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**Problem.** Let  $R$  be a commutative ring with identity. For the purposes of this problem, say that  $R$  is *special* provided  $R$  satisfies the following conditions:

- (1)  $R$  has at least two distinct proper, nonzero ideals, and
- (2) if  $I$  and  $J$  are distinct, proper, nonzero ideals of  $R$ , then  $I + J := \{i + j : i \in I, j \in J\} \notin \{I, J\}$ .

Find all special rings (up to isomorphism).