

COMBINE TYPES

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A number of new types of combines, incorporating different threshing and separating concepts, have recently been introduced. The purpose of this article is to explain differences in the principles of operation among the various types of combines.

PAMI has released evaluation reports on both conventional and new types of combines. Reports are available on the following conventional combines: International Harvester 914, John Deere 6601, John Deere Sidehill 6600, Belarus Niva SK-5, White 8650, Massey Ferguson 760, John Deere 7721 and Massey Ferguson 751. Reports are available on the following new types of combines: Sperry New Holland TR70, Western Roto Thresh and International Harvester 1460.

THE CONVENTIONAL COMBINE

FIGURE 1 illustrates the operating principles of a typical conventional grain combine. Crop is fed tangentially into a cross-mounted cylinder-concave assembly. Threshing occurs largely by impact of the cylinder bars on the incoming crop, while considerable separation occurs through the open grate

concave. Separation of the remaining grain from the straw is accomplished with straw walkers, while a cleaning shoe, with chaffer and sieve, is used for scalping and final cleaning.

NEW TYPES OF COMBINES

(a) Western Roto Thresh

Although this combine was marketed for only a few years, and is no longer in production, it is included in this review, because it used a different principle of grain-straw separation than either conventional combines or the newer axial type combines. The Western Roto-Thresh (FIGURE 2) used a conventional cylinder-concave assembly for threshing and initial separation. Final separation of grain from the straw was accomplished with a large diameter, slow speed, perforated separating drum. A conventional cleaning shoe, combined with an aspirator system was used for scalping and final cleaning.

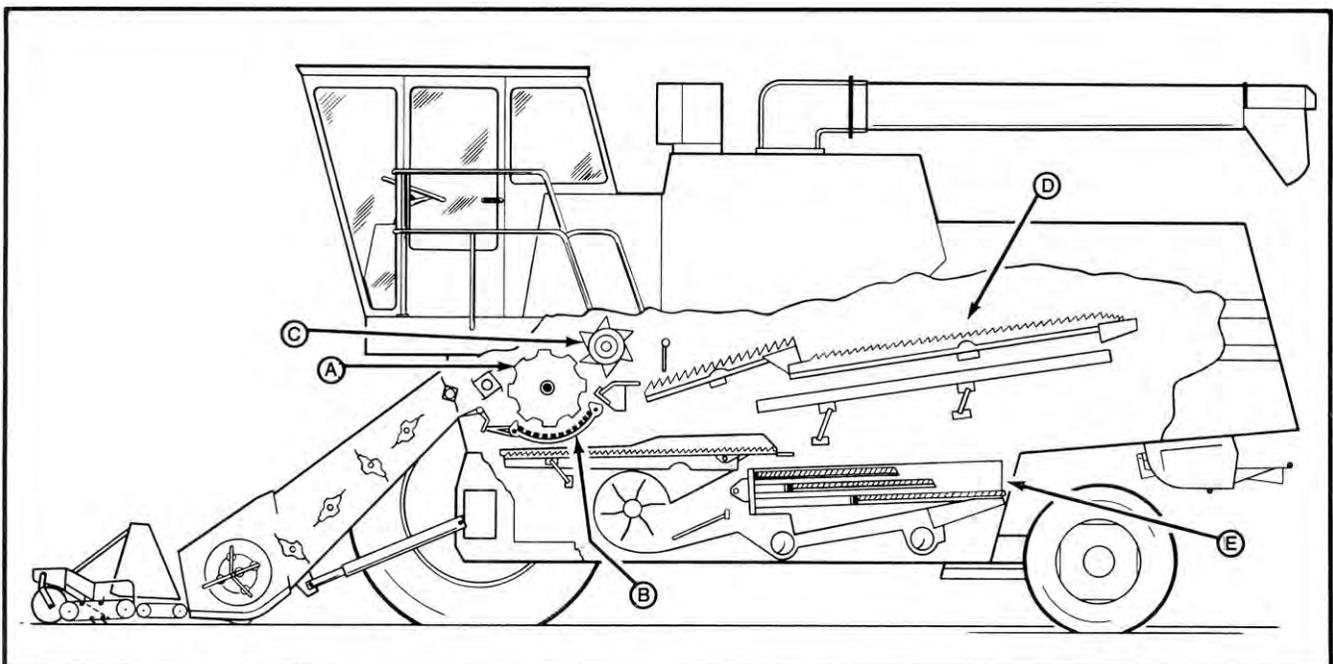


FIGURE 1. A typical conventional combine: (A) cylinder, (B) concave, (C) beater, (D) straw walkers, (E) shoe.

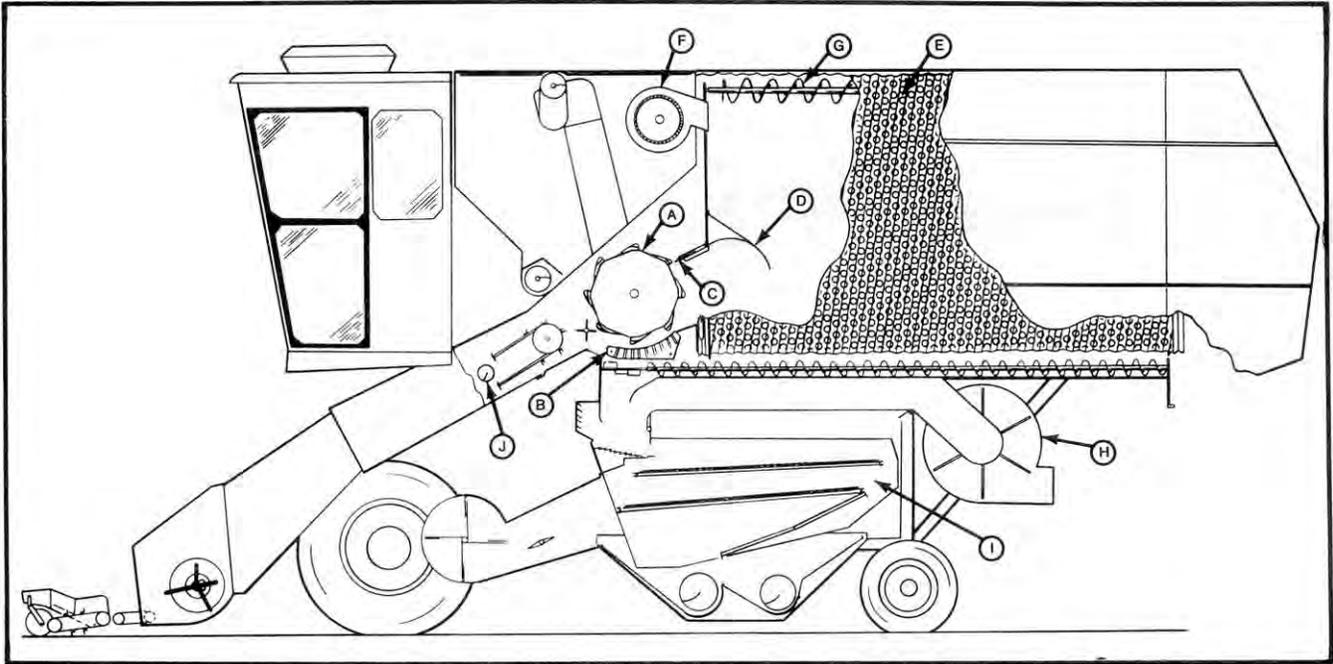


FIGURE 2. Western Roto Thresh: (A) cylinder, (S) concave, (C) stripper bar, (D) deflector, (E) separating drum, (F) separating drum fan, (G) stripper auger, (H) aspirator, (I) shoe, (J) tailings return.

(b) Sperry New Holland

Sperry New Holland (FIGURE 3) use two longitudinally-mounted, axial threshing and separating rotors. Threshing occurs in the threshing concaves at the front of the rotors, while separation of grain from straw is accomplished along the full

rotor length. A rear beater-grate assembly performs final separation. A conventional cleaning shoe is used for scalping and final cleaning. Several different sizes of this combine are currently being produced.

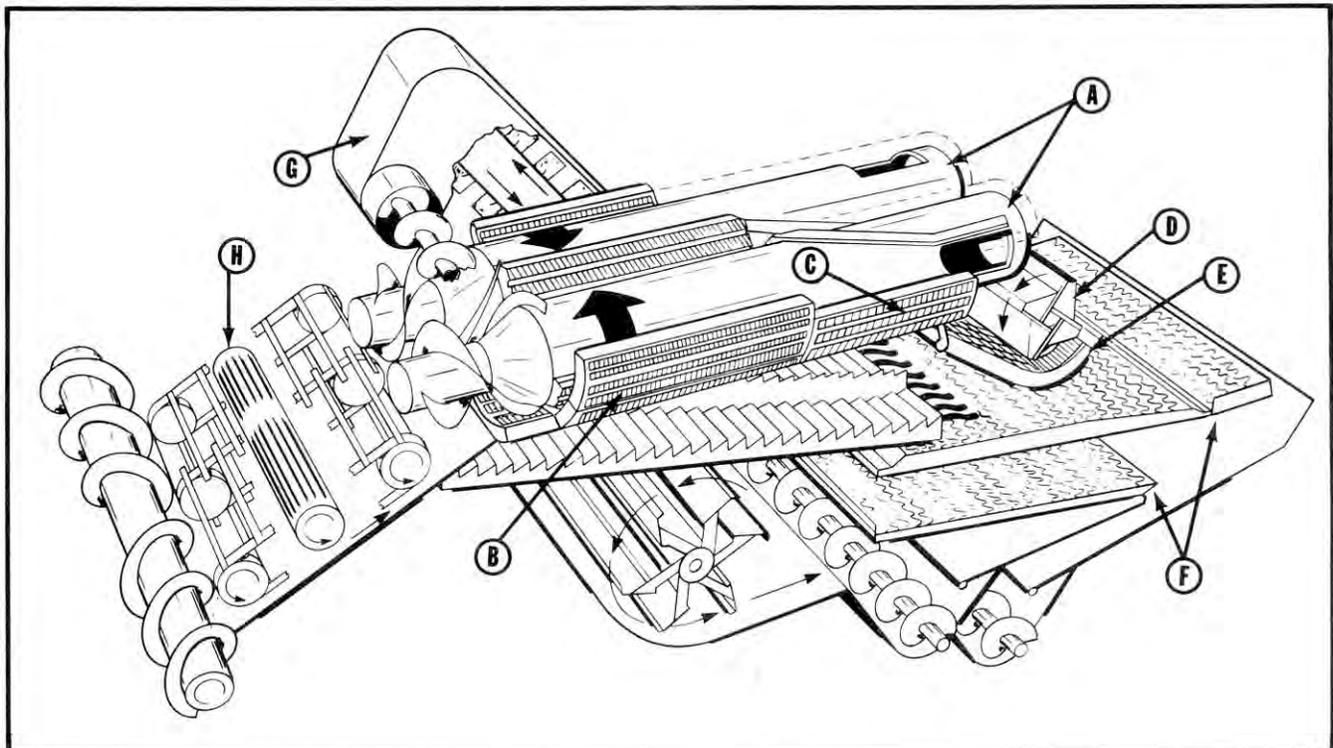


FIGURE 3. Sperry New Holland TR70: (A) rotors, (B) threshing concave, (C) separating concave, (D) back beater, (E) beater grate, (F) shoe, (G) tailings return, (H) stone ejection roller.

(c) International Harvester

International Harvester (FIGURE 4) use a single, longitudinally-mounted axial flow threshing and separating rotor. Threshing occurs at the front section of the rotor, while separation of the grain from straw is accomplished along the full rotor length in both the threshing and separation con-

caves. A rear beater aids in straw discharge. A conventional cleaning shoe is used for scalping and final cleaning. Several different sizes of this combine, including a pull-type version, are being produced.

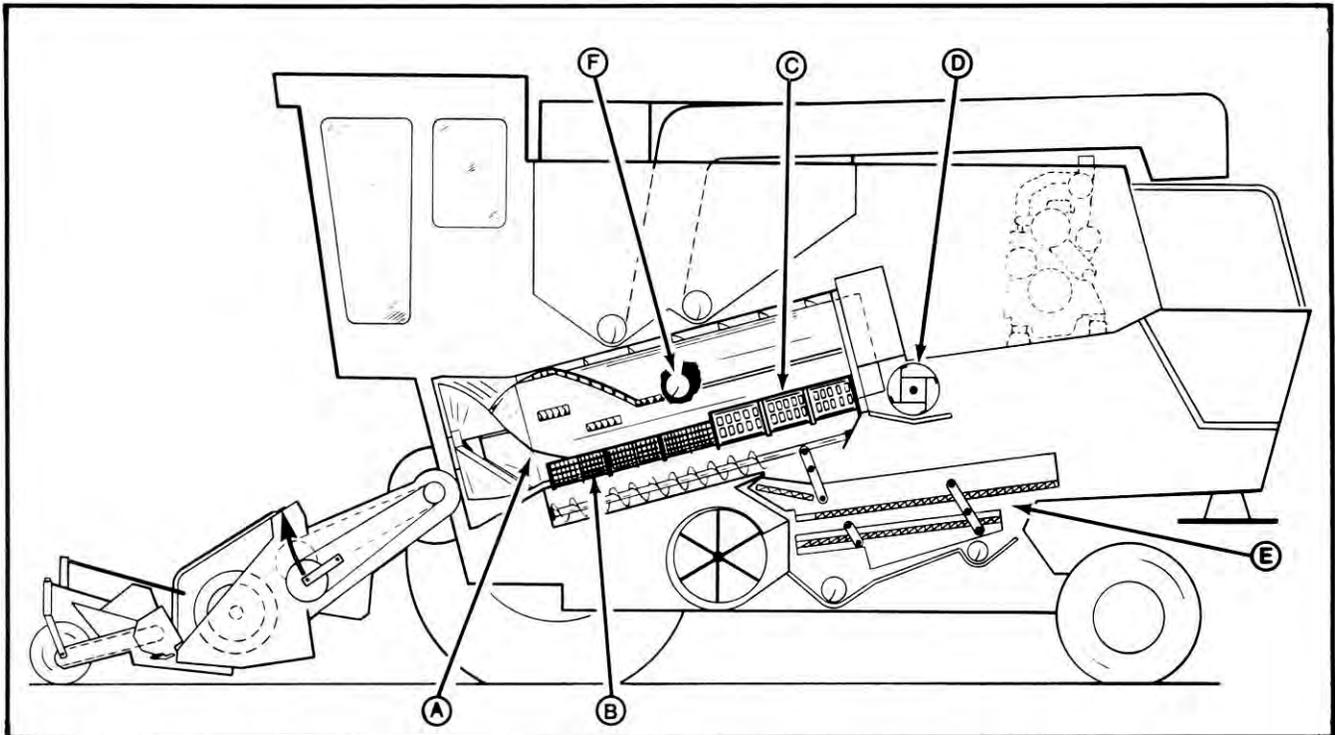


FIGURE 4. International Harvester 1460: (A) rotor, (B) threshing concaves, (C) separating concaves, (D) back beater, (E) shoe, (F) tailings return.

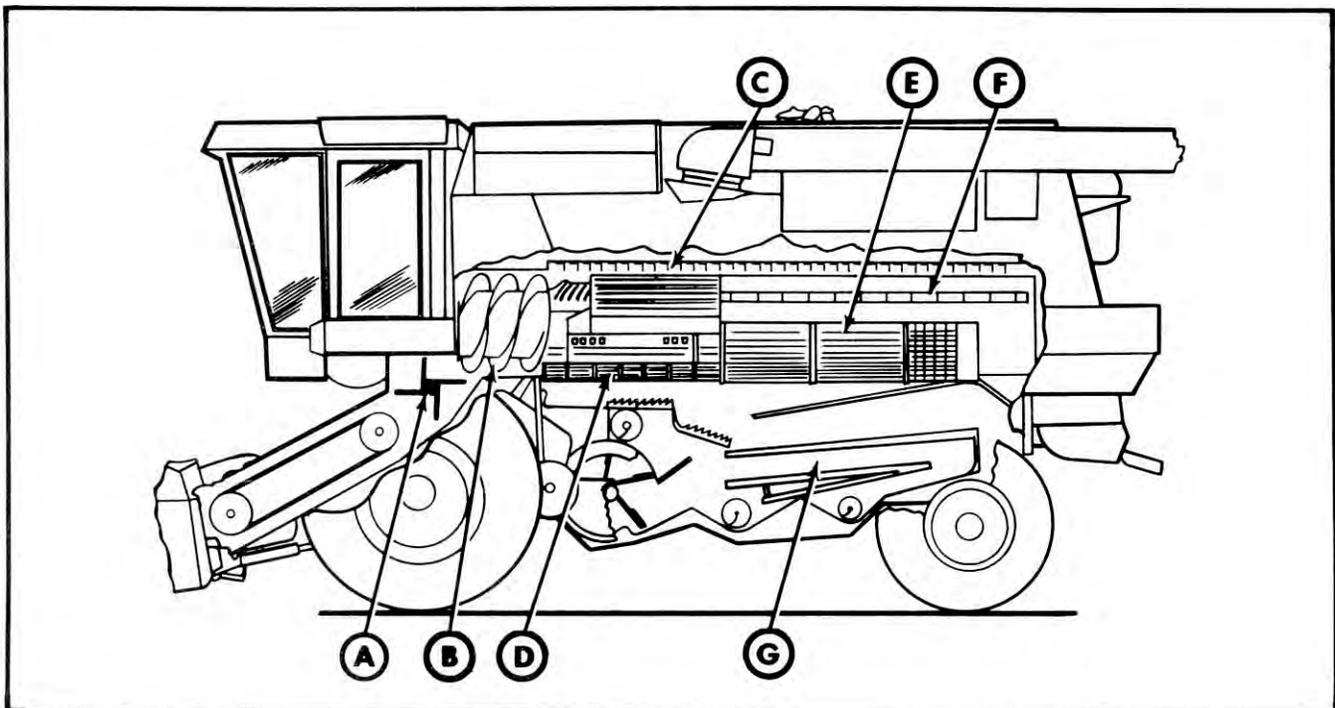


FIGURE 5. White 9700: (A) inlet beater, (B) rotor, (C) guide vanes, (D) threshing concave, (E) separating concave, (F) separator sweeps, (G) shoe.

(d) White

White (FIGURE 5) also use a single, longitudinally-mounted axial threshing and separating rotor. Threshing occurs at the front section of the rotor, while separation of grain from straw is accomplished along the full rotor length in both the threshing and separation concaves. A conventional cleaning shoe is used for scalping and final cleaning.

(e) Allis Chalmers

Allis Chalmers (FIGURE 6) use a different design than the previous three combines. The threshing and separating rotor (cylinder) is mounted crossways, with crop fed tangentially in-

to one end of the rotor. Threshing and separation occurs along the full length of the rotor as the crop spirals sideways along the rotor. A paddle and impeller assembly discharge the crop from the outlet end of the rotor. A conventional cleaning shoe, combined with accelerator rolls and a high velocity air blast, is used for scalping and final cleaning. Several sizes of this combine are available.

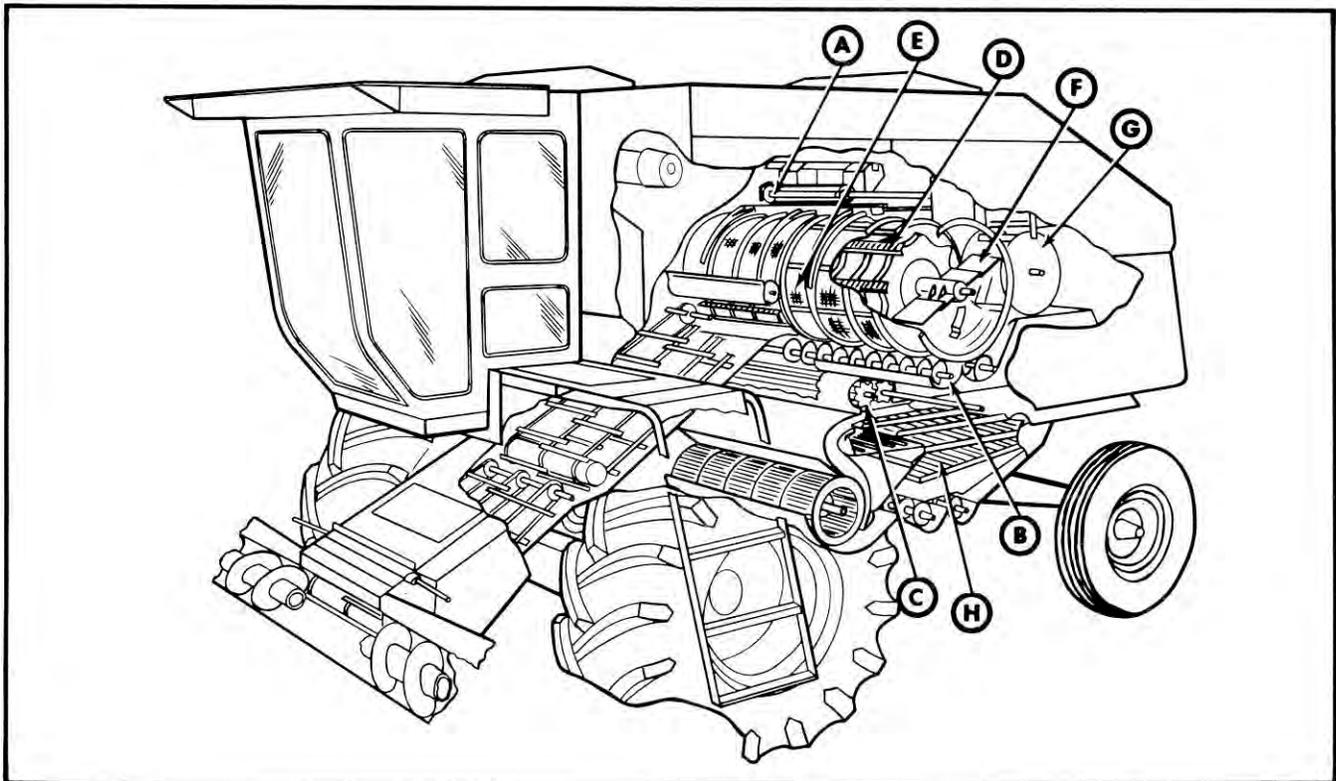


FIGURE 6. Allis Chalmers N6 Gleaner: (A) cage sweep, (B) distribution augers, (C) accelerator rolls, (D) rotor, (E) concave, (F) paddles, (G) impeller, (H) shoe.



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