanism to transfer the wool from the shaving mechanism, a cylinder, a piston operable by a fluid in said cylinder, means connecting said piston with the transfer mechanism, valves to control the inlet to and the outlet of a fluid from the cylinder, trigger mechanism to operate said valves to change the flow of the fluid and thus reverse the operation of the piston, and means associated with the piston to actuate the trigger mechanism.

16. Mechanism for cutting multiple strands of steel wool and for collecting the same, in combination with means for segregating and bunching portions thereof and conveying the same separately to a suitable point of deposit.

17. A conveyer for a metal wool machine, including a chute, a carriage, means for reciprocating said carriage along said chute, a rake pivotally mounted upon said carriage, means for swinging said rake in engaging relationship with material to be conveyed, whereby said material is dragged along said chute, and a retaining member disposed in said chute in the path of travel of said material, said retaining member being adapted to swing in a direction to permit the material to pass thereover while it is being dragged along said chute, said retaining member being adapted to hold said material in position after it has passed over said retaining member.

18. A conveyer for a metal wool machine, including a chute, a carriage, means for reciprocating said carriage along said chute, a rake pivotally mounted on said carriage, means for swinging said rake in engaging relationship with the material to be conveyed, whereby said material is dragged along said conveyer during the forward motion of said carriage, means for retaining said material in position intermediate the length of said chute, while said carriage is returning to its initial position, a second rake pivotally mounted on said carriage and adapted to pass over said material while said material is being retained in said intermediate position and while said carriage is returning to its initial position, whereby said second rake will push said retained material through the remaining length of the chute upon the forward motion of said carriage.

19. Mechanism affording a continuous supply of steel wool in connected entangled strands, in combination with means for segregating portions thereof by tearing them loose from the supply, without cutting them and bunching said segregated portions, and conveying the bunches separately to a suitable place of deposit.

20. A machine for making metal wool, including a shaving unit, a shield at said unit to receive the wool shavings, a collecting pocket to receive the shavings from the shield, a chute extending from said pocket through which the collected wool may be conveyed from the pocket, said chute being open at the top, and conveying means arranged above the chute and reaching down into the latter to move the wool in said chute, away from the pocket.

Signed at New York in the county of New York and State of New York this 31st day of July, A. D. 1928.

CROSBY FIELD.