

March 16, 1954

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2,672,244

SHEET SEPARATING AND FEEDING DEVICE

Filed Jan. 15, 1953

3 Sheets-Sheet 1

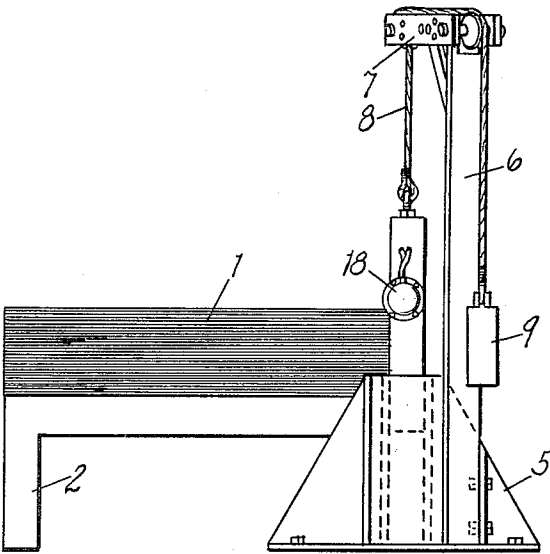


Fig. 1.

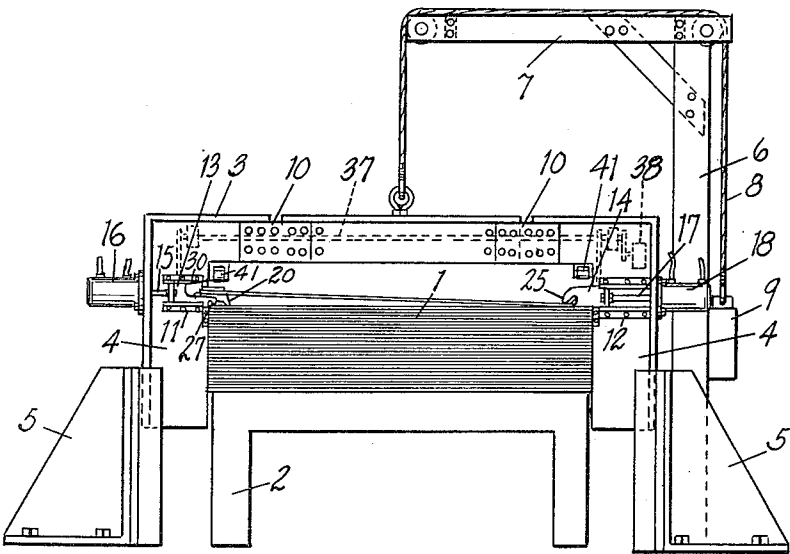


Fig. 2.

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3 Sheets-Sheet 2

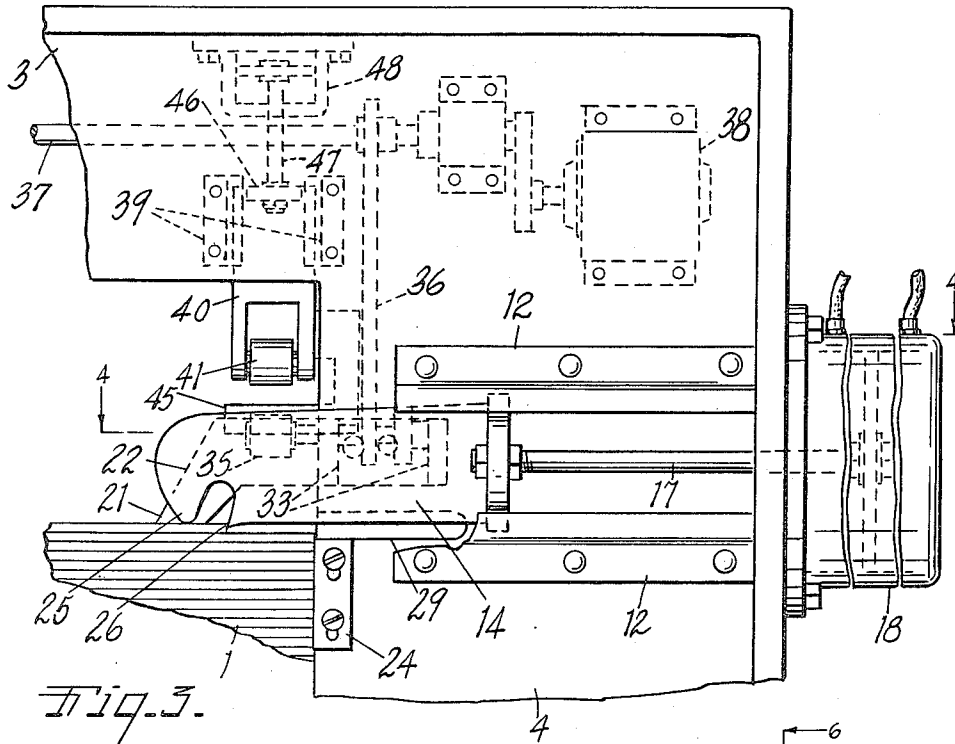


Fig. 3.

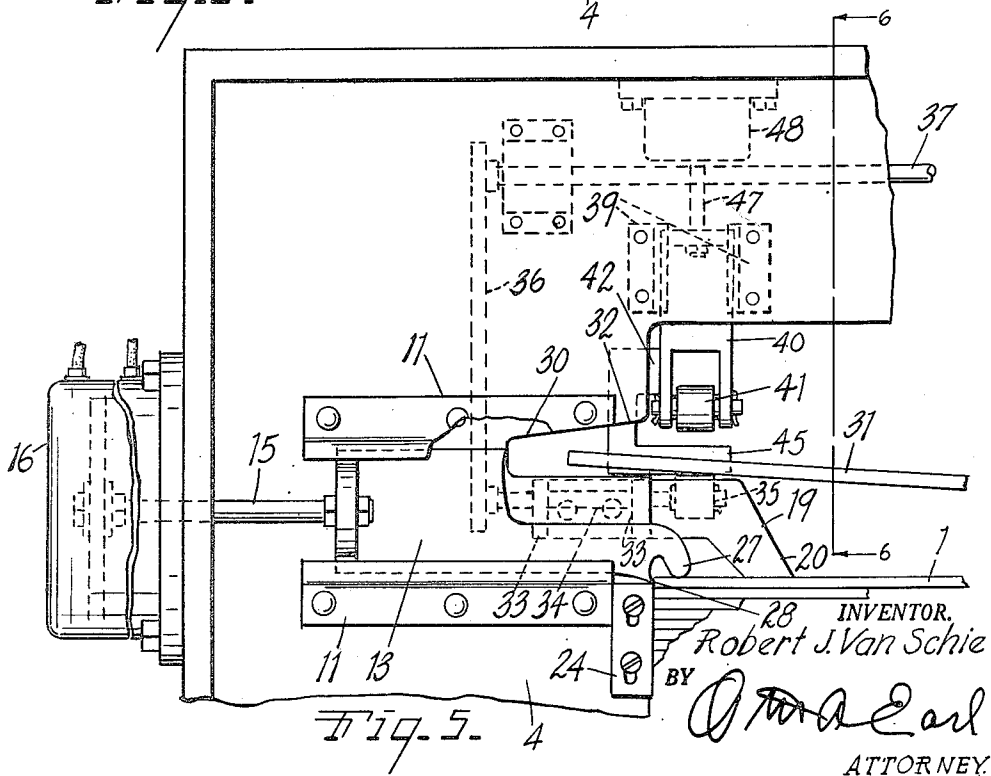


Fig. 5.

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3 Sheets-Sheet 3

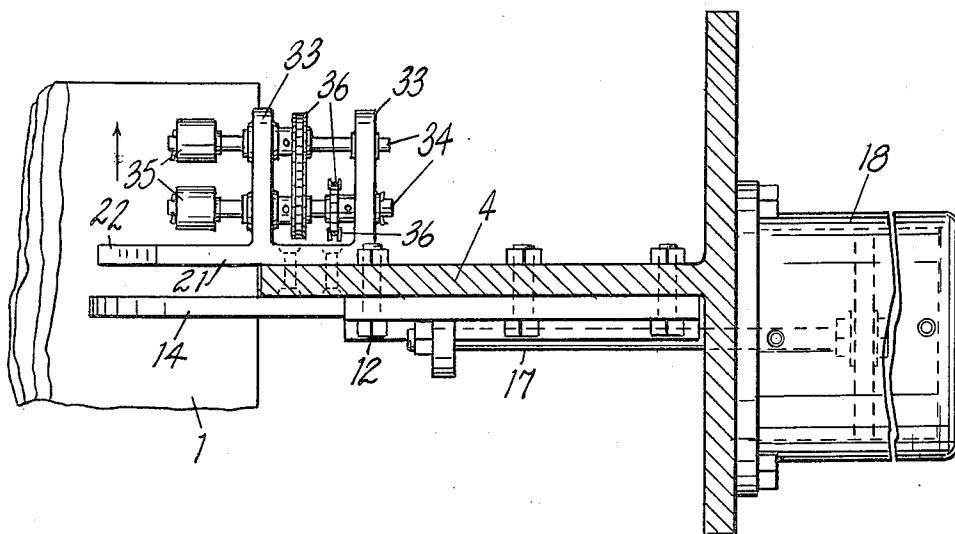


Fig. 4.

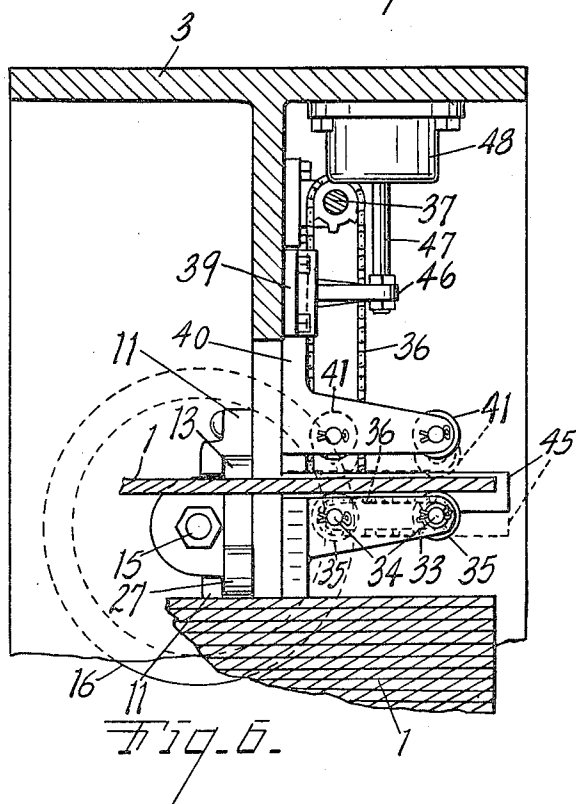


Fig. 5.

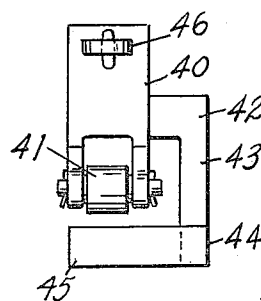


Fig. 7.

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SHEET SEPARATING AND FEEDING DEVICE

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8 Claims. (Cl. 214-8.5)

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This invention relates to improvements in sheet separating and feeding device.

The principal objects of this invention are:

First, to provide a sheet separating device which is easily adjusted or mounted over a stack of sheets of metal for separating and delivering the sheets individually from the stack.

Second, to provide a sheet feeding device that automatically follows the top of the stack of sheets as sheets are removed from the stack.

Third, to provide a sheet feeding device that is light and relatively inexpensive and which may be connected to remote power sources by flexible conduits and cables.

Fourth, to provide a sheet feeding device which is relatively small and compacted by reason of the off-feeding operation being performed by relatively small rollers.

Other objects and advantages of the invention will be apparent from a consideration of the following description and claims. The drawings of which there are three sheets illustrate a highly practical form of the device.

Fig. 1 is a side elevational view of the device operatively positioned over a stack of sheets to be separated and fed.

Fig. 2 is a rear elevational view of the device shown in Fig. 1.

Fig. 3 is a fragmentary enlarged rear elevational view of the right hand side of the device as illustrated in Fig. 2.

Fig. 4 is a fragmentary cross sectional view taken along the plane of the line 4-4 in Fig. 3.

Fig. 5 is an enlarged fragmentary rear elevational view of the left side of the device illustrated in Fig. 2.

Fig. 6 is a fragmentary vertical cross sectional view taken along the plane of the line 6-6 in Fig. 5.

Fig. 7 is a detailed front elevational view of the off-feeding pressure rollers and supporting bracket shown in Fig. 6.

Figs. 1 and 2 illustrate the general arrangement of the separating and feeding device in operative association with a stack of metal sheets 1 supported upon a pallet or pedestal 2. For the purpose of description the right side of Fig. 1 may be considered the front of the device with the sheets being fed from the rear or left to the right. Fig. 2 is then a rear elevational view of the device. The device consists generally of a U-shaped yoke or head 3 having downwardly projecting arms 4 that straddle the stack of sheets 1. The arms 4 are guided between two

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pedestals 5 that are desirably secured to the floor.

The right pedestal 5 supports an upright column 6 with a laterally projecting arm 7 on the upper end thereof. A cable 8 is secured to the head and trained over pulleys on the arm 7 to a counterweight 9 so that the head bears relatively lightly against the top of the stack 1 as will be described. The head 3 is desirably laterally adjustable by means of the plates 10 so as to co-act with sheets of varying widths.

Mounted on each of the arms 4 of the head are horizontally disposed slide way forming clips 11 and 12. The left clips 11 slidably support a left slide member 13 shown in Fig. 5 while the right slide way supports a right slide plate 14 shown in detail in Fig. 3. The left side plate 13 is reciprocable by a piston rod 15 driven by the pneumatic or hydraulic cylinder 16 while the right slide plate 14 is reciprocably driven by a piston rod 17 operated by the cylinder 18 on the right arm of the yoke. The left arm 4 of the yoke carries a supporting finger 19 that projects inwardly of the arm and terminates in an upwardly and outwardly inclined edge 20 at approximately the level of the bottom of the left slide plate 13. The right arm of the head carries a similar supporting finger 21 which projects rigidly inwardly and terminates in an upwardly and outwardly inclined edge 22 at approximately the level of the lower edge of the right slide plate 14. The head 3 is thus supported on the top sheet of the stack by reason of the fingers 19 and 21 resting upon the top sheet. Adjustable guide plates 24 are secured to the inner edges of the arm 4 to guide the head along the side of the stack.

The right slide plate 14 has a rounded inner nose 25 that guides the slide plate over the top of the top sheet. Outwardly from the nose 25 the slide plate 14 is provided with a sharpened jaw 26 that projects below the nose 25 just enough to engage the edge of the top sheet of the stack so that as the slide plate is moved inwardly or to the left as shown in Fig. 3 the jaw 26 will slide the top plate transversely to the left. Similarly the left slide plate 13 is provided with a rounded nose 27 that slides along the top sheet of the stack and guides a sharpened jaw 28 into engagement with the edge of the top sheet. The sequence of operation of the separating device starts with concurrent movement of the slide plates 13 and 14 to the right. In this operation the nose 28 on the left slide plate pushes the top plate of the stack to the right. The right arm

of the head 3 is provided with a lateral slot 29 to receive the right edge of the top sheet as it is moved by the left slide plate. The left slide plate 13 is advanced to the right far enough to advance the jaw 28 and the left edge of the top sheet inwardly beyond the head supporting finger 19 on the left side of the head. Motion of the slide plates 13 and 14 is then reversed so that the right slide plate 14 and jaw 26 advance the right edge of the top sheet to the left. The left edge of the sheet will engage and move upwardly along the inclined edge 23 of the finger 19. In order to accommodate this left wise movement of the top sheet the left arm of the head 3 is provided with a lateral slot 30 located above the finger 19. The left edge of the sheet will thus be elevated above the finger 19 as is indicated at 31 in Fig. 5. The direction of movement of the slide plates is then again reversed and the upper edge of the left slide plate 13 is provided with an upper laterally facing jaw portion 32 that engages the elevated edge of the upper sheet 31. Return movement of the upper sheet 31 brings its right edge into engagement with the inclined edge 22 of the right supporting finger 21 and the right edge of the top sheet is separated from the stack and elevated over the right finger 21. On this second advancing motion of the left slide plate 13 the lower jaw 28 engages a sub adjacent sheet of the stack to start the separating motion of a second cycle of the machine.

In order to deliver or off-feed the separated top sheet from its position on the tops of the fingers 19 and 21 the fingers are provided with forwardly projecting flanges or arms 33 that rotatably support transversely extending shafts 34. The shafts are disposed in a horizontal plane below the tops of the fingers 19 and 21 and project inwardly beyond the side edges of the stack. The shafts carry driven rollers 35 that have their upper edges or peripheries positioned slightly above the level of the upper edges of the supporting fingers 19 and 21. The shafts 34 are continuously driven by chains 36 that extend upwardly to a cross shaft 37 extending along the top cross piece of the head 3. A motor for rotating the shaft 37 is indicated at 38. The newly separated sheet is thus placed on top of the driven rollers 35 by operation of the slide plates 13 and 14.

The engagement between the separated top sheet and the driven rollers 35 is insufficient to positively discharge the sheet from the head and to more accurately control the discharge of the separated sheet, the top cross piece of the head is provided at each end with vertically extending slide way forming brackets 39. The brackets 39 slidably support vertical slide members 40. The slide members 40 carry pressure rolls 41 on their lower ends which coact with the driven rollers 35 to press the separated sheet between the rollers and cause the sheet to be fed positively to the front of the device.

In order to prevent accidental feeding or discharge of a separated sheet the vertical slide members 40 are provided with laterally outwardly extending arms 42 as is best illustrated in Fig. 7. The arms 42 connect with depending arms 43 and forwardly projecting arms 44 to which laterally inwardly projecting stops 45 are secured. The stops 45 are spaced vertically below the pressure rolls 41 so as to be positioned in front of the leading edge of the separated sheet as is best illustrated in Fig. 6. Upon low-

ering motion of the vertical slide members 40 and the pressure rolls 41 the stops 45 are also lowered out of the path of the separated sheet.

The vertical slide members 40 have forwardly projecting ears 46 on their forward sides which ears are connected to piston rods 47 operated by hydraulic or pneumatic cylinders 48 carried on the top cross member of the head 3. At the proper period in the cycle of operation of the machine the cylinders 48 and piston rods 47 are actuated to depress the stops 45 and pressure rollers 41 to off-feed the separated top sheet of the back. It will be understood that suitable automatic valving and pressure conduits may be connected to the cylinders 16, 18 and 48 to provide automatic and rapid operation of the sheet separating slide plates 13 and 14 and the off-feeding pressure rolls 41.

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

1. A sheet separating and feeding device comprising a downwardly opening U-shaped yoke adapted to straddle a stack of sheets to be fed and guidingly engage the sides thereof, a counter-weighted yieldable support for said head, supporting fingers secured to the sides of said yoke and projecting inwardly therefrom, said fingers having upwardly and outwardly inclined inner edges, slide plates reciprocable inwardly from the sides of said yoke and along the lower edges of said fingers, said slide plates having sheet engaging jaws on their lower edges adapted to engage the edge of a sheet on which said fingers rest, fluid operated pistons connected to reciprocate said slide plates, one side of said yoke having a lateral slot therein along the level of the lower edge of the finger attached thereto, the other side of said yoke having a lateral slot formed therein along the level of the upper edge of the finger attached thereto, arms secured to said fingers and projecting forwardly therefrom, off-feed rollers rotatably supported on said arms and having their upper edges positioned along the level of the upper edges of said fingers, drive means carried by said yoke and connected to rotate the said rollers, vertical slide members slidably mounted on the top of said yoke and over said rollers, pressure rolls mounted on said vertical slide members and over said first rollers, fluid operated means connected to reciprocate said vertical slide members to advance the rollers thereon into coacting feeding relation with the rollers on said arms, and stops carried by said vertical slide members and disposed in forwardly spaced relationship to said first rolls and extending vertically across the plane of the tops of said first rolls in the elevated position of said vertical slide members to engage the leading edge of a sheet supported on said first rolls.

2. A sheet separating and feeding device comprising a downwardly opening U-shaped yoke adapted to straddle a stack of sheets to be fed and guidingly engage the sides thereof, a counter-weighted yieldable support for said head, supporting fingers secured to the sides of said yoke and projecting inwardly therefrom, said fingers having upwardly and outwardly inclined inner edges, slide plates reciprocable inwardly from the sides of said yoke and along the lower edges of said fingers, said slide plates having sheet engaging jaws on their lower edges adapted to engage the edge of a sheet on which said fingers rest, fluid operated pistons connected to reciprocate said slide plates, one side of said yoke having

a lateral slot therein along the level of the lower edge of the finger attached thereto, the other side of said yoke having a lateral slot formed therein along the level of the upper edge of the finger attached thereto, arms secured to said fingers and projecting laterally therefrom, off-feed rollers rotatably supported on said arms and having their upper edges positioned along the level of the upper edges of said fingers, drive means carried by said yoke and connected to rotate the said rollers, vertical slide members slidably mounted on the top of said yoke, pressure rolls mounted on said vertical slide members and over said first rollers, and fluid operated means connected to reciprocate said vertical slide members to advance the rollers thereon into coacting feeding relation with the rollers on said arms.

3. A sheet separating and feeding device comprising a downwardly opening U-shaped yoke adapted to straddle a stack of sheets to be fed and guidingly engage the sides thereof, a yieldable support for said head, supporting fingers secured to the sides of said yoke and projecting inwardly therefrom, said fingers having upwardly and outwardly inclined inner edges, slide plates reciprocable inwardly from the sides of said yoke and along the lower edges of said fingers, said slide plates having sheet engaging jaws on their lower edges adapted to engage the edge of a sheet on which said fingers rest, fluid operated pistons connected to reciprocate said slide plates, one side of said yoke having a lateral opening therein along the level of the lower edge of the finger attached thereto, the other side of said yoke having a lateral opening formed therein along the level of the upper edge of the finger attached thereto, off-feed rollers rotatably supported from the sides of said yoke and having their upper edges positioned along the level of the upper edges of said fingers, said rollers being rotatable about axes extending transversely across said yoke, drive means carried by said yoke and connected to rotate the said rollers, vertical slide members slidably mounted on said yoke, pressure rolls mounted on said vertical slide members and over said first rollers, fluid operated means connected to reciprocate said vertical slide members to advance the rollers thereon into coacting feeding relation with the rollers on the sides of said yoke, and stops carried by said vertical slide members and disposed in forwardly spaced relationship to said first rolls and extending across the plane of the tops of said first rolls in the elevated position of said vertical slide members to engage the leading edge of a sheet supported on said first rolls.

4. A sheet separating and feeding device comprising a downwardly opening U-shaped yoke adapted to straddle a stack of sheets to be fed and guidingly engage the sides thereof, supporting fingers secured to the sides of said yoke and projecting inwardly therefrom, said fingers having upwardly and outwardly inclined inner edges, slide plates reciprocable inwardly from the sides of said yoke and along the lower edges of said fingers, said slide plates having sheet engaging jaws on their lower edges adapted to engage the edge of a sheet on which said fingers rest, fluid operated pistons connected to reciprocate said slide plates, one side of said yoke having a lateral opening therein along the level of the lower edge of the finger attached thereto, the other side of said yoke having a lateral opening formed therein along the level of the upper edge of the finger attached thereto, off-feed rollers rotatably

supported from the sides of said yoke and having their upper edges positioned along the level of the upper edges of said fingers, said rollers being rotatable about axes extending transversely across said yoke, drive means carried by said yoke and connected to rotate the said rollers, vertical slide members slidably mounted on said yoke, pressure rolls mounted on said vertical slide members and over said first rollers, and fluid operated means connected to reciprocate said vertical slide members to advance the rollers thereon into coacting feeding relation with the rollers on the sides of said yoke.

5. A sheet separating and feeding device comprising a downwardly opening U-shaped yoke adapted to straddle a stack of sheets to be fed and guidingly engage the sides thereof, supporting fingers secured to the sides of said yoke and projecting inwardly therefrom, said fingers having upwardly and outwardly inclined inner edges, slide plates reciprocable inwardly from the sides of said yoke and along the lower edges of said fingers, said slide plates having sheet engaging jaws on their lower edges adapted to engage the edge of a sheet on which said fingers rest, fluid operated pistons connected to reciprocate said slide plates, one side of said yoke having a lateral opening therein along the level of the lower edge of the finger attached thereto, the other side of said yoke having a lateral opening formed therein along the level of the upper edge of the finger attached thereto, opposed off-feed rollers rotatably supported on said yoke at the sides thereof and positioned along opposite sides of the level of the upper edges of said fingers to be on opposite sides of a sheet positioned on top of said fingers, means carried by said yoke and connected to rotate part of said rollers, vertical slide members slidably mounted on said yoke and movably supporting part of said rollers, fluid operated means connected to reciprocate said vertical slide members to advance said rollers into coacting feeding relation with a sheet supported on said fingers and stops carried by said vertical slide members and disposed in forwardly spaced relationship to said rolls and in the plane of the tops of said fingers in the retracted position of said vertical slide members to engage the leading edge of a sheet supported on said fingers.

6. A sheet separating and feeding device comprising a downwardly opening U-shaped yoke adapted to straddle a stack of sheets to be fed and guidingly engage the sides thereof, supporting fingers secured to the sides of said yoke and projecting inwardly therefrom, said fingers having upwardly and outwardly inclined inner edges, slide plates reciprocable inwardly from the sides of said yoke and along the lower edges of said fingers, said slide plates having sheet engaging jaws on their lower edges adapted to engage the edge of a sheet on which said fingers rest, fluid operated pistons connected to reciprocate said slide plates, one side of said yoke having a lateral opening therein along the level of the lower edge of the finger attached thereto, the other side of said yoke having a lateral opening formed therein along the level of the upper edge of the finger attached thereto, opposed off-feed rollers rotatably supported on said yoke at the sides thereof and positioned along opposite sides of the level of the upper edges of said fingers to be on opposite sides of a sheet positioned on top of said fingers, means carried by said yoke and connected to rotate part of said rollers, vertical slide members slidably mounted on said yoke and movably supporting part of said rollers, and fluid

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operated means connected to reciprocate said vertical slide members to advance said rollers into coacting feeding relation with a sheet supported on said fingers.

7. A sheet separating and feeding device comprising, a downwardly opening U-shaped yoke adapted to straddle a stack of sheets to be separated, means counterbalancing said yoke and partially supporting the weight thereof, fixed guides engageable with the sides of said yoke to guide the same in vertical sliding motion, fingers projecting inwardly from the sides of said yoke and adapted to support the yoke from the top of said stack, said fingers having upwardly and outwardly inclined inner ends, jaws reciprocable from the sides of said yoke and engageable with the top sheet of the stack to shift said top sheet transversely of said yoke and successively upwardly over the inclined ends of said fingers, a pair of rolls carried at each side of said yoke and disposed above and below the level of the tops of said fingers to be on opposite sides of a sheet positioned on top of said fingers, means for rotating one roll of each pair, and means for moving one roll of each pair toward the other to press the edges of a sheet positioned over said fingers between each pair of rolls.

8. A sheet separating and feeding device comprising, a downwardly opening U-shaped yoke

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adapted to straddle a stack of sheets to be separated, fixed guides engageable with said yoke to guide the same in vertical sliding motion, fingers projecting inwardly from the sides of said yoke and adapted to support the yoke from the top of said stack, said fingers having upwardly and outwardly inclined inner ends, jaws reciprocable from the sides of said yoke and engageable with the top sheet of the stack to shift said top sheet transversely of said yoke and successively upwardly over the inclined ends of said fingers, a pair of rolls carried at each side of said yoke and disposed above and below the level of the tops of said fingers to be on opposite sides of a sheet positioned on top of said fingers, means for rotating one roll of each pair, and means for moving one roll of each pair toward the other to press the edges of a sheet positioned over said fingers between each pair of rolls.

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References Cited in the file of this patent
UNITED STATES PATENTS

Number	Name	Date
2,565,207	Demler	Aug. 21, 1951
2,621,806	Van Schie	Dec. 16, 1952